

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/31/06
Date: Sunday, December 31, 2006 12:29:06 PM
Attachments: [oledata.mso](#)
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[image004.gif](#)

ISS On-Orbit Status 12/31/06

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – **New Year's Eve...16 times for the Expedition 14 crew of CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams while counting down to 2007! Ahead: Week 15 of Increment 14.***



As is traditional for each year's end, the ISS crew conducted a live televised interactive New Year conference with Russian government & industry leaders and

top management personnel from RSA (Roskosmos), RSC-Energia and GCTC (Star City's Gagarin Cosmonaut Training Center) at TsUP-Moscow, via Ku-band/video and S-band/audio.

Afterwards, the crew downlinked video greetings and congratulations for the S.P. Korolev Centennial, to be replayed to the guests of the Moscow Gala Dinner on Korolev's 100th birthday on 1/12. [*“From the International Space Station, we would like to extend our greetings to all guests of this gathering, to citizens of Russia, and to the entire civilized world on this 100th Birthday of Sergey Pavlovich Korolev who laid a foundation to both Russian and International Cosmonautics! The name of this distinguished designer is closely linked to many illustrious pages of space exploration: the first satellites, the first human flight to space, manned spacecrafts, lunar and interplanetary stations, manned orbital stations, and crew rotation stations. Many years of operational experience with Salyut, Skylab, and Mir stations have proven that they can be very effectively used to enhance science, technology, and their ground applications. Space stations have become unique science outposts in space: large-scale international research centers in a natural space environment. Over the past years, Cosmonautics has become an important tool that allows us to learn more about the surrounding universe, to resolve local and global mankind issues, to demonstrate advances in science and technology by nations. It is not coincidental that almost all leading countries of the world participate in the ISS Project. We wish prosperity and abundance to all people on the planet, each household, each family! Let there be Peace and Tranquility on Earth!”*]

Misha Tyurin completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables, the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/ Moscow.

At ~3:15pm EST, Suni Williams is scheduled for her weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop),

The crew completed their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR), TVIS treadmill (FE-1, FE-2), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Weekly Science Update (*Expedition Fourteen -- 14th*)

ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS): ALTEINO

is functioning nominally.

ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System): Planned.

BASE: Complete.

BCAT-3 (Binary Colloidal Alloy Test-3): Planned.

CAR-2 (Investigating Mechanisms of Heart Disease in Micro-G, ESA): Complete.

CBOSS (Cellular Biotechnology Support Systems): Complete.

CFE (Capillary Flow Experiment): Complete.

CULT (Cultural Factors Questionnaire): Complete.

DAFT (Dust & Aerosol Measurement Feasibility Test): Complete.

Earth Knowledge Acquired by Middle School Students (EarthKAM): In progress.

ETD (Eye Tracking Device): Complete for Thomas Reiter.

GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology): Planned

IMMUNO (Saliva Sampling): Complete.

LEUKIN: Complete.

MISSE (Materials ISS Experiment): Ongoing.

MTR-2 (Russian radiation measurements): Passive dosimeters measurements in DC1 "Pirs". Removal of passive dosimeters from the MATRYOSHKA Phantom was performed on 12/07 and returned on STS-12A.1.

NOA (Nitric Oxide Analyzer): Complete.

Nutrition: Planned.

PK-3 (Plasma Crystal 3): In progress.

PMDIS (Perceptual Motor Deficits in Space): Sunita Williams has completed the

first PMDIS activity on orbit.

POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G): Complete.

RC (Refrigerated Centrifuge): Planned.

RS (Renal Stone): Planned (CDR only).

SAMPLE: Complete.

SEM (Space Experiment Module): Complete.

SLEEP: Planned.

SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite): In progress.

Swab (Characterization of Microorganisms & Allergens in Spacecraft): Planned.

TROPI (Study of Novel Sensory Mechanism in Root Phototropism): The third Tropi run activities were completed this week. The run was initiated on 12/23 and ran under automated control of the EMCS (European Modular Cultivation System) systems. Images were taken and downloaded at intervals throughout the week. On 12/27, EMCS detected a communications problem between its control computer and its subsystems and cut power to all subsystems. EMCS engineers were able to restart EMCS after diagnosis of the issue. The outage of 4.5 hours occurred at a time in planned experiment sequence that it is believed will result in relatively minor impact to the science. After resumption of nominal operations, the automated photo stimulation was initiated as planned, and data were collected on the EMCS tape recorder over a two day period. The CDR exchanged the EMCS video tapes on 4 occasions during this time. The experiment activities were completed by the EMCS EC (Experiment Container) replacement, Tropi sample removal and MELFI-TROPI insertion activities on 12/29. Tropi EMCS video tapes and Tropi frozen samples will be returned to the ground at some future opportunity.

YING (Yeast in No Gravity): Complete.

For CEO (Crew Earth Observations), investigators uplinked a long list of geographical coordinates of selected cities for orbital imagery during the next few days.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);
<http://earthobservatory.nasa.gov/>
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 11:40am EST [= epoch]*):

Mean altitude -- 340.2 km

Apogee height -- 356.1 km

Perigee height -- 324.2 km

Period -- 91.34 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0023751

Solar Beta Angle -- -35.7 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in last 24 hours -- 83 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46432

Significant Events Ahead (all dates Eastern and subject to change):

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch

01/20/07 -- Progress M-59/24P docking (DC1)

02/02/07 -- US EVA-6

02/06/07 -- US EVA-7

02/10/07 -- US EVA-8

02/19/07 -- US EVA-9 (Progress antenna removal)

03/16/07 -- STS-117/13A launch -- S3/S4 trusses

03/18/07 -- STS-117/13A docking

04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

05/11/07 -- Progress M-59/24P undocking (DC1) & reentry

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (DC1)

05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3

09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

A Happy New Year 2007 to Everyone!
And a Good Flight to our Crew!

С Н О В Ы М **2007** Г О Д О М

И С Ч А С Т Л И В О Г О П О Л Е Т А !

(from Grandfather Frost)

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/30/06
Date: Saturday, December 30, 2006 12:38:33 PM
Attachments:

ISS On-Orbit Status 12/30/06

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 14 crew CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams.*

Before breakfast, FE-2 Williams rounded out the NASA/JSC experiment NUTRITION with her blood sample collection, assisted by CDR Lopez-Alegria, which was deferred from last Thursday (12/28, erroneously reported here as done). *[The samples were first spun in the RC (Refrigerated Centrifuge) and then placed in MELFI (Minus-Eighty Laboratory Freezer for ISS). The RC was later powered off after a temperature reset to limit wear on the compressor, and cleaned.]*

The crew conducted the regular weekly three-hour task of thorough station cleaning, wearing protective garment. *["Uborka", normally done every Saturday, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with "Fungistat" disinfectant wipes; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of *uborka*, CDR and FE-2 conducted an inspection/cleaning of the Airlock cabin smoke detector (suspected of having an FOD/foreign object debris) stuck in it. Also, FE-1 Tyurin performed preventive maintenance/cleaning of Service Module (SM) SOTR ventilation systems on "Group B" ventilation fans, including a checkout of the ventilators and a thorough cleaning of fan screens and flexible air ducts.

Mike L-A completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

At ~8:30am EST, the crew had their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

Working off his voluntary "time permitting" task list, the FE-1 performed a session of the Russian "Diatomeya" ocean observations program, using the Nikon-F5 (85-mm lens) and Sony PD-150P video camera (medium zoom) to record high production zones and associated oceanic phenomena in the Pacific, Atlantic, and Indian Oceans. *[Uplinked target areas were Agulhas Plateau water area, Mozambique Channel, Hindustan peninsula coastal area, Peru Current area, Caribbean Sea and Sargasso Sea.]*

Also working from the task list, Misha used the Nikon D1X (SIGMA 300-800mm telephoto lens) to take aerial KPT-3 photography for Russia's Environmental Safety Agency (ECON) of contamination in the waters of the Gulf of Mexico and Atlantic Ocean. *[KPT-3 photography is a frequent earth observing experiment for ECON.]*

At ~5:30am, Tyurin conducted a private "NetMeeting" exchange "s Novym Godom" with the Cosmonaut Corps at Star City's Gagarin Cosmonaut Training Center (GCTC). Later, Misha also had his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

The crew conducted their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR), TVIS treadmill (CDR, FE-1, FE-2), RED (FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni copied her, L-A's and Misha's exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

For CEO (Crew Earth Observations), investigators uplinked a long list of geographical coordinates of selected cities for orbital imagery during the next few days.

Looking ahead on OGS Installation: Mike L-A's and Suni's main activities next week will center on the (partial) installation of the new OGS (Oxygen Generation System), a long, highly complicated procedure which will consume the better part of four days (1/2-1/5/07). The OGS is one of the three Regenerative ELCSS system racks slated to be installed in Node 3. However, some of this system's components

will already be installed in the Lab as it is as yet unproven/untested in a space environment and critical to support six-person ISS crew operations. Some of the required reconfigurations in the Lab will include installing new cables/hoses that will be integrated into existing Lab hardware, setting up new rack/standoff structures, performing a software upgrade, and converting a water vent into a hydrogen/nitrogen (H₂/N₂) vent.

For CEO (Crew Earth Observations), investigators have uplinked a long list of geographical coordinates of selected cities for orbital imagery during the next few days.

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ISS Orbit (*as of this morning, 11:19am EST [= epoch]*):

Mean altitude -- 340.3 km
Apogee height -- 356.3 km
Perigee height -- 324.3 km
Period -- 91.34 min.
Inclination (to Equator) -- 51.64 deg
Eccentricity -- 0.0023795
Solar Beta Angle -- -30.9 deg (magnitude increasing)
Orbits per 24-hr. day -- 15.76
Mean altitude loss in last 24 hours -- 93 m
Revolutions since FGB/Zarya launch (Nov. 98) -- 46416

Significant Events Ahead (all dates Eastern and subject to change):

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry
01/18/07 -- Progress M-59/24P launch
01/20/07 -- Progress M-59/24P docking (DC1)
02/02/07 -- US EVA-6
02/06/07 -- US EVA-7
02/10/07 -- US EVA-8
02/19/07 -- US EVA-9 (Progress antenna removal)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses
03/18/07 -- STS-117/13A docking
04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
05/11/07 -- Progress M-59/24P undocking (DC1) & reentry
05/12/07 -- Progress M-60/25P launch
05/14/07 -- Progress M-60/25P docking (DC1)
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

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To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/29/06
Date: Friday, December 29, 2006 2:17:33 PM
Attachments:

ISS On-Orbit Status 12/29/06

All ISS systems continue to function nominally, except those noted previously or below. *Today is Day 100 for Mike Lopez-Alegria and Mikhail Tyurin aboard the ISS: Soyuz TMA-9/13S docked at the Service Module (SM) aft port on 9/20, also carrying the first woman "space tourist", Anousheh Ansari).*

Before breakfast, FE-2 Williams concluded her first session with the NASA/JSC experiment NUTRITION, finishing the required 24-hour data collection by securing the last urine specimen for immediate placement in the MELFI (Minus-Eighty Laboratory Freezer for ISS) freezer. The equipment was then disassembled and stowed.

CDR Lopez-Alegria serviced the EMCS (European Modular Cultivation System), changing out the tape in the video recorder located in the ISIS (International Subrack Interface Standard) drawer with a blank tape. Later, the CDR closed the manual gas valves of the EMCS. *[EMCS, delivered on ULF1.1, is a combination centrifuge/growth chamber that allows plant growth experiments to be carried out in controlled partial and microgravity conditions.]*

Afterwards, the CDR terminated the ongoing TROPI (Analysis of a Novel Sensory Mechanism in Root Phototropism) experiment, securing the seed samples in cold stowage bags in the MELFI and returning the MWA (Maintenance Work Area) to its configuration prior to payload use, with the ELC3 (EXPRESS Rack 3 laptop computer) powered down. The removed TROPI ECs (Experiment Containers) were replaced with EMCS Reference ECs. *[Main research focus for EMCS is on multi-generation (seed-to-seed) experiments, studies on gravity effects on early development and growth, and on signal perception and transduction in plant tropisms. Experiments with insects, amphibian and invertebrates as well as studies with cell and tissue cultures are also foreseen for EMCS. By sprouting seeds under different levels of partial gravity, and different frequencies of light, this experiment should help to better understand the different systems used by plants to determine*

in what direction their roots and shoots should grow. In the NASA-sponsored TROPI study, Arabidopsis thaliana plants (or thale cress, with a small-sized genome which makes it useful for genetic mapping and sequencing) sprouted from seeds will be video taped and mature plants will be harvested. The ESA-sponsored adjunct experiment GRAVI (Threshold Acceleration for Gravisensing) experiment will grow lentil seedling roots under various gravity conditions. Later, the mature plants will be analyzed at the molecular level to determine what genes are responsible for successful plant growth in microgravity. Insights gained from TROPI can lead to sustainable onboard agriculture for future long duration space missions.]

For FE-1 Tyurin, today was the day for downlinking the video footage of his EVA-17 GOLF Demo experiment of 11/22, using the Glisser-M video equipment to replay the tape for the ground. *[During the GOLF promo/demo, Misha was able to hit one of the 3-gram balls, after which the ground terminated the activity due to lack of time. The golf ball's trajectory, long since decayed, stayed well away from the ISS (although it was sliced in an unintended direction).]*

As part of regular Russian Segment fire alarm maintenance, Tyurin had four hours set aside for working in the FGB to dismantle nine IDZ-2 smoke detector for cleaning their needles, then reinstalling the devices and turning the temporarily disabled Message Acquisition System (ACC) back on. *[The tenth FGB smoke detector, #8, has failed and is deactivated.]*

Mike L-A and Sunita had another ~8:20 hours reserved between the two of them for Shuttle STS-116 cargo unpacking and stowage.

The regular maintenance reboot on the OCA Comm Router SSC (Station Support Computer) laptop was today performed by the FE-1.

Williams conducted her second periodic atmospheric status check for ppO₂ (Partial Pressure Oxygen) and ppCO₂ (pp Carbon Dioxide), using the CSA-O₂ (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO₂ Monitoring Kit). Batteries were to be replaced if necessary. *[CSA-CP measurements were gathered with the new 12A.1 units #1044 & #1051 for recording O₂, CO, HCN and HCl readings in the Lab, with the CSA-O₂ units #1041 & #1048 for O₂ in the Lab, and with the CDMK #1009 for CO₂ in SM and Lab. The instruments were turned off afterwards, and returned to their regular locations.]*

Tyurin performed repair work on the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system by removing its failed "zero" sensor plus the associated tape cassette and replacing it with a dummy insert, then taking test

readings (with the second zero-sensor properly in place). *[GANK tests for Methane (CH₄), Ammonia (NH₃), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO₂), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

L-A conducted the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

Misha completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Suni did the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The crew conducted their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR, FE-2), TVIS treadmill (CDR, FE-1), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni copied her, L-A's and Misha's exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Williams again had one hour set aside on today's schedule for ISS familiarization and adaptation, to help in adjusting to her new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

At ~2:30am EST, Tyurin linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing transfer details and stowage locations. *[Today's issues included IMS information on recently replaced DC-1 and FGB dust filters and dust collectors, updated data on SLG (Personal Hygiene Items), etc.]*

At ~3:30am EST, the crew held the regular (nominally weekly) tagup with the

Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

Looking ahead on OGS Installation: Mike L-A's and Suni's main activities next week will center on the (partial) installation of the new OGS (Oxygen Generation System), a long, highly complicated procedure that will consume the better part of four days (1/2-1/5/07). The OGS is one of the three Regenerative ELCSS system racks slated to be installed in Node 3. However, some OGS components will already be installed in the Lab as this system is as yet unproven/untested in a space environment and critical to support six-person ISS crew operations. Some of the required reconfigurations in the Lab will include installing new cables/hoses that will be integrated into existing Lab hardware, setting up new rack/standoff structures, performing a software upgrade, and converting a water vent into a hydrogen/nitrogen (H₂/N₂) vent.

SARJ/TRRJ Update: The patch uplinks of the new SARJ (Solar Alpha Rotary Joint)-type toothcrash-prevention software for the S1 and P1 TRRJ (Thermal Radiator Rotary Joints) have been completed and checked out successfully yesterday in a functionality test. The TRRJ, held in Directed Position in the meantime, can now be set to "autotracking" by ground command next Tuesday (1/2).

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ISS Orbit (*as of this morning, 3:26am EST [= epoch]*):

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Perigee height -- 324.4 km

Period -- 91.34 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0023769

Solar Beta Angle -- -26.0 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in last 24 hours -- 40 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46395

Significant Events Ahead (all dates Eastern and subject to change):

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- 02/02/07 -- US EVA-6
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To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
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Subject: ISS On-Orbit Status 12/28/06
Date: Thursday, December 28, 2006 1:26:16 PM
Attachments:

ISS On-Orbit Status 12/28/06

All ISS systems continue to function nominally, except those noted previously or below.

Before breakfast, FE-2 Sunita Williams began her first day with the NASA/JSC experiment NUTRITION, for which she had to forego exercising and food intake for eight hours. *[Suni started the session by collecting blood samples (assisted by CDR Lopez-Alegria), which were first spun in the RC (Refrigerated Centrifuge) and then placed in MELFI (Minus-Eighty Laboratory Freezer for ISS). The RC was later powered off after a temperature reset to limit wear on the compressor, and cleaned. Williams also started the required 24-hour data collection by securing urine specimen during the day, also stored immediately in MELFI. The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing inflight samples and an additional postflight sample. Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

FE-1 Mikhail Tyurin worked on the ASN Satellite Navigation System, building a new radio cable configuration by combining two cables with a soldering iron and performing a continuity check on it with the "Elektronika" Multimeter (MMTs-01)

instrument. *[Tyurin also was to conduct a search for a missing data cable not found during his ASN-M cable checkout on 12/22. ASN-M will be required for the arrival of the European ATV (Automated Transfer Vehicle) “Jules Verne” next year.]*

The CDR serviced the EMCS (European Modular Cultivation System) by changing out the tape in the video recorder located in the ISIS (International Subrack Interface Standard) drawer with a blank tape. *[EMCS, delivered on ULF1.1, is a combination centrifuge/growth chamber that allows plant growth experiments to be carried out in controlled partial and microgravity conditions.]*

Afterwards, Lopez-Alegria set up and configured the EMCS MWA (Maintenance Work Area) in preparation for tomorrow’s TROPI (Study of Novel Sensory Mechanism in Root Phototropism) payload operations. *[By sprouting seeds under different levels of partial gravity, and different frequencies of light, the TROPI experiment should help to better understand the different systems used by plants to determine in what direction their roots and shoots should grow. In this NASA-sponsored study, Arabidopsis thaliana plants (or thale cress, with a small-sized genome which makes it useful for genetic mapping and sequencing) sprouted from seeds is being video taped and mature plants are harvested. Later, the mature plants will be analyzed at the molecular level to determine what genes are responsible for successful plant growth in microgravity. Insights gained from TROPI can lead to sustainable onboard agriculture for future long duration space missions.]*

Mike L-A and Sunita Williams completed another filling out of the regular weekly FFQ (Food Frequency Questionnaire) on the MEC (Medical Equipment Computer), his thirteenth and Suni’s second, which keeps a personalized log of their nutritional intake over time on special MEC software. *[The FFQ, updated with the new food brought up on 12A.1, records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins. IBMP/Moscow (Institute of Biomedical Problems, Russian: IMBP – Institute of Medico-Biological Problems) recommended average daily caloric value of the crew’s food intake is 2200-2300 cal. If larger quantities of juices and fruits are taken into account, the value can go to 2400-2500 cal.]*

Williams and Lopez-Alegria also performed the periodic on-orbit hearing assessment (O-OHA) test, a 30-min. NASA environmental health systems examination to assess the efficacy of acoustic countermeasures, using a special MEC laptop application. It was L-A’s third and Suni’s first session. *[The O-OHA audiography test involves minimum audibility measurements for each ear over a wide range of frequencies (0.25-10 kHz) and sound pressure levels, with the crewmembers using individual-specific Prophonics earphones, Bose ANC headsets and the SLM (sound level meter). To conduct the testing, the experimenter is*

supported by special EarQ software on the MEC, featuring an up/down-arrow-operated slider for each test frequency that the crewmember moves to the lowest sound pressure level at which the tone can still be heard. The baseline test is required not later than about Flight Day 14 for each new Expedition and is then generally performed once per month.]

Misha worked with L-A on the fire warning system in the Service Module (SM), removing and replacing all ten smoke detectors (SIGNAL-VM DS-7A), which are expired. Needle cleaning of nine IDZ-2 smoke detectors in the FGB is scheduled for Misha tomorrow. *[DS-7A #9 had annunciated a false alarm last Saturday, probably caused by dust stirred up by the crew's "uborka" housecleaning activities.]*

The FE-1 completed the second-day activity with the Russian MO-21 experiment, inspecting and assessing bacteria colonies grown on "Medium #1" Petri dishes since 12/26. Another sample assessment, on "Medium #2", is scheduled for next week. *[The equipment, which includes an air sampler set, a charger, power supply unit, and incubation tray for Petri dishes, determines microbial contamination of the ISS atmosphere, specifically the total bacterial and fungal microflora counts and microflora composition according to morphologic criteria of microorganism colonies.]*

As standard documentation for each Increment, L-A performed POSSUM (Payload On-orbit Still Shots for Utilization and Maintenance) digital photography of all Lab payload racks that have undergone recent changes. *[POSSUM is a regular payload photo activity that obtains formal electronic still shots of any subrack and locker payload that is moved or reconfigured.]*

Suni completed the weekly audit/inventory of the available CWCs (Contingency Water Containers) and their contents, to keep track of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week.]*

L-A performed the periodic on-orbit load calibration of the SchRED (Schwinn Resistive Exercise Device) Flexpack canisters (about every 2 months and after cord replacement). *[The calibration of the cans re-establishes the relationship of specific load settings with a specific number of pulls per setting, followed by recording of the load values measured with a calibration tool and steel handles from the on-orbit calibration kit. The calibration allows ground specialists to update exercise protocols and keeps track of hardware status.]*

The FE-2 conducted the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally*

introduced on the space station Mir.]

Working from the Russian discretionary “time permitting” task list for today, Misha Tyurin was to continue preparations for Progress M-57/22P undocking (1/17/07) by dismantling and moving aside the SOTR thermal airduct & fan/heater assembly from between the DC-1 and Progress hatches. *[The ventilation unit remains active, connected to its power outlet (RBS-20).]*

L-A completed today’s routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Suni did the daily updating/editing of the standard IMS (Inventory Management System) “delta” file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The crew conducted their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR), TVIS treadmill (FE-1, FE-2), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, the FE-2 copied her, L-A’s and Misha’s exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Suni again had one hour set aside on today’s schedule for ISS familiarization and adaptation, to help in adjusting to her new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

Just before lunchtime, at ~7:15am EST, the crew conducted the traditional live televised New Year’s press conference with Russian news media assembled at TsUP-Moscow. *[Media included news agencies like Interfax, RIA Novosti, ITREA-TASS and Associated Press, and TV companies, e.g., Channel One, RTR (Vesti), NTV, Russia Today, etc.]*

Current ECLSS Status Update:

- Elektron O₂ Generator: Running nominally in 32 amps mode;
- Vozdukh (Carbon Dioxide Scrubber): Running nominally;
- CDRA (Carbon Dioxide Removal Assembly): On Standby (nominal);

- MCA (Major Constituents Analyzer): Operating nominally;
- SKV-1, SKV-2 air conditioners: Off (nominal).

For CEO (Crew Earth Observations), investigators have uplinked a long list of geographical coordinates of selected cities for orbital imagery during the next few days.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 3:04am EST [= epoch]*):

Mean altitude -- 340.4 km

Apogee height -- 356.3 km

Perigee height -- 324.6 km

Period -- 91.34 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0023623

Solar Beta Angle -- -21.3 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in last 24 hours -- 90 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46379

Significant Events Ahead (all dates Eastern and subject to change):

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch

01/20/07 -- Progress M-59/24P docking (DC1)

02/02/07 -- US EVA-6

02/06/07 -- US EVA-7

02/10/07 -- US EVA-8

02/19/07 -- US EVA-9 (Progress antenna removal)

03/16/07 -- STS-117/13A launch -- S3/S4 trusses

03/18/07 -- STS-117/13A docking

04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

05/11/07 -- Progress M-59/24P undocking (DC1) & reentry

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (DC1)
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/27/06
Date: Wednesday, December 27, 2006 2:02:45 PM
Attachments:

ISS On-Orbit Status 12/27/06

All ISS systems continue to function nominally, except those noted previously or below.

Before breakfast, CDR Lopez-Alegria performed the 24-hr. data registration of the acoustic dosimeters (body-worn and one static) deployed yesterday. Readings will again be taken this afternoon, after which L-A will deactivate and stow the dosimeters at ~1:40pm EST. *[Before turning the dosimeters back on again, their batteries were changed out. The dosimeters were then statically deployed for approximately 12 hrs in specified locations.]*

FE-1 Tyurin serviced the Russian BMP Harmful Impurities Removal System, starting the "bake-out" cycle to vacuum on absorbent bed #2 of the regenerable dual-channel filtration system. The bake-out will be terminated this afternoon before sleep time (~2:15pm EDT). Bed #1 was regenerated on 12/24. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

The FE-1 worked a 3.5-hr IMF (In-Flight Maintenance) task on the Russian thermal control system's heating loop #2 (SOTR KOB-2), installing a Progress 23-delivered clamp on the hydraulic (manual pump) assembly (4GB3). Afterwards, Tyurin completed the installation of the new replaceable pump panel 4SPN2 that Reiter had to put on hold on 8/22 due to failure of the 4GB3. The work was supported by ground specialist tagup at ~9:30am. *[Each of the two SOTR KOB loops has two redundant pump panels with two redundant pumps each. While in the early years of Mir and ISS the pumps were integral to the SPN panels, the current design allows them to be replaced without requiring an entire new SPN block.]*

Lopez-Alegria and FE-2 Williams spent several hours in the US Airlock, stowing EVA tools from 12A.1 and inventorying/preparing EVA equipment and tools for the EVA-6/-7-8 spacewalks in February.

Sunita Williams unstowed and set up the blood and urine collection hardware for her first HRF (Human Research Facility) NUTRITION session tomorrow, after discussing experiment activities and the RC (Refrigerated Centrifuge) troubleshooting, which has become necessary, with a ground specialist in a teleconference at ~12:30pm. *[The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts, collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing inflight samples and an additional postflight sample. Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI/Minus Eighty Degree Celsius Laboratory Freezer for ISS), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

Mike L-A serviced the EMCS (European Modular Cultivation System) by changing out the tape in the video recorder located in the ISIS (International Subrack Interface Standard) drawer with a blank tape. *[EMCS, delivered on ULF1.1, is a combination centrifuge/growth chamber that allows plant growth experiments to be carried out in controlled partial and microgravity conditions.]*

Mikhail Tyurin performed a 1.5-hr. inventory audit of 45 Russian medical kits and items located in the Service Module (SM) medical cabinet. Purpose: to verify their availability, condition and stowage locations, and to weed out a number of discarded kits.

The CDR performed the combined weekly and monthly maintenance of the TVIS treadmill, consisting of an inspection for damage of the Russian and U.S. tie-down harnesses (straps & buckles), the associated SBS (Series Bungee System) as well as the condition of the SLDs (Subject Loading Devices), SLD cables and SPDs (Subject Positioning Devices), lubricating as required, plus recording time & date values

The crew conducted their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (FE-2),

TVIS treadmill (FE-1, CDR), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni copied her, L-A's and Misha's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

L-A completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables and today also the periodic checkout/verification of IP-1 airflow sensors in the various Russian segment (RS) hatch openings (8) in the SM, FGB and DC1.

In addition, L-A completed the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Suni again had one hour set aside on today's schedule for ISS familiarization and adaptation, to help in adjusting to their new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

At ~7:15am EST, Lopez-Alegria set up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, power supply) and at 7:20am conducted a ham session with students at the Kashiwahara Community Center in the city of Sayama, Japan, about 30 km from Tokyo. *["Did the subject you studied at Elementary School reflect your work now?"; "Is your DVD player and TV the same as on Earth?"; "What do you do for fun in the space station?"]*

At 10:40am, the crew downlinked a number of scripted audio/video messages of general ISS greetings on S-band & Ku-band. *[One downlink was a generic welcome message from the Expedition 14 crew for use at NASA Visitors Centers around the U.S., invaluable to PAO and to the educational/public outreach programs at all NASA Centers, the others to be used as promo "teases" on NASA TV and the nasa.gov website.]*

After the completion of propellant transfers from Progress M-57/22P's KDU refueling system to the SM tanks (sections 1 & 2), the usual purging/venting of the fuel (UDMH) and oxidizer (NTO) manifolds and lines was initiated this morning (~8:25am) by time-tag commands on the SPP automatic daily sequencer system.

[To control/hold attitude during the purging with Russian thrusters, attitude control of the station was handed over to the Russian MCS (motion control system) at 8:20am and returned to US momentum management at 10:40.]

For CEO (Crew Earth Observations), investigators have uplinked a long list of geographical coordinates of selected cities for orbital imagery during the next few days.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);
<http://earthobservatory.nasa.gov/>
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 4:16am EST [= epoch]*):

Mean altitude -- 340.5 km

Apogee height -- 356.6 km

Perigee height -- 324.5 km

Period -- 91.34 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0023883

Solar Beta Angle -- -16.6 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in last 24 hours -- 100 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46364

Significant Events Ahead (all dates Eastern and subject to change):

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch

01/20/07 -- Progress M-59/24P docking (DC1)

02/02/07 -- US EVA-6

02/06/07 -- US EVA-7

02/10/07 -- US EVA-8

02/19/07 -- US EVA-9 (Progress antenna removal)

03/16/07 -- STS-117/13A launch -- S3/S4 trusses

03/18/07 -- STS-117/13A docking

04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

05/11/07 -- Progress M-59/24P undocking (DC1) & reentry

05/12/07 -- Progress M-60/25P launch
05/14/07 -- Progress M-60/25P docking (DC1)
05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/26/06
Date: Tuesday, December 26, 2006 2:04:05 PM
Attachments:

ISS On-Orbit Status 12/26/06

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 14 of Increment 14.*

Before breakfast, CDR Lopez-Alegria, FE-1 Tyurin and FE-2 Williams performed the Russian biomedical routine assessments of Calf Volume Measurement (PZEh-MO-7) and Body Mass Measurement (PZEh-MO-8), first time for Suni, seventh time for L-A and Misha, using the IM mass measurement device, later breaking it down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference points, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G, where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

Also before breakfast, the CDR began Part 1 (of 5) of the periodic acoustic measurement protocol by deploying crew-worn acoustic dosimeters, to be carried for 24 hours (with a microphone on the shirt collar). (Last time done: 10/3/06). *[Tonight, after about 15 hours of measurements, dosimeter data will be recorded and the hardware power-cycled, for another data take tomorrow morning after 8.5-hr. sleep. At that point, the crew will deploy the dosimeters statically in the station for the duration of the day, record measurements tomorrow night and stow the instruments. Acoustic data must be taken twice per Increment, each time for the duration of the 16-hour crew workday.]*

As part of regular monthly fitness evaluation, Mikhail Tyurin undertook his second session of the Russian MO-5 MedOps protocol of cardiovascular evaluation in the

below-the-waist reduced-pressure device (ODNT, US: LBNP) on the VELO ergometer, assisted by Lopez-Alegria as CMO (Crew Medical Officer). *[The assessment, supported by ground specialist tagup (VHF) and telemetry monitoring (today on Daily Orbit 15, 10:09am EST), uses the Gamma-1 ECG equipment with biomed harness, skin electrodes and a blood pressure and rheoplethysmograph cuff wired to the cycle ergometer's instrumentation panels. The Chibis ODNT provides gravity-simulating stress to the body's cardiovascular/circulatory system for evaluation of Tyurin's orthostatic tolerance (e.g., the Gauer-Henry reflex) after 14 weeks in zero-G.]*

Later, Tyurin used the ECOSFERA equipment, set up yesterday, to conduct microbial air sampling runs for the MedOps SZM-MO-21 experiment, with the POTOX Air Purification System temporarily powered down, complemented by MedOps SZM-MO-22 sanitary-epidemiological incubation status checks, taking samples from cabin surfaces along with samples from crewmembers for sanitation and disease studies. *[The equipment, consisting of an air sampler set, a charger, power supply unit, and incubation tray for Petri dishes, determines microbial contamination of the ISS atmosphere, specifically the total bacterial and fungal microflora counts and microflora composition according to morphologic criteria of microorganism colonies.]*

The FE-1 also to set up and charged the batteries of the Russian "Glisser-M" videocam system, afterwards terminating the process and tearing the set-up down.

FE-2 Williams performed the monthly PEP (Portable Emergency Provisions) safety inspection, her first. *[The IMS (Inventory Management System)-supported inspection involves verification that PFEs (Portable Fire Extinguishers), PBAs (Portable Breathing Apparatus), QDMAs (Quick-Don Mask Assemblies) and EHTKs (Extension Hose/Tee Kits) are free of damage to ensure their functionality, and to track shelf life/life cycles on the hardware. In the U.S. segment (USOS), there are a total of 5 PFEs and 7 PBAs, plus 7 QDMAs and 4 EHTKs. In the Node, Williams made sure that no more than three PBA bottles are stowed in the locker, to reduce the risk of getting too much oxygen concentration inside the stowage area in case of bottle leakage.]*

Sunita Williams also updated the three SODF (Station Operations Data File) Warning Books from Lab, SM (Service Module) and FGB, printing out new procedures for the 12A.1 Stage and then replacing pages in the books as per detailed uplinked instructions.

Between the two of them, Mike L-A and Suni had another ~7 hours reserved for Shuttle STS-116 cargo unpacking and stowage.

Mikhail Tyurin worked on the ESA/RSC-Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS), ascertaining the size of the recorded data on the ACT spectrometer's PCMCIA memory card by removing it and inserting it into the RSE1 laptop for "reading", then changing it out with a new card. *[ALTCRISS uses the ACT spectrometer employed by VC8 guest cosmonaut Roberto Vittori last year in the DC1 for the Italian LAZIO (Low Altitude Zone/ Ionization Observatory) experiment.]*

Afterwards, Misha unstowed the REFLOTRON-4 hardware and subjected it to a function/health check, in preparation for another round of medical checkup sessions coming up. The task involved taking photography of the measuring chamber and its cover, for subsequent downlinking of the images for ground inspection. *[Reflotron-4 is a sophisticated clinical analyzer used for periodic biochemical blood and saliva analysis to monitor crew health or to be used diagnostically on Flight Surgeon request. Built in earlier versions originally by Boehringer in Mannheim/Germany for the Mir program, the Reflotron-4 consists of the analyzer itself, which has a mass of 13-lbs. and uses 40W power, a set of measuring strips and a small equipment kit.]*

Misha also gathered and readied equipment and tools to be used by him tomorrow in an IFM (Inflight Maintenance) on the RS SOTR (Russian Segment Internal Thermal System), for installing a Progress 23-delivered clamp on the hydraulic (manual pump) assembly of KOB2 (Thermal Loop 2).

As all new station crews, Suni had one hour set aside on today's schedule for ISS familiarization and adaptation, to help in adjusting to their new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

Tyurin completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables.

The FE-1 was also charged with the daily updating/editing of the standard IMS (Inventory Management System) "delta" file, tracking equipment items and stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The crew conducted their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR), TVIS treadmill (FE-1, FE-2), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni copied her, L-A's and Misha's exercise data files to the MEC

(Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~8:16am EST, on DO2, TsUP/Moscow undertook the usual propellant transfer from Progress M-57/22P's KDU refueling system to section 2 of the SM fuel and oxidizer tanks. No crew action was required. Afterwards, the transfer system was reconfigured to connect 22P to the first prop section, to be used tomorrow.

For CEO (Crew Earth Observations), investigators have uplinked a long list of geographical coordinates of selected cities for orbital imagery during the next few days.

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<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 11:25am EST [= epoch]*):

Mean altitude -- 340.6 km

Apogee height -- 356.5 km

Perigee height -- 324.7 km

Period -- 91.35 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0023672

Solar Beta Angle -- -11.9 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in last 24 hours -- 110 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46353

Significant Events Ahead (all dates Eastern and subject to change):

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch

01/20/07 -- Progress M-59/24P docking (DC1)

02/02/07 -- US EVA-6

02/06/07 -- US EVA-7

02/10/07 -- US EVA-8

02/19/07 -- US EVA-9 (Progress antenna removal)

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05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/25/06
Date: Monday, December 25, 2006 1:45:33 PM
Attachments: [image002.gif](#)

ISS On-Orbit Status 12/25/06

All ISS systems continue to function nominally, except those noted previously or below. *Ahead: Week 14 of Increment 14.*

Merry Christmas!!! *(see ISS downlink below – you've gotta see this!)*

FE-1 Tyurin worked on the Elektron-VM O₂ (oxygen) generator, powering it up after checking the hydraulic pressure in the H₂ (hydrogen) dump line and conducting a health check on the BZh-9 Liquid Unit micropumps, operating valves to remove any gas bubbles from micro pump cavities that could trip a safety shutdown. *[Elektron was deactivated on 12/10 before Shuttle arrival, and O₂ was since supplied from STS-116 and Progress storage tanks.]*

CDR Lopez-Alegria performed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables.

FE-2 Williams conducted the routine inspection of the running ALTEA (Anomalous Long-Term Effects on Astronauts) equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[ALTEA uses six particle detectors originally introduced on the space station Mir.]*

Suni also did the standard checkup of the CGBA-4 (Commercial Generic Bioprocessing Apparatus #4) payload, newly set up by her on 12/15. *[CGBA comprises two educational experiments to be utilized by middle school students. One experiment will examine seed germination in micro-G including gravitropism (plant growth towards gravity) and phototropism (plant growth towards light). The second experiment investigates how micro-G affects the model organism Caenorhabditis elegans, a small nematode worm.]*

In preparation for an upcoming microbial air sampling session in the cabin, Misha Tyurin unstowed the MedOps SZM-MO-21 ECOSFERA equipment, activated the Ecosphere system and initiated charging on its power pack (BP). *[The equipment, consisting of an air sampler set, a charger, power supply unit, and incubation tray for Petri dishes, determines microbial contamination of the ISS atmosphere, specifically the total bacterial and fungal microflora counts and microflora composition according to morphologic criteria of microorganism colonies.]*

The crew conducted their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR, FE-2), TVIS treadmill (CDR, FE-1), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni copied her, L-A's and Misha's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Williams and Lopez-Alegria had their weekly PFCs (private family conferences) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop), Suni at 10:50am EST, L-A at 11:20am.

At ~6:05am EST, the crew set up a fitting scenery for a festive Russian New Year TV downlink to Russia's "Grandfather Frost", dedicating the event on the Eve of 2007 to two upcoming significant events: The "Year of the Child" in Moscow and the 50th Anniversary of Cosmonautics (Sputnik 1: 1957). The event was attended by children from Moscow and Vologda Oblast interested in space who speak English and a children's vocal group, the Boy's Choir from Balakirev School of Arts. *[The meeting was opened by "Grandfather Frost" (aka TsUP Director Vladimir Ivanovich Lobachev), with the Governor of Vologda Oblast, Vyacheslav Yevgenievich Pozgalev, reading a Decree (ukas) officially nominating Mikhail Turin as "Space Grandfather Frost", and Sunita Williams as "Space Snow Maiden". They were also "ordered" to wish the entire planet a Happy New Year on the eve of December 31 – January 1. Grandfather Frost then had Tatiana Alexeevna Vasilieva, Public Relations Committee Chairwoman, greet Sunita Williams, the "first female to see New Year in on the ISS", to talk to her about the fact that the approaching New Year in Moscow "will be signified as the Year of the Child, that children should live in peace, obtain peace-oriented constructive professions and jointly explore peaceful space in the 21st Century". The young Muscovites and Vologdites then greeted the ISS crew in English and Russian, and sang along with the crew one stanza of traditional New Year and Christmas Songs: "Little New Year Tree was Born in the Forest" and "Jingle Bells". Grandfather Frost closed the greeting part and asked the crew to send New Year greetings from space to all children on the planet. **ISS Crew to Earth:** "Dear young citizens of Planet Earth, we are your space envoys and would like to send you our greetings. Planet Earth appears boundless, but compared to the Galaxy, it is only a small speck. So are you, compared to the Earth, appearing almost invisible, but together you are capable of great deeds! May these deeds be based on good thoughts! We would like for the Earth to be filled with children's laughter, beautiful sweeping discoveries, creative labor, and love to all. New Year is approaching fast. Adults and children are looking forward to this holiday, equally impatient. Celebrate with peace and joy! Hurry up to do good, and the world is going to be a better place!"]*

At ~11:00am, Misha also used the SM's amateur radio equipment to conduct a 10-min. ham radio exchange with students and faculty at famed MAI (Moscow Aviation Institute). Pavel Vinogradov, Alexander Poleschuck, and Alexander Spirin were expected to be the event.

For CEO (Crew Earth Observations), investigators have uplinked a long list of geographical coordinates of selected cities for orbital imagery during the next few days.

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

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ISS Orbit (as of this morning, 11:04am EST [= epoch]):

Mean altitude -- 340.7 km

Apogee height -- 356.4 km

Perigee height -- 324.9 km

Period -- 91.35 min.
Inclination (to Equator) -- 51.64 deg
Eccentricity -- 0.002344
Solar Beta Angle -- -7.4 deg (magnitude increasing)
Orbits per 24-hr. day -- 15.76
Mean altitude loss in last 24 hours -- 123 m
Revolutions since FGB/Zarya launch (Nov. 98) -- 46337

Significant Events Ahead (all dates Eastern and subject to change):

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02/06/07 -- US EVA-7
02/10/07 -- US EVA-8
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06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

Merry Christmas and Big Cheers from three Santas/Space Grandfathers Frost and...Space Snow Maiden!



From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/24/06
Date: Sunday, December 24, 2006 2:59:20 PM
Attachments: [image001.gif](#)

ISS On-Orbit Status 12/24/06

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – off-duty for the Expedition 14 crew of CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams. Christmas Eve (see below). Ahead: Week 14 of Increment 14.*

FE-1 Tyurin serviced the Russian BMP Harmful Impurities Removal System, starting the "bake-out" cycle to vacuum on absorbent bed #1 of the regenerable dual-channel filtration system. Before sleep time tonight (4:15pm EST) the bake-out will be terminated. Regeneration of bed #2 follows tomorrow. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

The FE-1 also performed the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water from an EDV containing water from the BKO multifiltration/purification column unit. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh-8 Liquid Unit where they could cause Elektron shutdown.]*

CDR Lopez-Alegria supported the deactivation of the CDRA (Carbon Dioxide Removal Assembly) by disconnecting the LTL (Low Temperature Loop) supply line of the ITCS (Internal Thermal Control System). *[If L-A detected leakage during the demate, he was to remate and report to MCC-Houston.]*

Tyurin completed today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables, the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/Moscow.

Working off his voluntary "time permitting" task list, Mikhail performed another session of the Russian "Diatomeya" ocean observations program, using the Nikon-F5 digital still camera with 85 mm lens and the Sony PD-150P camcorder (medium zoom) to obtain oceanological data about the Atlantic & Pacific Ocean areas characterized by intensive bioproduction process development. *[Targets were Gibraltar and the near-estuary area of the Amazon River in the Atlantic, plus the waters SE of New Zealand and the Isthmus of Panama coastal area in the Pacific Ocean.]*

Also off his discretionary "free time" task list, Misha conducted the periodic check of the Mosfet (metal oxide semiconductor field-effect transistor) radiation sensor reader/display of the MATRYOSHKKA-R payload in the DC1 Docking Compartment. *[The reader automatically records radiation readings at strictly defined times (:00, :15, :30, :45 minutes). The complex Matryoshka payload suite is designed for sophisticated radiation studies. The payload collects radiation measurements every 15 minutes of each hour around the clock. Note: Matryoshka is the name for the traditional Russian set of nested dolls.]*

The crew conducted their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR), TVIS treadmill (CDR, FE-1, FE-2), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1). *[Yesterday a temporary TVIS malfunction (due to incorrect positioning of the TVIS STOP magnet) forced the crew to go all day without treadmill exercise. Overnight, troubleshooting steps were uplinked, and proper function of the device was restored early this morning by the crew.]*

Weekly Science Update (*Expedition Fourteen -- 13th*)

ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS): ALTEINO is functioning nominally.

ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System): Planned.

BASE: Complete.

BCAT-3 (Binary Colloidal Alloy Test-3): Planned.

CAR-2 (Investigating Mechanisms of Heart Disease in Micro-G, ESA): CARD samples shall remain on board ISS until required cold download capability is provided.

CBOSS (Cellular Biotechnology Support Systems): Complete.

CFE (Capillary Flow Experiment): Complete.

CULT (Cultural Factors Questionnaire): Complete.

DAFT (Dust & Aerosol Measurement Feasibility Test): Complete.

Earth Knowledge Acquired by Middle School Students (EarthKAM): In progress.

ETD (Eye Tracking Device): Complete for Thomas Reiter.

GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology): Planned

IMMUNO (Saliva Sampling): IMMUNO samples packed together with TROPI samples were packed for return on 12/19.

LEUKIN: Complete.

MISSE (Materials ISS Experiment): Ongoing.

MTR-2 (Russian radiation measurements): Passive dosimeters measurements in DC1 "Pirs". Removal of passive dosimeters from the MATRYOSHKA Phantom was performed on 12/07 and returned on STS-12A.1.

NOA (Nitric Oxide Analyzer): Last session for Thomas Reiter was successfully performed on 11/30.

Nutrition: Planned.

PK-3 (Plasma Crystal 3): In progress.

PMDIS (Perceptual Motor Deficits in Space): Sunita Williams has completed the first PMDIS activity on orbit. The photos have been downloaded for review.

POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G): All remaining samples were returned on STS-116. Thanks again from the POEMS team.

RC (Refrigerated Centrifuge): Planned.

RS (Renal Stone): Planned.

SAMPLE: Complete.

SEM (Space Experiment Module): Complete.

SLEEP: Lopez-Alegria was able to locate his "lost" Actiwatch. Impact (if any) to be determined after the next downlink.

SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite): In progress.

Swab (Characterization of Microorganisms & Allergens in Spacecraft): Planned.

TROPI (Study of Novel Sensory Mechanism in Root Phototropism): Half of the frozen samples from Runs 1 and 2 were packed into the Double Cold Bag and returned to Earth on STS-116. The remaining frozen samples remain in MELFI. Preparation of EMCS for the third TROPI run was scheduled with the EMCS Purge starting on 12/22. The TROP run was planned to start on 12/23.

YING (Yeast in No Gravity): Complete.

For CEO (Crew Earth Observations), investigators have uplinked a long list of geographical coordinates of selected cities for orbital imagery during the next few days.

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Solar Beta Angle -- -3.0 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in last 24 hours -- 140 m

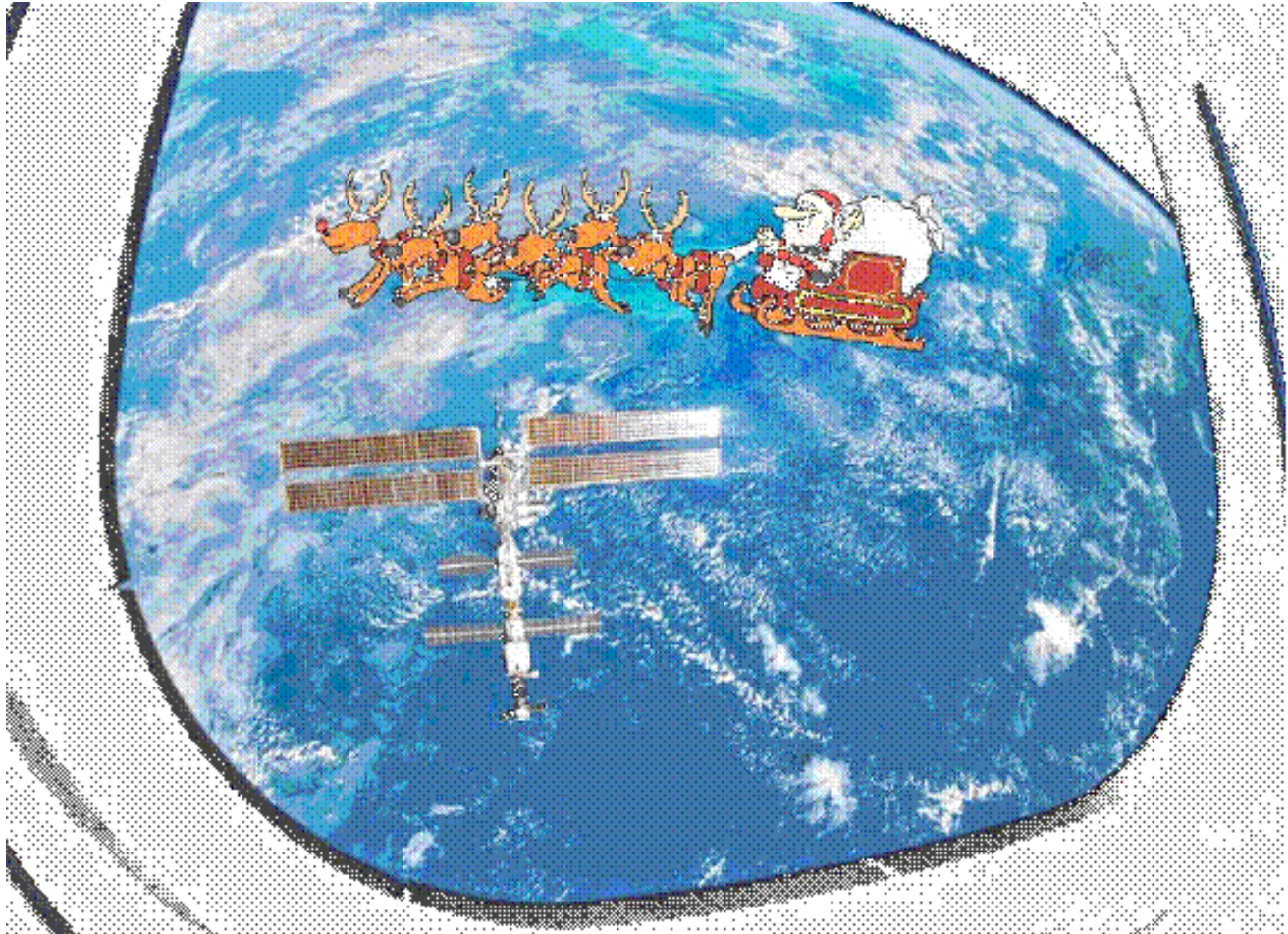
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09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

Merry Christmas and Great Holidays to everyone! (Image: Courtesy Flight Control Team crew uplink)



From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/23/06
Date: Saturday, December 23, 2006 3:36:40 PM
Attachments:

ISS On-Orbit Status 12/23/06

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 14 crew CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams.*

STS-116/Discovery returned to Earth last night, touching down smoothly at KSC at sunset, on the second opportunity, with wheel stop at 17:32pm EST after 202 orbits, thereby crowning a highly successful ISS 12A.1 mission. It was the 117th Space Shuttle flight, the 33rd by Discovery and the 20th Shuttle mission to visit the ISS. *Welcome back, Discovery, after a 12d 20h 45m and ~5.3 million-mile journey in space!*

The crew conducted the regular weekly three-hour task of thorough station cleaning, wearing protective garment. [*"Uborka", normally done every Saturday, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with "Fungistat" disinfectant wipes; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.*]

As part of today's *uborka*, the FE-1 Tyurin replaced two dust filters (PS1, PS2) in the *Funktsionalnyi-Grusovoi Blok* (FGB) and cleaned the mesh screens of the FGB's central ventilation fans (TsV1 & TsV2), with the fans running (in earlier years they had to be turned off first by the ground).

Also in the FGB, Mikhail replaced the "Sputnik-01" (Satellite-01) unit in the BR-9TsU-8 amateur radio system with a new unit, delivered on 23P.

Working briefly in the Soyuz TMA-9/13S Descent Module (SA), Tyurin powered down the gas analyzer (GA), activated on 12/20, via its InPU Integrated Control

Panel.

CDR Lopez-Alegria finished clean-up activities in the "Quest" Airlock after the four recent 12A.1 spacewalks, today terminating the regeneration of the third reusable METOX (Metal Oxide) CO₂ filter canister.

FE-2 Williams undertook her first filling out of the regular weekly FFQ (Food Frequency Questionnaire) on the MEC (Medical Equipment Computer), which keeps a personalized log of her nutritional intake over time on special software. *[The FFQ, updated with the new food brought up on 12A.1, records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins. IBMP/Moscow (Institute of Biomedical Problems, Russian: IMBP – Institute of Medico-Biological Problems) recommended average daily caloric value of the crew's food intake is 2200-2300 cal. If larger quantities of juices and fruits are taken into account, the value can go to 2400-2500 cal.]*

Afterwards Suni performed her first periodic atmospheric status check for ppO₂ (Partial Pressure Oxygen) and ppCO₂ (pp Carbon Dioxide), using the CSA-O₂ (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO₂ Monitoring Kit).

Batteries were to be replaced if necessary. *[CSA-CP measurements were gathered with the new 12A.1 units #1044 & #1051 for recording O₂, CO, HCN and HCl readings in the Lab, with the CSA-O₂ units #1041 & #1048 for O₂ in the Lab, and with the CDMK #1009 for CO₂ in SM and Lab. The instruments were turned off afterwards, and returned to their regular locations.]*

Working off his voluntary "time permitting" task list, the FE-1 performed a session of the Russian "Uragan" (hurricane) earth-imaging program, using the Nikon D1X digital camera with the SIGMA 300-800 focal length lens to take pictures of the western slope of the Huascarán volcano north of Peru near the Pacific coast.

An additional item on Misha's voluntary task list for today was a session with the Russian "Diatomeya" ocean observations program, using the Nikon D1X with telephoto lens to photograph the waters of the Red Sea and Persian Gulf.

In the SM, L-A set up the video equipment for filming the subsequent workouts on the TVIS (Treadmill with Vibration Isolation & Stabilization), for biomechanical evaluation of the individual crewmembers and assessment of the hardware status by ground engineers. Afterwards, he dismantled and stowed the video

equipment. *[Preparations included the removal of the treadmill's "skirt" to show TVIS motion within the floor "pit" in the SM along with the crewmember's feet striking the belt.]*

The crew conducted their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR), TVIS treadmill (CDR, FE-1, FE-2), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Suni copied her, L-A's and Misha's exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

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From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/22/06
Date: Friday, December 22, 2006 1:49:01 PM
Attachments:

ISS On-Orbit Status 12/22/06

All ISS systems continue to function nominally, except those noted previously or below.

Crew work/rest period today returned to the standard cycle of 1:00am - 4:30pm.

FE-1 Tyurin worked a 2.5-hr. assignment for an in-depth connectivity checkout of a new antenna cable delivered on Progress M-58/23P for the Russian ASN-M Satellite Navigation System. *[The job required assembling the necessary circuits and using the FHS3 frequency analyzer plus laptop CD for checking and calibrating the cable for various frequencies. ASN-M will be required for prox ops during the arrival of the European ATV (Automated Transfer Vehicle) "Jules Verne" next year.]*

CDR Lopez-Alegria continued clean-up activities in the Airlock (A/L) after the four recent 12A.1 spacewalks, today setting up the equipment for the standard EMU (Extravehicular Mobility Unit) "scrubbing" and then starting the ionic and particulate filtration process of the EMU and A/L cooling loops, for elimination of any biomaterial residues. Each suit requires about 2.5 hours for the procedure.

In the A/L, the CDR, assisted by the FE-2 on "handover" duty, terminated the maintenance discharging of the second set of EMU batteries and the regeneration of the second reusable METOX (Metal Oxide) CO₂ filter canister, then initiated it on the third.

L-A also disassembled and stowed the video equipment used yesterday to record the crew's workout sessions on the RED (Resistive Exercise Device).

FE-2 Williams supported the EMCS (European Modular Cultivation System) payload by a safety check on its pressure relief valve, via control buttons, looking for low pressure or resistance on the valve.

Later in the day, Lopez-Alegria, Tyurin and Williams worked through a special combination session of the standard emergency egress OBT (on-board training) drill, particularly intended to (1) familiarize the entire crew with the location and quantities of the new ammonia (NH₃) respirators and their use, and (2) familiarize Sunita Williams with the location of hardware and the position of valves used in emergency situations, including hatches and passageways. *[The rule is that the emergency egress exercise should be performed by every new station crewperson once within seven days after departure of the previous crew. The drill today was also used for a comm check while the crew was on the respirators, to see how well they can be communicated with in this state.]*

Mike L-A, assisted by FE-2, undertook his third general U.S. PFE (Periodic Fitness Evaluation), a monthly 1.5-hr. procedure to check up on blood pressure and electrocardiogram (ECG) during programmed exercise on the CEVIS (Cycle Ergometer with Vibration Isolation) in the Lab. Readings were taken with the BP/ECG (Blood Pressure/Electrocardiograph) and the HRM (Heart Rate Monitor) watch with its radio transmitter. *[BP/ECG provides automated noninvasive systolic and diastolic blood pressure measurements while also monitoring and displaying accurate heart rates on a continual basis at rest and during exercise.]*

Mikhail Tyurin unstowed the CMS Trace Contaminant Analyzer for real-time gas monitoring, collected air samples, and took formaldehyde, carbon oxide (CO), ammonia (NH₃), ozone (O₃) and benzene measurements for reporting to TsUP/Moscow.

Afterwards, as comparison, Tyurin also collected cabin air readings with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system of the SM SOGS (Pressure Control & Atmospheric Monitoring System), which is being evaluated since its zero-sensor is failed. *[GANK tests for Methane (CH₄), Ammonia (NH₃), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO₂), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

Later, Misha performed troubleshooting on the RBO-1 "Prognoz" instrument, an autonomously running operational payload in the Russian segment (RS) for prediction of crew radiation dose loads. *[After demating the BITS2-12 telemetry connectors, Misha replaced the failed R-16 dosimeter (#25) with a new spare (#23), then restored the telemetry for ground monitoring. Prognoz dosimeter R-16, intended for measuring surface and depth radiation dose at its location on the internal surface of SM panel 327, was diagnosed as failed after troubleshooting by Pavel Vinogradov on 7/7/06.]*

Lopez-Alegria and Williams had several hours set aside for more unpacking of STS-116 deliveries.

Mike L-A completed another filling out of the regular weekly FFQ (Food Frequency Questionnaire) on the MEC (Medical Equipment Computer), his twelfth, which keeps a personalized log of his nutritional intake over time on special MEC software. Suni's first FFQ logging will be tomorrow. *[The FFQ, updated with the new food brought up on 12A.1, records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins. IBMP/Moscow (Institute of Biomedical Problems, Russian: IMBP – Institute of Medico-Biological Problems) recommended average daily caloric value of the crew's food intake is 2200-2300 cal. If larger quantities of juices and fruits are taken into account, the value can go to 2400-2500 cal.]*

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Afterwards, L-A completed the regular maintenance reboots on the SSC (Station Support Computer) File Server and OCA Comm Router laptops.

Misha performed the routine daily maintenance of the SM SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

The FE-1 also undertook the daily update/edit of the standard IMS (Inventory Management System) "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

At ~9:35am EST, Tyurin linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing transfer details and stowage locations. *[Today's issues included the whereabouts of an EDV enclosure and a*

quantity of equipment listed as being in the FGB, the number of KBO-M soft trash bags added to the trash stowed in Progress 22P, any significant equipment transfers during joint ops with the Shuttle not recorded yet, etc.]

Mike L-A conducted the weekly audit/inventory of the available CWCs (Contingency Water Containers) and their contents, to keep track of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week.]*

As usual, the crew conducted their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR/for PFE, FE-2), TVIS treadmill (FE-1), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1). *[An illustration of the vigorous crew workouts: In 8 recorded running sessions on the TVIS over an 11-day period, Mikhail Tyurin has covered a documented distance of 35.12 km (~22 s.mi.)!]*

Afterwards, Suni copied her, L-A's and Misha's exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

New addition to "job jar" task list: Verify the presence of at least 15 cable straps in a half-CTB in the Node, which will be required for the OGS (Oxygen Generation System) activation installation task scheduled for the first week of January. Also: Suni Williams was lauded for her good maintenance job on the OGS yesterday.

12A.1 Top Level Summary (held over from yesterday): 12A.1 accomplished all objectives (assembly, maintenance, and resupply): Replacing one ISS crewmember, delivering a total mass of ~9200 lbs/4170 kg (4407 lbs/2000 kg external components, including the 4109 lbs/1834 kg P5 spacer), 4435 lbs/2012 kg internal dry cargo, ~236 lbs/106L water, ~69 lbs/31.3 kg oxygen for the A/L HPTs (high-pressure tanks) plus more O₂ for EVA prebreathing, 49 lbs/22.2 kg nitrogen for the A/L HPTs plus some for cabin repressurization, and 20 days of food (three persons). Mass returning on STS-116: 4575 lbs/2075 kg dry cargo (1210 lbs/549 kg in Middeck, 3365 lbs/1526 kg in Spacehab). Four spacewalks were performed safely and successfully, and transition to permanent power & thermal systems was completed, with 17,900 ground commands uplinked. *[Footnote of interest: Part of the return cargo on STS-116/Discovery is Suni Williams' long, flowing hair. She parted with it and donated it to "Locks of Love, a Florida-based organization that makes wigs for children who have lost their hair due to cancer.]*

No CEO (Crew Earth Observation) photo targets uplinked for today. *[CEO ops are*

suspended for the duration of the STS-116 mission. Generation of daily target uplinks will resume on 12/23 assuming a nominal landing later today.]

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 7:20am EST [= epoch]*):

Mean altitude -- 341.1 km

Apogee height -- 357.0 km

Perigee height -- 325.1 km

Period -- 91.36 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0023725

Solar Beta Angle -- 5.3 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in last 24 hours -- 190 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46287

Significant Events Ahead (all dates Eastern and subject to change):

12/22/06 -- STS-116/12A.1 landing

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch

01/20/07 -- Progress M-59/24P docking (DC1)

02/02/07 -- US EVA-6

02/06/07 -- US EVA-7

02/10/07 -- US EVA-8

02/19/07 -- US EVA-9 (Progress antenna removal)

03/16/07 -- STS-117/13A launch -- S3/S4 trusses

03/18/07 -- STS-117/13A docking

04/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

04/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

05/11/07 -- Progress M-59/24P undocking (DC1) & reentry

05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (DC1)

05/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3

09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/21/06
Date: Thursday, December 21, 2006 2:55:49 PM
Attachments:

ISS On-Orbit Status 12/21/06

All ISS systems continue to function nominally, except those noted previously or below. *The crew is off-duty except for a few housekeeping & maintenance tasks.*

Crew work/rest cycle is shifting back, with wake-up today at 5:00am EST, sleep time at 4:30pm. The standard cycle of 1:00am - 4:30pm will be resumed starting tomorrow, 12/22.

FE-1 Tyurin stowed five new 12A.1-delivered ammonia-protection (NH₃) respirators in the FGB, two of them ready for use in tomorrow's planned Emergency Drill, a standard OBT (on-board training) exercise.

FE-2 Williams performed the periodic early checkout and preventive maintenance on the U.S. OGS (Oxygen Generation System). *[The maintenance consists of cycling of the H₂, O₂, and water valves within the OGS plus a purge with nitrogen every 90 days until OGS activation, to prevent stiction. The OGS, launched on ULF1.1 to provide early checkout, will not be functional until all remaining parts, delivered by 12A.1, are installed.]*

CDR Lopez-Alegria and Sunita Williams took the CHeCS CMO (Crew Health Care Systems/Crew Medical Officer) on-board training drill, a 30-min. video & audio refresher course to hone the CMO's acuity in applying ACLS (advanced cardio life support) in an emergency. *[The HMS (Health Maintenance Systems) hardware, including ACLS equipment, may be used in contingency situations where crew life is at risk. To maintain proficiency, crewmembers spend one hour per month reviewing HMS and ACLS equipment and procedures via the HMS and ACLS CBT (computer-based training). The training drill, each crewmember separately, refreshes their memory of the on-orbit stowage and deployment locations, equipment etc. and procedures.]*

Mike L-A continued cleaning up after the four 12A.1 spacewalks, today terminating the maintenance discharging of the first set of EMU (Extravehicular Mobility Unit) batteries and starting the process on the second set. He also terminated regeneration of the first reusable METOX (Metal Oxide) CO₂ filter canister batch and initiated it on the second set.

Mikhail Tyurin set up the Russian BIO-5 Rasteniya-2 ("Plants-2") experiment in the "Lada-9" greenhouse in the Service Module (SM) with the newly delivered plants kit, and then conducted a checkout of the equipment. *[Rasteniya-2 researches growth and development of plants under spaceflight conditions. Plants seeds will be planted between the wicks of a root module which will be connected with the power supply and locked. Regular daily maintenance of the experiment by Tyurin involves monitoring of seedling growth, humidity measurements, moistening of the substrate if necessary, and photo/video recording.]*

Misha also did the routine daily maintenance of the SM SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

L-A supported the EMCS (European Modular Cultivation System) payload, originally installed by Thomas Reiter, by powering up the EXPRESS Rack 3 laptop (ELC-3) and opening the EMCS gas mix valves. *[EMCS, delivered on ULF1.1, is a combination centrifuge/growth chamber that allows plant growth experiments to be carried out in controlled partial and microgravity conditions.]*

The CDR powered up the SVG (Space Vision Gateway) computer for subsequent ground-commanded downlinking of HDTV footage taken by Thomas with the SVG camcorder during 12A.1. *[SVG is a specialized computer designed to capture, encode, packetize and downlink HDTV live via Ku-band assets or to record it on the hard drive. HDTV uses the Sony HDW-750 camcorder with Sony F115 microphone and V10 VTR (Video Tape Recorder). The flight-certified SVG hardware was provided by NASA and JAXA (Japanese Aerospace Exploration Agency) for temporary installation in the ISS Lab under an agreement between NASA, the Japan Broadcasting Corporation NHK (Nippon Hoso Kyokai) and Discovery Communications, Inc. (DCI).]*

For video-documenting the subsequent crew workout on the RED (Resistive Exercise Device), L-A also set up the video camcorder to tape the sessions. *[The RED video, showing the entire apparatus on the Node "ceiling", including the exercising envelope, is periodically required to support biomechanical evaluation of the on-orbit crewmembers and assessment of the on-orbit hardware status and performance during exercising.]*

As usual, time is set aside for the crew to conduct their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR), TVIS treadmill (FE-1, FE-2), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1). *[The importance of vigorous workouts for station crews cannot be overstated. For illustration: In 8 recorded sessions of running on the TVIS over an 11-day period, Mikhail Tyurin has covered a documented distance of 35.12 km (~22 s.mi.)!]*

Afterwards, Suni will copy her, L-A's and Misha's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

12A.1 Top Level Summary: 12A.1 accomplished all objectives (assembly, maintenance, and resupply): Replacing one ISS crewmember, delivering a total mass of ~9200 lbs/4170 kg (4407 lbs/2000 kg external components, including the 4109 lbs/1834 kg P5 spacer), 4435 lbs/2012 kg internal dry cargo, ~236 lbs/106L water, ~69 lbs/31.3 kg oxygen for the A/L HPTs (high-pressure tanks) plus more O₂ for EVA prebreathing, 49 lbs/22.2 kg nitrogen for the A/L HPTs plus some for cabin repressurization, and 20 days of food (three persons). Mass returning on STS-116: 4575 lbs/2075 kg dry cargo (1210 lbs/549 kg in Middeck, 3365 lbs/1526 kg in Spacehab). Four spacewalks were performed safely and successfully, and transition to permanent power & thermal systems was completed, with 17,900 ground commands uplinked. *[Footnote of interest: Part of the return cargo on STS-116/Discovery is Suni Williams' long, flowing hair. She parted with it and donated it to "Locks of Love, a Florida-based organization that makes wigs for children who have lost their hair due to cancer.]*

TRRJ Toothcrash Test: An on-orbit test of the new "toothcrash" (gear teeth not meshing) recovery software for the Thermal Radiator Rotary Joint Rotary Joint Motor Control (RJMC) will be conducted on 12/29. The software, which is similar to that used by the SARJ (Solar Alpha Rotary Joint) RJMC, contains updates from lessons learned during recent SARJ operations. The purpose of the test is to determine if the RJMC is able to recover from a toothcrash automatically (much like the SARJ).

No CEO (Crew Earth Observation) photo targets uplinked for today. *[CEO ops are suspended for the duration of the STS-116 mission. Generation of daily target uplinks will resume on 12/23 assuming a nominal landing on 12/22.]*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 6:58am EST [= epoch]*):

Mean altitude -- 341.3 km

Apogee height -- 357.2 km

Perigee height -- 325.4 km

Period -- 91.36 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.002364

Solar Beta Angle -- 9.2 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in last 24 hours -- 146 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46271

Significant Events Ahead (all dates Eastern and subject to change):

12/22/06 -- STS-116/12A.1 landing

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch

01/20/07 -- Progress M-59/24P docking (DC1)

02/02/07 -- US EVA-6

02/06/07 -- US EVA-7

02/10/07 -- US EVA-8

02/19/07 -- US EVA-9 (Progress antenna removal)

03/16/07 -- STS-117/13A launch -- S3/S4 trusses

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04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

04/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

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05/12/07 -- Progress M-60/25P launch

05/14/07 -- Progress M-60/25P docking (DC1)

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06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3

09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/20/06
Date: Wednesday, December 20, 2006 12:27:40 PM
Attachments:

ISS On-Orbit Status 12/20/06

All ISS systems continue to function nominally, except those noted previously or below. *Expedition 14 work/rest cycle is shifting back, with wake-up today at 9:00am EST, sleep time at 8:00pm. The standard cycle of 1:00am - 4:30pm will be resumed starting tomorrow, 12/21.*

Discovery and ISS are flying in separate orbits again.

After Crew Farewell at ~2:00pm (with lots of hugs) and Shuttle/ISS airduct disassembly and hatch closing at 2:18pm, Discovery undocked smoothly from PMA-2 at 5:09pm, after a total docked time of 7 days 21 hours. *[For undocking, the station was maneuvered to LVLH YPR 0,0,0 attitude at 4:09pm and returned to 12A.1 State +XVV TEA attitude at 5:51pm. Discovery backed away, then performed a partial flyaround at 400-600 ft while being video-recorded and photographed by Mike L-A. A 1.5 ft/s separation burn followed at 6:01pm on the -V bar (i.e., behind the ISS), a second at 6:40pm, and a third at a second at 7:15pm, increasingly more powerful.]*

KSC landing of STS-116 is set for 12/22 (Friday) at ~3:56pm EST. *[If the landing occurs on the 1st opportunity as planned, Discovery's mission duration will be 12d 19h 9m.]*

On board the station, CDR Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Sunita Williams are enjoying an off-duty day.

After the FE-2 set up the MultiMeter and Scopemeter instruments to monitor BZh Liquid Unit temperature, FE-1 Tyurin worked on reactivation of the Elektron-VM oxygen generator, with the usual preceding nitrogen (N₂) purge. *[Elektron was deactivated on 12/10 in preparation for the arrival of the Shuttle that provided the necessary O₂.]*

Later, Tyurin also activated the gas analyzer (GA) in the Soyuz TMA-9/13S spacecraft via its InPU Integrated Control Panel.

Meanwhile, Williams is to turn off the PCS (Portable Computer System) A31p laptops in the Airlock (A/L) and at the Cupola RWS (Robotic Workstation).

After the four 12A.1 spacewalks, the crew will have a number of tasks assigned to clean up the "Quest" A/L. Today, Mike L-A begins the cleanup by starting the maintenance discharging of the EMU (Extravehicular Mobility Unit) batteries and the regenerations of the used METOX (Metal Oxide) CO₂ absorption canisters.

Misha is to perform the routine daily maintenance of the SM SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Sunita Williams takes on the routine inspection of the running ALTEA equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected.

Suni will also inspect the CGBA-4 (Commercial Generic Bioprocessing Apparatus #4) payload, newly set up by her on 12/15. *[CGBA comprises two educational experiments to be utilized by middle school students. One experiment will examine seed germination in micro-G including gravitropism (plant growth towards gravity) and phototropism (plant growth towards light). The second experiment investigates how micro-G affects the model organism Caenorhabditis elegans, a small nematode worm.]*

At ~1:30pm EST, the CDR will hold a teleconference with ground specialists on the problem of sample packing inside MELFI (Minus Eighty Degree Celsius Laboratory Freezer for ISS) dewars. *[MELFI has performed excellently to date, actually reaching temperatures of -95 degC according to crew reports.]*

L-A's assignments include the standard weekly maintenance on the TVIS (Treadmill with Vibration Isolation & Stabilization) with SLD (Subject Loading Devices) contingency configuration, primarily inspecting the condition of the SLDs, SLD cables and SPDs (Subject Positioning Devices), lubricating as required, plus recording time & date values.

As usual, time is set aside for the crew to conduct their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR, FE-2), TVIS treadmill (CDR, FE-1), RED resistive

exerciser (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1). *[The importance of vigorous workouts for station crews cannot be overstated. For illustration: In 8 recorded sessions of running on the TVIS over an 11-day period, Mikhail Tyurin has covered a documented distance of 35.12 km (~22 s.mi.)!]*

Afterwards, Suni will copy her, L-A's and Misha's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Preliminary timelines for the three U.S. spacewalks by L-A and Suni in February were uplinked for crew review. *[EVA objectives will include ETCS (External Thermal Control System) Loop A/Loop B reconfiguration, Starboard & Aft Radiator retraction & shrouding, removal of P3 RJMC & XPOP shrouds, and UCCAS (Unpressurized Cargo Carriers Attachment System) deployment.]*

No CEO (Crew Earth Observation) photo targets uplinked for today. *[CEO ops are suspended for the duration of the STS-116 mission. Generation of daily target uplinks will resume on 12/23 assuming a nominal landing on 12/22.]*

CEO photography can be viewed and studied at the websites:

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<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (as of this morning, 6:35am EST [= epoch]):

Mean altitude -- 341.4 km

Apogee height -- 357.5 km

Perigee height -- 325.3 km

Period -- 91.36 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0023975

Solar Beta Angle -- 12.9 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in last 24 hours -- 172 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46255

Significant Events Ahead (all dates Eastern and subject to change):

12/22/06 -- STS-116/12A.1 landing (KSC -- 3:56pm or 5:33pm)

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch
01/20/07 -- Progress M-59/24P docking (DC1)
02/02/07 -- US EVA-6
02/06/07 -- US EVA-7
02/10/07 -- US EVA-8
03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses
03/18/07 -- STS-117/13A docking
03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
04/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/19/06
Date: Tuesday, December 19, 2006 1:38:59 PM
Attachments:

ISS On-Orbit Status 12/19/06

All ISS systems continue to function nominally, except those noted previously or below. *Flight Day 11 for 12A.1 and the last docked day for the ten-person crew of CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin, FE-2 Thomas Reiter, CDR Mark Polansky, PLT Bill Oefelein, FE-2-14 Sunita Williams, MS Robert Curbeam, MS Nick Patrick, MS Christer Fuglesang and MS Joan Higginbotham.*

After ISS crew wakeup at 9:18am EST (30 min. after Shuttle crew), the station residents are busy conducting preparations for this afternoon's Shuttle undocking. Sleep time is shortly after midnight, at 12:05am.

Discovery undocks today at 5:09pm EST (12/22: KSC – 3:56pm/5:33pm; 12/23: KSC – 2:39pm/4:15pm; EDW – 5:44pm).

The originally unplanned EVA-4 yesterday was a complete success – the 4B solar array of the P6 truss is now fully retracted in their boxes. *[The fourth spacewalk by Robert Curbeam & Christer Fuglesang began at 2:00pm EST and ended at 8:38pm, lasting 6 hrs 38 min. It was the 77th spacewalk for ISS assembly & maintenance and the 29th from the "Quest" Airlock. As of now, 53 NASA astronauts, 14 Russians and eight astronauts representing Japan, Canada, France, Germany and Sweden have logged 469 hrs 59 min outside the station on building and maintaining it. During EVA-4, Curbeam and Fuglesang –*

- *Facilitated/enabled the complete retraction of the 4B SAW (Solar Array Wing) and the latching of the 4B blanket boxes (retraction was impacted by one frayed inboard guide wire, with two wires of the 21-wire bundle torn), and performed two get-ahead tasks:*
- *Checking the MLI (Multi-Layered Insulation) cover of the SSMRS LEE FMS (Space Station Remote Manipulator System/Latching End Effector/Force Moment Sensor) which had been installed during EVA-2 and appeared to billow out (the result - as the crew ascertained - of more MLI situated under the new FMS MLI, and*

- *Relocating one APFR (Articulating Portable Foot Restraint) from ESP-2 (External Stowage Platform 2) to CETA-2 (Crew Equipment Translation Aid) cart 2 in preparation for Flight 13A.]*

As part of post-EVA cleanup, the new FE-2, Sunita Williams, performed EMU/ spacesuit reconfiguring.

Lopez-Alegria disconnected the EXPRESS Rack 1 Moderate Temperature Loop (ER1 MTL) jumper QD (Quick Disconnects) at the Lab UIP (Utility Interface Panel), required yesterday for MAMS (Microgravity Acceleration Measurement System) operation.

Mike L-A also disassembled and tore down the Shuttle-O₂ prebreathe setup.

Later, the CDR will set up the IWIS (Internal Wireless Instrumentation System) for taking structural dynamics data during the Shuttle undocking.

Thomas Reiter, who departs from the ISS today aboard Discovery, was scheduled to pack the frozen samples of the ESA experiments TROPI (Study of Novel Sensory Mechanism in Root Phototropism) and IMMUNO (Saliva, blood & urine samples for stress testing) from their cold storage in the MELFI (Minus Eighty Degree Celsius Laboratory Freezer for ISS) in so-called Double Coldbags for return to Earth, guided by detailed instructional photos.

Afterwards, at ~1:00pm, Reiter conducted a brief cargo transfer status update with ground specialists and will later, when part of the Discovery crew, perform final transfer cleanup/closeout in the Shuttle.

FE-1 Tyurin took the monthly sensor readings of the Russian “Pille-MKS” radiation dosimetry experiment, which has ten sensors placed at various locations in the Russian segment (port cabin window, starboard cabin window, ASU toilet facility, control panel, etc.), leaving the reader powered up and calling the dosage data to TsUP/Moscow after cleanup ops.

Late last night Mike L-A completed the task-listed installation of an IMV (Intermodular Ventilation) valve in the Lab forward port side end cone. *[Purpose of this valve and the one on the starboard side is to provide ventilation between the Lab and Node-2 when the latter has been installed on the STS-120/10A mission next year. Since one of four band clamps could not be located, the installation was completed with the remaining three (of which one was inadvertently overtightened, to be repaired and checked out after undock).]*

The CDR has time set aside for updating and redeploying the Expedition 14 SODF (Station Operations Data File) hardcopy procedures books

Tyurin is to perform the routine daily maintenance of the SM SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Misha also does the daily update/edit of the standard IMS "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

In preparation for Shuttle departure, Mike L-A and Suni Williams will perform the following pre-undock activities:

- Dismantle the Shuttle-O₂ prebreathe gear;
- Install and program IWIS (Internal Wireless Instrumentation System) for data taking during STS undock [*part of the ISS Structural Life Validation & Extension SDTO (Station Development Test Objective), this activity provides structural behavior verification information for analysis. Dynamic data during undocking were additionally obtained by the SDMS (Structural Dynamic Measurement System).*];
- Close Lab window shutter to protect against jet plumes;
- Configure the VDS VTR (Video Distribution System/Video Tape Recorder) bypass cables for covering the Shuttle departure; and
- Configure the PA-2 (Pressurized Mating Adapter 2) for Shuttle undocking.

The traditional Crew Farewell ceremony is scheduled for ~2:00pm, followed by hatch closure at 2:15pm, handled on the ISS side by Misha and Suni.

Discovery will undock from ISS at 5:09pm, after a total docked time of 7 days 21 hours. [*For undocking, the station will be maneuvered to LVLH YPR 0,0,0 attitude at 4:09pm and returned to 12A.1 State +XVV TEA attitude at 5:51pm. Discovery will back away from the ISS PMA-2, then perform a partial flyaround at 400-600 ft while being video-recorded and photographed by Mike L-A. A 1.5 ft/s separation burn followed at 6:01pm on the -V bar (i.e., behind the ISS), a second at 6:40pm, and a third at a second at 7:15pm, increasingly more powerful.*]

After Shuttle departure, the ISS crew will –

- Remove the IWIS equipment,
- Reconfigure the Airlock CCAA (Common Cabin Air Assembly) flexible air duct to its nominal stage setup,
- Disconnect the UOP DCP (utility outlet panel/display & control panel) bypass

- power cable for the VTR at the Lab RWS (Robotics Work Station),
- Restore the onboard communications network to its nominal configuration, and
- Depressurize the PMA-2 to prevent humidity condensation and pressure fluctuations, followed by leak checking for the standard one hour. Afterwards, the necessary equipment will be torn down.

Tyurin is scheduled for the monthly recharging of the Motorola-9505 Iridium satellite phone. *[After retrieving it from its location in the Soyuz TMA-9/13S descent module (BO), Misha will initiate the recharging of its lithium-ion battery, a 30-min. process, monitoring the process every 10-15 minutes as it takes place. Upon completion Misha returns the phone inside its SSSP Iridium kit and stows it back in the BO's operational data files (ODF) container. The satphone accompanies returning ISS crews on Soyuz reentry and landing for contingency communications with SAR (Search-and-Rescue) personnel after touchdown. The Russian-developed procedure for the monthly recharging has been approved jointly by safety officials. During the procedure, the phone is left in its fluoroplastic bag with open flap.]*

For her first exercise session on the U.S. CEVIS (Cycle Ergometer with Vibration Isolation), FE-2 Williams will personalize her exercise protocol on the cycle computer.

As usual, time is set aside for the crew to conduct their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exerciser (CDR), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Misha will copy his, L-A's, and Suni's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

No CEO (Crew Earth Observation) photo targets uplinked for today. *[CEO ops are suspended for the duration of the STS-116 mission. Generation of daily target uplinks will resume on 12/23 assuming a nominal landing on 12/22.]*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);
<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 6:12am EST [= epoch]*):

Mean altitude -- 341.6 km

Apogee height -- 357.1 km

Perigee height -- 326.1 km

Period -- 91.37 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0023094

Solar Beta Angle -- 18.2 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in last 24 hours -- 73 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46239

Significant Events Ahead (all dates Eastern and subject to change):

12/19/06 -- STS-116/12A.1 undocking (5:09pm)

12/22/06 -- STS-116/12A.1 landing (KSC -- 3:56pm or 5:33pm)

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch

01/20/07 -- Progress M-59/24P docking (DC1)

02/02/07 -- US EVA-6

02/06/07 -- US EVA-7

02/10/07 -- US EVA-8

03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

03/16/07 -- STS-117/13A launch -- S3/S4 trusses

03/18/07 -- STS-117/13A docking

03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

04/06/07 -- Progress M-59/24P undocking (DC1) & reentry

04/09/07 -- Progress M-60/25P launch

04/11/07 -- Progress M-60/25P docking (DC1)

04/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3

09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](mailto:vonPuttkamer, Jesco H. (HQ-CJ000))
To: jvonputt@hq.nasa.gov;
CC:
Subject: ISS On-Orbit Status 12/17/06
Date: Tuesday, December 19, 2006 10:45:24 AM
Attachments:

ISS On-Orbit Status 12/17/06

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – a busy 7th docked day for the ten-person crew of CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin, FE-2 Thomas Reiter, CDR Mark Polansky, PLT Bill Oefelein, FE-2-14 Sunita Williams, and MSs Robert Curbeam, Nick Patrick, Christer Fuglesang and Joan Higginbotham. Ahead: Week 13 of Increment 14.*

After ISS crew wakeup at 9:48am EST (30 min. after Shuttle crew), the station residents are conducting cargo transfers, some maintenance R&R, and preparations for tomorrow's EVA-4. Sleep time for both crews is at 1:18am.

All EVA-3 objectives yesterday were accomplished with complete success and no issues. *[The third spacewalk by Bob "Beamer" Curbeam and Sunita "Suni" Williams began at 2:25pm EST, ahead of schedule, and ended at 9:56pm, lasting 7 hrs 31 min. It was the 76th spacewalk for ISS assembly & maintenance and the 28th from the "Quest" Airlock. As of now, 52 NASA astronauts, 14 Russians and seven astronauts representing Japan, Canada, France, Germany and Sweden have logged 463 hrs 21 min outside the station on building and maintaining it. During EVA-3, Curbeam and Williams --*

- *reconfigured electrical MBSU (Main Bus Switching Unit) cables of power channels 1 & 4;*
- *assembled three SMDP (Service Module Debris Panel) bundles on an adapter and transferred this "Christmas tree" configuration onto the Strela adapter on PMA-3 (Pressurized Mating Adapter 3) using the SRMS (Shuttle Manipulator System);*
- *completed the Z1-005 Patch Panel 1 reconfiguration and Russian power reconfiguration;*
- *transferred the AGB (Adjustable Grapple Bar) to the FHRC (Flex Hose Rotary Coupler); and*
- *assisted with troubleshooting the partially retracted P6 SAW (Solar Array Wing) 4B.*

Flight controllers successfully powered up the electrical systems in their new channel 1/4 configuration and also performed the time-critical activation of ammonia (NH₃) cooling loop A on the P1 truss without issues. After the SMDP transfer, one of the EVA digital still cameras carried by a crewmember came loose from its bracket due to a backed-out screw and floated away. There is no trajectory information available yet.]

P6 SAW Retraction: Curbeam and Williams confirmed that the problem is indeed caused by snagging grommets. They provided information on grommet orientation and then attempted to manually shake the partially retracted SAW in an effort to free the wires and grommets that are preventing full retraction. Several oscillation and retraction attempts were attempted until the EVA had to be terminated due to time constraints. In the slow bay-by-bay process the SAW was retracted an additional 6 bays, leaving 11 bays out. The decision was made to finish the job tomorrow (Monday) in an additional spacewalk, EVA-4. Discovery undocking is now planned for 12/19 (Tuesday) with landing on 12/22 (Friday). [The grommets are ring-like gadgets sliding on a guidewire, similar to curtain rings on a curtain pole. EVA-4 will be performed by Curbeam and Fuglesang. SAW 2B will be retracted next year, probably also requiring a special EVA.]

Before breakfast, FE-2 Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

With EVA-3 accomplished, Reiter gathered the three obsolete 12A Warning Books (Lab, FGB, SM) and discarded them in a trash bag for disposal.

CDR Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Thomas Reiter have another ~4.5 hrs reserved for Shuttle transfers, topped off with the daily transfer status tagup with the ground scheduled at ~9:20pm. *[An estimated 61% of cargo transfers have been completed as of yesterday morning (82% of resupply; 43% of return items). Transfer of N₂ (nitrogen) from Shuttle to ISS continued and was terminated today by Reiter and Lopez-Alegria. Total goal: ~60 lbs.]*

Hardware transfers by Thomas include the POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G) payload.

Also continuing today are ISS handover activities between the CDR and FE-2 with Williams, to familiarize Suni with onboard equipment and procedures (~2 hrs).

As part of handover initiation, L-A and Suni will conduct the regular maintenance reboots on the SSC (Station Support Computer) File Server and OCA Comm Router laptops.

Suni also has time set aside to familiarize herself with CMS (Counter Measure Systems) systems/protocols, before performing her first physical exercise on ISS, on the RED (Resistive Exercise Device).

After yesterday's health check on the BRPK-2 air/liquid condensate separator apparatus condensate pump, Tyurin today is scheduled to perform R&R (removal & replacement) of the BRPK-2 unit, stowing the discarded unit for disposal, a two-hour job, including disconnecting/reconnecting the BITS 2-12 onboard telemetry measurement system.

The FE-1 will also equip the newly arrived CSA-CP (Compound Specific Analyzer-Combustion Products) units with batteries. *[As usual, the CSA-CPs require time for decontamination ("outgassing").]*

Thomas Reiter is scheduled to clear access to the Italian ALTEA (Anomalous Long-Term Effects on Astronauts) payload, which uses the ELC4 (EXPRESS Rack 4) laptop, and to run the first experiment session with activated CNSM (Central Nervous System Monitoring) helmet equipment. Afterwards, the experiment will be deactivated and restowed. *[Purpose of ALTEA is to define and measure descriptors for the electrophysiological brain functioning and to follow their dynamics, correlating it with space environments. The originally planned CNSM sessions by a crewmember wearing a helmet for a 32-channel EEG system is now back on. ALTEA has to date operated only in its long-term unmanned mode of real-time particle flux dosimetry (DOSI mode) inside the ISS using six particle detectors (originally introduced on Mir).]*

The periodic routine inspection of the running ALTEA equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected, is to be performed by Mike L-A.

L-A is also timelined for another filling out of the regular weekly FFQ (Food Frequency Questionnaire) on the MEC (Medical Equipment Computer), his eleventh, which keeps a personalized log of his nutritional intake *over time on special MEC software. [The FFQ records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins. IBMP/Moscow (Institute of Biomedical Problems, Russian: IMBP – Institute of Medico-Biological Problems) recommended average daily caloric value*

of the crew's food intake is 2200-2300 cal. If larger quantities of juices and fruits are taken into account, the value can go to 2400-2500 cal.]

As another handover task, Tyurin and Williams are to perform the remaining routine daily maintenance of the SM SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Misha also does the daily update/edit of the standard IMS "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

In preparation for tomorrow's EVA-4, which again will require Curbeam and Fuglesang to "camp out" in the Airlock (A/L) overnight at 10.2 psi, the crew will work on the EMUs (Extravehicular Mobility Units), swapping Suni's #3018 and Christer's #3015 suits and preparing the EV2's 3015 for the spacewalk. *[Preps will include removing and replacing the ISS cuff checklist, install fitting gloves, installing wrist mirrors, helmet, helmet lights and TV camera, and mounting the suit, with its white identifier stripe, on the EDDA (EMU Don Doff Assembly) in the A/L.]*

EVA tools will be prepared, isolated with Kapton tape against electrical shock, and the DCS-760 camera equipment prepared.

Also in preparation for EVA-4, the MT (Mobile Transporter), with the SSRMS based on it, was moved this morning by ground control from WS5 (Workstation 5) to WS3, to support the P6 SAW retraction support.

L-A is to do the periodic atmospheric status checks for ppO₂ (Partial Pressure Oxygen) and ppCO₂ (pp Carbon Dioxide), using the CSA-O₂ (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO₂ Monitoring Kit). Batteries are to be replaced if necessary. *[CSA-CP measurements are to be gathered with units #1055 (prime) at the SM Central Post & #1053 (backup) in the Node, CSA-O₂ (#1042, #1063) in the Lab, and CDMK (#1009) in SM and Lab. The instruments will be turned off afterwards, except for #1055, and returned to their regular locations.]*

As part of getting ready for exercising, Williams will load her personalized HRM (Heart Rate Monitor) software on the MEC.

As usual, time is set aside for the crew to conduct their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2/only), RED resistive exerciser (CDR, FE-2-14), and VELO bike with bungee cord load

trainer (FE-1).

Afterwards, Thomas will copy his, L-A's, Misha's and Suni's exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

CDRA Update: After yesterday's R&R of the failed adsorbent/desiccant bed of CDRA (Carbon Dioxide Removal Assembly) with the newly designed Zeolite Bed 2, CDRA was activated and has successfully completed two half-cycles, thus confirming nominal dual bed operations.

WLES Update: Discovery's Wing Leading Edge System, which stopped recording early on FD8 due to an unexpected loss of communications, was successfully recovered after an adjustment of Flight Deck settings.

No CEO (Crew Earth Observation) photo targets uplinked for today. *[CEO ops are suspended for the duration of the STS-116 mission. Generation of daily target uplinks will resume on 12/23 assuming a nominal landing on 12/22].*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

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<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

Significant Events Ahead (all dates Eastern and subject to change):

12/18/06 -- 12A.1 EVA-4 (EV1-Curbeam/EV2-Fuglesang)

12/19/06 -- STS-116/12A.1 undocking

12/22/06 -- STS-116/12A.1 landing

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch

01/20/07 -- Progress M-59/24P docking (DC1)

02/02/07 -- US EVA-6

02/06/07 -- US EVA-7

02/10/07 -- US EVA-8

03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

03/16/07 -- STS-117/13A launch -- S3/S4 trusses

03/18/07 – STS-117/13A docking
03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
04/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/18/06
Date: Monday, December 18, 2006 12:41:39 PM
Attachments:

ISS On-Orbit Status 12/18/06

All ISS systems continue to function nominally, except those noted previously or below. *Flight Day 10 for 12A.1 and a busy 8th docked day for the ten-person crew of CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin, FE-2 Thomas Reiter, CDR Mark Polansky, PLT Bill Oefelein, FE-2-14 Sunita Williams, and MSs Robert Curbeam, Nick Patrick, Christer Fuglesang and Joan Higginbotham. Underway: Week 13 of Increment 14.*

After ISS crew wakeup at 9:48am EST (30 min. after Shuttle crew), the station residents are conducting preparations for this afternoon's fourth spacewalk, cargo transfers, and some maintenance R&Rs. Sleep time for both crews is at 1:18am.

Discovery undocking is scheduled for tomorrow (12/19) at 5:09pm EST (*KSC landing: 12/22 – 3:56pm/5:33pm; 12/23: KSC – 2:39pm/4:15pm; EDW – 5:44pm*).

Before breakfast, FE-2 Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

Today's EVA-4 will be conducted by Mission Specialists Robert Curbeam (EV1, red stripe) and Christer Fuglesang (EV2, all white). The spacewalk is currently scheduled to begin at ~2:12pm EST. *[Major objective: to assist in the final retraction of the partially retracted P6 SAW (Solar Array Wing) 4B. Two potential tasks have been added: adjusting the MLI (Multi Layer Insulation) cover of the SSRMS FMS (Space Station Remote Manipulator System/Force Moment Sensor), installed during EVA-1, which from video appears to cover the FMS incompletely; and, if time permits, obtaining imagery of the 2B SAW for analysis to attempt to determine whether a similar situation to 4B exists on that unit.]*

In support of the spacewalk, the MT (Mobile Transporter) was translated yesterday from WS-3 (Work Site 3) to WS-5, and the SSRMS was subsequently maneuvered to have its cameras pointed in the EVA-4 viewing position. *[During the spacewalk, the SSRMS will be operated by FE Suni Williams. After the EVA the SSRMS will be powered down for the remainder of the docked mission.]*

CDR Lopez-Alegria and PLT Oefelein are again spending several hours under "Campout" conditions (10.2 psi) in the Airlock (A/L) with Curbeam and Fuglesang, purging the EMUs (Extravehicular Mobility Units) for prebreathing (nitrogen desaturation), then repressing the A/L to ISS cabin pressure and opening the Node's starboard hatch while continuing the prebreathe. Next steps include outfitting EV1 and EV2 with their SAFER (Simplified Aid for EVA Rescue) units and METOX (Metal Oxide) canisters, then entering the A/L CL (Crewlock) and conduct its depressurization prior to EVA begin. *[EV1 and EV2 spent their night "camping out" in the A/L.]*

When the spacewalk gets underway, FE-2 Reiter will again have powered down the amateur radio equipment in the FGB to prevent RF interference with EVA communication links, to be turned back on after the spacewalk.

Structural excitation data will be recorded during EVA-4 by MAMS (Microgravity Acceleration Measurement System, IWIS (Internal Wireless Instrumentation System) and SDMS (Structural Dynamics Measurement System). To support this activity, FE-2 Reiter was to hook up the EXPRESS Rack 1 Moderate Temperature Loop (ER1 MTL) jumper QD (Quick Disconnects) to the Lab UIP (Utility Interface Panel), and Suni Williams to power up IWIS sensors (not including its SM RSU/ Remote Sensor Unit). *[MAMS needs to be up and running two hours before the event to ensure data collection. Due to large SAW motions observed during similar activities on EVA-3, these data are required during EVA-4 to accurately predict fatigue life consumption of the SAW.]*

The CDR will conduct the routine inspection of the running ALTEA equipment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected. *[Christer Fuglesang was thanked by the ALTEA team for a very successful session with the ALTEA CNSM (Central Nervous System Monitoring) helmet equipment yesterday. Purpose of ALTEA is to define and measure descriptors for the electrophysiological brain functioning and to follow their dynamics, correlating it with space environments. The CNSM helmet is instrumented for a 32-channel EEG (electroencephalograph) system.]*

Mike L-A also is scheduled to inspect the CGBA-4 (Commercial Generic Bioprocessing Apparatus #4) payload, newly set up by FE-2-14 Sunita Williams on

12/15. *[CGBA comprises two educational experiments to be utilized by middle school students. One experiment will examine seed germination in micro-G including gravitropism (plant growth towards gravity) and phototropism (plant growth towards light). The second experiment investigates how micro-G affects the model organism Caenorhabditis elegans, a small nematode worm.]*

After setting up the necessary pump/hose hookup, FE-1 Tyurin performs another urine transfer from filled EDV-U liquid waste containers to the BV2 water tank of the Progress 22P cargo ship-turned-trash can for disposal. *[Each of the two spherical Rodnik tanks (BV1 & BV2) consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane and is leak-tested before receiving the liquid waste.]*

Tyurin has a major IFM (Inflight Maintenance) job on his hands, for about two hours: removing a failed 800A storage battery (#1) in the FGB module and replacing it with a spare Blok 800A unit, restoring "Zarya" to six units. The removed unit is to be discarded. *[The battery's ZRU charge/discharge unit was to be deactivated by TsUP/Moscow beforehand and later reactivated. The battery will then be placed in Cycle mode for conditioning.]*

The FE-1 today collects cabin air readings in the ISS with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system of the SM SOGS (Pressure Control & Atmospheric Monitoring System). *[GANK tests for Methane (CH₄), Ammonia (NH₃), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO₂), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

In more SOGS work, Tyurin will deactivate the SM's IK0501 gas analyzer (GA) and replace its BF carbon dioxide (CO₂) filter assembly with a new unit from FGB stowage (replaced last: 11/6). *[After ensuring good seals on the instrument's base and no leaks around the installed filter, Mikhail is to reactivate the GA and stow the spent BF for disposal. IK0501 is an automated system for measuring CO₂, O₂, and H₂O in the air as well as the flow rate of the gas being analyzed.]*

Thomas Reiter has another ~1h 40min reserved for Shuttle transfers, topped off with the daily transfer status tagup with the ground scheduled at ~9:33pm. *[An estimated 92% of cargo transfers have been completed as of yesterday morning (94% of resupply; 90% of return items). Transfer of N₂ (nitrogen) from Shuttle to ISS, completed yesterday, amounted to ~49 lbs.]*

As part of his transfers, Thomas is scheduled to bring the last canister of the POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G) payload from the Shuttle to the ISS.

Tyurin is to perform the routine daily maintenance of the SM SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Reiter does the daily update/edit of the standard IMS "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The FE-2 also will conduct the periodic (once per month) routine inspection of the RED (Resistive Exercise Device) with canister cords, squat harness components, and accessory straps, and the Flexpack canister bolts for re-tightening if required.

As usual, time is set aside for the crew to conduct their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR, FE-2-14/1hr.), and VELO bike with bungee cord load trainer (FE-1). No exercise is permitted during the EVA.

Afterwards, L-A will copy his, Thomas', Misha's and Suni's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Lost EVA Camera Update: The Kodak DCS 760 still camera lost overboard during EVA-3 is tracking below and in front of the station. After tomorrow's (FD11) Shuttle undocking, it will be approximately 100 nmi in front of Discovery, opening with >50 nmi per revolution. To prevent a reoccurrence of the loss, a tether has been added to the thermal shield of the camera for EVA-4 and Dycal, a dental epoxy, has been applied to the camera foot screw (to prevent its backing out). One of the two Shuttle digital cameras will be left on ISS to increase the onboard inventory.

[Before its application, the dental epoxy is mixed from Dycal Base and Dycal Catalyst.]

CDRA Update: The Carbon Dioxide Removal Assembly has worked nominally after the R&R of its adsorbent/desiccant bed #2. Due to low CO₂ levels, CDRA is now off to preserve hardware life but will be reactivated later today to support METOX (Metal Oxide) canister regeneration. *[The new CDRA sorbent bed is an updated*

version designed to prevent the release of Zeolite, which has been an issue with the previous design.]

IMV Valve Installation: The planned installation of an IMV (Intermodular Ventilation) valve at the Lab forward port remains on the discretionary “job jar” task list for L-A. If the task is performed after Shuttle departure, a special cap will be required to avoid having to repressurize PMA-2.

No CEO (Crew Earth Observation) photo targets uplinked for today. *[CEO ops are suspended for the duration of the STS-116 mission. Generation of daily target uplinks will resume on 12/23 assuming a nominal landing on 12/22].*

CEO photography can be viewed and studied at the websites:

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);
<http://earthobservatory.nasa.gov/>
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 7:23am EST [= epoch]*):

Mean altitude -- 341.7 km

Apogee height -- 357.6 km

Perigee height -- 325.7 km

Period -- 91.37 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0023719

Solar Beta Angle -- 19.3 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in last 24 hours -- 50 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46224

Significant Events Ahead (all dates Eastern and subject to change):

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12/19/06 -- STS-116/12A.1 undocking (5:09pm)

12/22/06 -- STS-116/12A.1 landing (KSC – 3:56pm or 5:33pm)

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch

01/20/07 -- Progress M-59/24P docking (DC1)

02/02/07 -- US EVA-6

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06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/16/06
Date: Saturday, December 16, 2006 3:11:52 PM
Attachments: [image001.jpg](#)

ISS On-Orbit Status 12/16/06

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – a busy 6th docked day for the ten-person crew of CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin, FE-2 Thomas Reiter, CDR Mark Polansky, PLT Bill Oefelein, FE-2-14 Sunita Williams, and MSs Robert Curbeam, Nick Patrick, Christer Fuglesang and Joan Higginbotham (see yesterday’s picture at bottom).*

After ISS crew wakeup at 10:12am EST (30 min. after Shuttle crew), the crews got ready for the third spacewalk, continuing cargo transfers and conducting two R&Rs. Sleep time for both crews is at 1:52am.

Before breakfast, FE-2 Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

Preparations for this afternoon’s EVA-3 were completed. The spacewalk, currently underway, is being conducted by Shuttle MS Bob Curbeam (EV1, red stripe) and FE-2-14 Sunita Williams (EV3, all white). Both spent another night “camping out” in the Airlock (A/L) at 10.2 psi (pounds per square inch) pressure. EVA began at 2:25pm EST and ends around 8:35pm. *[Major objectives: (1) completing the rewiring of the ISS EPS (Electrical Power System) to the permanent architecture (i. e., integrating the new P4 solar panels), today finishing with the EPS’ Channel 1/4 side; (2) installing an SSRMS grapple fixture, the AGB (Adjustable Grapple Bar), on the FHRC (Flexible Hose Rotary Coupler) on the A/L ESP-2 (Airlock External Stowage Platform-2); (3) relocating three SMDP (Service Module Debris Panel) debris shield bundles from the interior to a storage point on the PMA-3; and (4) troubleshooting the unretracted P6 4B SAW (Solar Array Wing) by slightly shaking the SAW grommet/wire mechanism.]*

Nick Patrick is in charge of the SSRMS (Space Station Remote Manipulator System) during spacewalk activities, carrying EV1.

In preparation for the EVA-3 power connection changes in conjunction with the Channel 1/4 power down, ground controllers and crew successfully transferred power feeds to the affected systems to the Channel 2/3 side. Subsequent checkouts of the systems were successfully completed.

As part of the EVA preps, FE-2 Reiter has again powered down the amateur radio equipment in the FGB to prevent RF interference with EVA communication links and the OpsLAN (Operations Local Area Network). Both will be turned on again after the spacewalk.

Afterwards, Mike L-A and Thomas are configuring the Lab DDCU (DC-to-DC Converter Unit) Rack 1 for the Channel 1/4 power down. *[They will place the DDCU Rack in Parallel mode and install the DDCU Parallel connector and the Channel 1/4 cable assembly.]*

To enable the DDCU Rack activities, Reiter first has to disassemble and tear down the CEVIS (Cycle Ergometer with Vibration Isolation). Afterwards, he will reinstall the CEVIS and restore it to its regular exercise status.

The EPS reconfiguration work by Curbeam and Williams, expected to take about 1.5 hrs to complete, was preceded by a carefully choreographed program of power-down commanding by flight controllers. *[Purpose: to place all associated equipment in a safe condition before opening the DCSU RBIs (Direct Current Switching Unit/Remote Bus Isolators) and thereby powering down the MBSUs (Main Bus Switching Units) and DDCUs (DC-to-DC Converter Units). Filling the EATCS Loop A with NH₃ (ammonia) coolant, pressurized by N₂ at 390 psi, has been successfully completed overnight. The time-critical activation of MBSU cooling on Loop A will be performed during the EVA. The EATCS Loop B has been running nominally since its activation on 12/14.]*

Lopez-Alegria and Tyurin have about two hours set aside on their schedule for a major IFM (In-flight Maintenance) job – R&R (Removal & Replacement) of one of the two absorbent beds (#202) of the CDRA (Carbon Dioxide Removal Assembly). *[Adsorbent/desiccant bed #2 has been nonfunctional with a “stuck open” check valve ever since 8/17/05, and the CDRA has operated in single-bed mode. It is hoped that the installation of a new unit will return the CDRA to full operation.]*

Mike L-A, Mikhail and Thomas have another ~4 hrs reserved for Shuttle transfers, topped off with the daily transfer status tagup with the ground scheduled at

~9:50pm. *[An estimated 51% of cargo transfers have been completed to date, with ~2500 lbs transferred from ISS to Spacehab and ~3400 lbs from Spacehab to ISS.]*

The CDR will later will collect cabin air readings in the ISS with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system of the SM SOGS (Pressure Control & Atmospheric Monitoring System). *[GANK tests for Methane (CH₄), Ammonia (NH₃), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO₂), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

The FE-2 is to conduct the remaining routine daily maintenance of the SM SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables and today also the weekly BRPK air/liquid condensate separator apparatus inspection, with a health check of its #2 condensate pump.

L-A is assigned to the daily update/edit of the standard IMS “delta file”, including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

After ingress of the EVA-3 spacewalkers, the crew will complete joint post-EVA operations including -

- Crewlock (CL) repress,
- EVA clean-up,
- EVA tool stowage,
- Remove Y-jumper cable in the Node (FE-2),
- Remove power jumper cable at Lab Avionics Rack 2 (CDR), and
- Download EVA imagery (FE-2).

As usual, time is set aside for the crew to conduct their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

P6 SAW Retraction Update: Troubleshooting of the incompletely retracted P6 4B Solar Array Wing continues. Actions by the IVA crew to “shake” the array via successive forward and reverse BGA (Beta Gimbal Assembly) rotations to loosen the guidewires were conducted yesterday along with a RED exercise session with specific excitation cycles. Subsequently the array was redeployed one bay in an attempt to retry the retraction. The retraction attempt was unsuccessful, and the

partially deployed configuration is now the same as it was before the attempt. This configuration is currently stable for completion of this mission. If time allows, the EVA-3 spacewalkers today will try to push slightly on the MDA (Motor Drive Assembly) override handle to try to build a small oscillation in the array and resettlement the grommets on the guidewires. *[The MDA sits atop the P6 truss, at the "highest" point of the ISS. The grommets are ring-like gadgets sliding on a guidewire, similar to curtain rings on a curtain pole. It is thought that one or several of these rings are snagged on the wire. There may also be other causes.]*

Solar Activity Update: Radiation levels are not a consideration for the EVA today, but radiation levels are expected to increase later tonight after the scheduled EVA.

Weekly Science Update (*Expedition Fourteen -- 12th*)

ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):

ALTCRISS activities have been performed on 12/06 and 12/07. Some problem was encountered with one of the memory cards. After exchange of the memory card, ALTEINO is functioning nominally and is now recording the current solar activity.

ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System): Planned.

BASE: Complete.

BCAT-3 (Binary Colloidal Alloy Test-3): Planned.

CAR-2 (Investigating Mechanisms of Heart Disease in Micro-G, ESA): CARD samples shall remain on board ISS until required cold download capability is provided.

CBOSS (Cellular Biotechnology Support Systems): Complete.

CFE (Capillary Flow Experiment): Complete.

CULT (Cultural Factors Questionnaire): Last (sixth) session for Thomas Reiter was successfully performed on 11/29.

DAFT (Dust & Aerosol Measurement Feasibility Test): Complete.

Earth Knowledge Acquired by Middle School Students (EarthKAM): In progress.

ETD (Eye Tracking Device): Last session (eighth) for Thomas Reiter was

performed successfully on 12/04.

GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology): Planned

IMMUNO (Saliva Sampling): Pre-pack activities are going on for download on STS-12A.1.

LEUKIN: Complete.

MISSE (Materials ISS Experiment): Ongoing.

MTR-2 (Russian radiation measurements): Passive dosimeters measurements in DC1 "Pirs". Removal of passive dosimeters from the MATRYOSHKA Phantom was performed on 12/07, with a download on STS-12A.1.

NOA (Nitric Oxide Analyzer): Last session for Thomas Reiter was successfully performed on 11/30.

Nutrition: Planned.

PK-3 (Plasma Crystal 3): In progress.

PMDIS (Perceptual Motor Deficits in Space): Sunita Williams has completed the first PMDIS activity on orbit. The photos have been downloaded into DIMS and the ground is currently reviewing.

POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G): Planned.

RC (Refrigerated Centrifuge): Planned.

RS (Renal Stone): Planned.

SAMPLE: Complete.

SEM (Space Experiment Module): Complete.

SLEEP: Ongoing for Sunita Williams.

SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite): In progress.

Swab (Characterization of Microorganisms & Allergens in Spacecraft): Planned.

TROPI (Study of Novel Sensory Mechanism in Root Phototropism): Planned.
Looking forward to having some of the frozen samples returned on STS-116. Also looking forward to the third Tropi experiment run in late December.

YING (Yeast in No Gravity): Complete.

CEO (Crew Earth Observations): Planned.

No CEO (Crew Earth Observation) photo targets uplinked for today. *[CEO ops are suspended for the duration of the STS-116 mission. Generation of daily target uplinks will resume on 12/20 assuming a nominal landing on 12/19].*

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

Significant Events Ahead (all dates Eastern and subject to change):

12/16/06 -- 12A.1 EVA-3 (6 hrs, EV1-Curbeam/EV3-Williams)

12/18/06 -- STS-116/12A.1 undocking (4:17pm)

12/21/06 -- STS-116/12A.1 landing @ KSC (4:17pm EST)

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch

01/20/07 -- Progress M-59/24P docking (DC1)

02/02/07 -- US EVA-6

02/06/07 -- US EVA-7

02/10/07 -- US EVA-8

03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

03/16/07 -- STS-117/13A launch -- S3/S4 trusses

03/18/07 -- STS-117/13A docking

03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

04/06/07 -- Progress M-59/24P undocking (DC1) & reentry

04/09/07 -- Progress M-60/25P launch

04/11/07 -- Progress M-60/25P docking (DC1)

04/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3

09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

Good-looking STS-116 and Expedition 14 crew members on 12/15.



From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/15/06
Date: Friday, December 15, 2006 1:38:45 PM
Attachments:

ISS On-Orbit Status 12/15/06

All ISS systems continue to function nominally, except those noted previously or below.

Great news! SARJ (Solar Alpha Rotary Joint) with the new P4 arrays is tracking the sun as expected. The ammonia cooling loop is performing very well, too.

After ISS crew wakeup at 10:18am EST (30 min. after Shuttle crew), the ten station occupants today are working another busy schedule, with some off-duty time to rest after yesterday's second spacewalk. Sleep time for both crews is at 1:50am.

All EVA-2 objectives last night were accomplished with complete success and no issues. *[The second spacewalk by Bob "Beamer" Curbeam and Christer Fuglesang began at 2:41pm EST, ahead of schedule, and ended at 7:41pm, lasting 5h. It was the 75th spacewalk for ISS assembly & maintenance and the 27th from the "Quest" Airlock. As of now, 50 NASA astronauts, 14 Russians and seven astronauts representing Japan, Canada, France, Germany and Sweden have logged 455 hrs 50 min outside the station on building and maintaining it. During EVA-2, Curbeam and Fuglesang –*

- *reconfigured electrical cables of power channels 2 & 3,*
- *relocated both CETA (Crew & Equipment Translation Aid) carts, clearing the way for the MT (Mobile Transporter) to move to WS-2 (Worksite 2) on the S1 truss for 13A assembly tasks;*
- *installed insulation on the force moment sensors of ISS SSRMS LEEs (Space Station Remote Manipulator System/Latching End Effectors),*
- *reconfigured electrical cables on the Z1 truss patch panel, and*
- *inventoried EVA equipment before ingressing.*

Flight controllers began sending commands at 4:45pm to power up the electrical systems in their new configuration. The remaining two channels (1 & 4) will be rewired during the mission's third spacewalk by Curbeam and Williams, scheduled tomorrow (Saturday). The ground also successfully performed the time-critical

activation of ammonia (NH₃) cooling loop B on the P1 truss.]

While the ground today continues reactivating electrical systems on channels 2 & 3, filling the starboard side loop of the EATCS (External Active Thermal Control System) with NH₃, and getting ready to power down electrical channels 1 & 4, the onboard crew prepares for tomorrow's EVA-3, led off by an overnight Airlock (A/L) campout by Curbeam and Williams, joined before the EVA by Oefelein, Fuglesang and Lopez-Alegria on prebreathe, for assistance.

Before breakfast, FE-2 Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

Reiter also set up and undertook his final biweekly NOA/Nitric Oxide Analyzer session, later filling in the electronic log book on the RSE1 laptop. Afterwards, he was to downlink measurements from the RSE laptop via OCA and pack up the experiment for return. *[Purpose of the ESA experiment ESANO1, consisting of the "Platon" analyzer and its power supply, is to monitor expired nitric oxide (NO) in the subject's exhaled air to detect signs of airway inflammation and indications of venous gas emboli (bubbles) that may be caused by inhalation of pollutants in the closed environment of the ISS cabin and increased risk of decompression sickness.]*

FE-1 Tyurin will perform maintenance on the SRV-K2M condensate water processing equipment, replacing the Elektron circuit's multifiltration/purification column unit (BKO). *[The BKO, which provides processed water to the oxygen generator, has reached the end of its service life and will be returned to the ground, after today's last water sampling. The BKO removes dissolved mineral and organic impurities from the condensate. Downstream from it, the condensate water is treated in the BKV water conditioning unit with salts for taste and silver ions for preservation, before it flows to the KPV potable water container.]*

FE-2 Reiter is also scheduled for a half-hour IFM (inflight maintenance), replacing the old ORCA (Oxygen Recharge Compressor Assembly) with a new unit delivered on STS-116. *[ORCA is used for pumping Shuttle O₂ to the ISS Airlock tanks.]*

Reiter will initiate (and later terminate) another transfer of water from the Lab condensate collection tank to a CWC (Contingency Water Container).

The CDR is timed for removing and replacing the CBA (Charcoal Bed Assembly) of the Lab TCCS (Trace Contaminant Control Subassembly), stowing

the old CBA in packaging for return to Earth.

Mike L-A also conducts the weekly audit/inventory of the available CWCs (Contingency Water Containers) and their contents, to keep track of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week.]*

After the ground-commanded reactivation of the LA-2 MDM (Multiplexer/Demultiplexer) computer as part of systems power-ups, Thomas Reiter will perform a functionality checkout of the associated C&W (Caution & Warning) Panel.

As part of continuing cargo transfers, FE-2-14 Sunita Williams has time reserved for the transfer of the CGBA (Commercial Generic Bioprocessing Apparatus) payload from Discovery to the ISS. *[CGBA comprises two educational experiments to be utilized by middle school students. One experiment will examine seed germination in micro-G including gravitropism (plant growth towards gravity) and phototropism (plant growth towards light). The second experiment investigates how micro-G affects the model organism Caenorhabditis elegans, a small nematode worm.]*

A crew tagup with the ground on transfer status is scheduled for ~10:20pm.

Mikhail Tyurin is handling Progress M-58/23P cargo transfers, with commensurate IMS (Inventory Management System) updating.

L-A will unpack and check out a new RSP (Respirator Support Pack, #1004) that arrived with 12A.1. Upon verification of proper functioning, the old RSP (#1002) will be packed for return to Earth.

Tyurin will transfer two items from the old ALSP (Advanced Life Support Pack) to the newly arrived ALSP.

Preparatory steps to be undertaken by Misha, L-A and Thomas for tomorrow's EVA-3, the preceding campouts and the Channel 1/4 power-downs include -

- reactivating the PDIM (Power/Data Interface Module) of the MedOps defibrillator equipment, plus
- Reiter reconfiguring the OpsLAN (Operations Local Area Network) by returning the SSC (Station Support Computer) laptops 4,5,7,8 and FS (File Server) to their original power sources,
- reconfiguring the A/L for the 1/4 powerdown, preceded by temporary shutoff of the A/L's PCS (Portable Computer System) A31p laptop, and
- swapping the Lab CCAA (Common Cabin Air Assembly) air conditioner from the port to the starboard unit as a get-ahead for tomorrow's (FD8) power

systems (EPS) Channel 1/4 reconfiguring.

Suni will conduct preparations for her first spacewalk, e.g., size-fitting her EMU (Extravehicular Mobility Unit) and, along with L-A and Misha, spending an hour on reviewing EVA procedures.

Williams, Lopez-Alegria and Reiter again have ~2.5 hrs set aside for handover activities to familiarize Suni with onboard equipment and procedures.

Suni also has another hour scheduled for ISS familiarization and adaptation, to help in adjusting to her new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

The CDR conducts the remaining routine daily maintenance of the SM SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Reiter is assigned to the daily update/edit of the standard IMS "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Mike L-A is to do the periodic atmospheric status checks for ppO₂ (Partial Pressure Oxygen) and ppCO₂ (pp Carbon Dioxide), using the CSA-O₂ (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO₂ Monitoring Kit). Batteries are to be replaced if necessary. *[CSA-CP measurements are to be gathered with units #1055 (prime) at the SM Central Post & #1053 (backup) in the Node, CSA-O₂ (#1042, #1063) in the Lab, and CDMK (#1009) in SM and Lab. The instruments will be turned off afterwards, except for #1055, and returned to their regular locations.]*

As usual, time is set aside for the crew to conduct their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Misha will copy his, L-A's and Thomas' exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

The crew also worked with Suni Williams to familiarize her with the onboard exercise equipment and protocols.

At ~2:10pm EST, Thomas Reiter and Christer Fuglesang are scheduled for a televised PAO interactive VIP event for the ESA exhibit at the “Kulturhuset” Exhibition in Stockholm/Sweden, attended by Crown Princess Victoria (the future Queen of Sweden), Maud Olofsson, Sweden’s Deputy Prime Minister, and others.

The joint crew will assemble for the traditional crew photograph at ~3:30pm and afterwards support an interactive TV news conference with U.S. and Swedish media at NASA centers and Swedish media at Kulturhuset, ESA Exhibition, in Stockholm.

In addition, at ~5:28pm, L-A and Misha are scheduled for two televised media interviews, one with KNX Radio (Ron Kilgore), Los Angeles, the other with National Public Radio (NPR, Andrea Seabrook)’s “Weekend Edition”.

Later tonight (~midnight EST), Suni, Beamer and Bill Oefelein will start PBA mask prebreathe for denitrogenation, while configuring EVA tools, then depress the A/L to 10.2 psi for the campout.

Yesterday’s replacement of the TVIS gyroscope by the crew was accomplished successfully. *[The R&R was required due to the gyro’s limited life. As part of this activity, the crew removed the TVIS from the SM “pit” (floor opening) and then opened its body to access the gyro, which was removed and replaced with a new one delivered by 12A.1. TVIS was re-assembled and replaced in the pit, followed by activation and checkout. TVIS was declared operational and cleared for nominal operations.]*

P6 SAW Retraction Update: In support of troubleshooting the Solar Array Wing 4B retraction, the array was “wiggled” this morning to try and resolve grommet-to-guidewire snagging, by moving the 4B BGA (Beta Gimbal Assembly) through 10 degrees and back ~60 sec later. The BGA cycle will be tested prior to the Shuttle water dump today, and if it indicates acceptable array settling, the retraction may be attempted again after the water dump. Other IVA activities are under consideration, and ground teams are also assessing EVA options, either a 12A.1 EVA-4 or a later Stage 12A.1 EVA (but prior to 14S relocation).

Solar Activity Update: Due to the solar events, the Earth’s atmospheric density at orbit altitude was 2.5 times greater than nominal. This caused high momentum on ISS while being controlled by the U.S. Momentum Manager, with CMGs approaching saturation. The decision was made to hand control over to Orbiter VRCS (Vernier Reaction Control System) for the crew sleep period.

No CEO (Crew Earth Observation) photo targets uplinked for today. *[CEO ops are suspended for the duration of the STS-116 mission. Generation of daily target uplinks will resume on 12/20 assuming a nominal landing on 12/19].*

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 7:41am EST [= epoch]*):

Mean altitude -- 341.6 km

Apogee height -- 357.6 km

Perigee height -- 325.7 km

Period -- 91.37 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0023728

Solar Beta Angle -- 26.1 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in last 24 hours -- 44 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46177

Significant Events Ahead (all dates Eastern and subject to change):

12/16/06 -- 12A.1 EVA-3 (6 hrs, EV1-Curbeam/EV3-Williams)

12/18/06 -- STS-116/12A.1 undocking (4:17pm)

12/21/06 -- STS-116/12A.1 landing @ KSC (4:17pm EST)

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch

01/20/07 -- Progress M-59/24P docking (DC1)

02/02/07 -- US EVA-6

02/06/07 -- US EVA-7

02/10/07 -- US EVA-8

03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

03/16/07 -- STS-117/13A launch -- S3/S4 trusses

03/18/07 -- STS-117/13A docking

03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

04/06/07 -- Progress M-59/24P undocking (DC1) & reentry

04/09/07 -- Progress M-60/25P launch

04/11/07 -- Progress M-60/25P docking (DC1)
04/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/14/06
Date: Thursday, December 14, 2006 2:31:10 PM
Attachments:

ISS On-Orbit Status 12/14/06

All ISS systems continue to function nominally, except those noted previously or below.

After ISS crew wakeup at 10:48am EST (30 min. after the Shuttle crew), the ten station occupants today are working another very busy schedule, preparing for the second spacewalk and continuing cargo transfers. Sleep time for both crews is at 1:10am.

Before breakfast, FE-2 Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

FE-1 Tyurin collected final water samples from downstream of the Elektron system's multifiltration/purification column unit (BKO). *[The BKO, which provides processed water to the oxygen generator, has reached the end of its service life and will be returned to the ground, after today's last water sampling.]*

Tyurin will also perform inspection & maintenance work on SD1-7 lighting fixtures in the Service Module (SM). *[The electrical continuity testing will be done with the "Elektronika" MMTs-01 Volt/Amp Multimeter on the applicable multi-pin socket.]*

Preparations are underway for tonight's EVA-2, again to be conducted by Shuttle Mission Specialists Bob Curbeam (EV1, red stripe) and Christer Fuglesang (EV2, all white), who spent a second night "camping out" in the Airlock (A/L) at 10.2 psi pressure. The spacewalk is currently scheduled to begin at ~3:12pm EST and to end at ~9:42pm. *[Major objectives: (1) reconfigure the ISS EPS (Electrical Power System) to the permanent architecture, drawing power from the P4 solar panels, beginning with the EPS' Channel 2/3 side; (2) relocate two CETA (Crew &*

Equipment Translation Aid) carts from their current locations on the S1 truss to the S0 on top of the Lab to allow the MT (Mobile Transporter) to move to the S1 WS-2 (Worksite 2) for next year's installation of the S3/S4 truss elements (13A/STS-117); (3) install a thermal blanket on the SSRMS LEE (Space Station Remote Manipulator System/Latching End Effector) force moment sensors; and (4) reconfigure power to the Z1 truss electrical patch panel 6. EV2 will also retrieve the starboard and port QD (quick disconnect) bags, filled with maintenance hardware and tools, from the A/L and relocate the bags on top of the A/L.]

Mike Lopez-Alegria, Sunita Williams and Bill Oefelein are spending several hours under "Campout" conditions (10.2 psi) in the Airlock (A/L) with Curbeam and Fuglesang, purging the EMUs (Extravehicular Mobility Units) for prebreathing (nitrogen desaturation), then, wearing the PBA (Portable Breathing Apparatus), repressing the A/L to ISS cabin pressure and opening the hatch to the Node (starboard) while continuing the prebreathe. Next steps include entering the A/L CL (Crewlock) and conducting its depressurization prior to EVA begin (~3:12pm). *[During the overnight Campout, another current spike occurred on the MCA (Major Constituents Analyzer) ion pump, introducing additional O₂. The decision was made to forego use of this automated system for the remainder of the flight, relying on manual control instead.]*

Suni and Joan Higginbotham will be in charge of the SSRMS for the EVA, supporting the spacewalkers in the relocation of the two CETA carts.

As part of the EVA preps, FE-2 Reiter has again powered down the amateur radio equipment in the FGB to prevent RF interference with EVA communication links and the OpsLAN (Operations Local Area Network). Both will be turned on again after the spacewalk.

Afterwards, Thomas and Mikhail will configure the Lab DDCU (DC-to-DC Converter Unit) rack for the Channel 2/3 power down. *[They will place the DDCU Rack in Parallel mode and install the DDCU Parallel connector and the Channel 2/3 cable assembly.]*

The EPS reconfiguration work by Curbeam and Fuglesang, expected to take about 1.5 hrs to complete, will be preceded by a carefully choreographed program of power-down commanding by flight controllers. *[Their purpose is to place all associated equipment in a safe condition before opening the DCSU RBIs (Direct Current Switching Unit/Remote Bus Isolators) and thereby powering down the MBSUs (Main Bus Switching Units) and DDCUs (DC-to-DC Converter Units). Turning the MBSUs back on again afterwards is a prerequisite for powering the EATCS (External Active Thermal Control System) to cool the MBSUs in the first*

place before they overheat (it is estimated that they can run OK without cooling for an hour). Filling the EATCS Loop B with NH₃ (ammonia) coolant, pressurized by N₂ at 390 psi, has been successfully completed overnight. The EATCS has never been tested as an integrated system in its on-orbit configuration.]

Reiter and Lopez-Alegria have three hours set aside on their schedule for a major IFM (Inflight Maintenance) job: removing the stabilizing gyroscope from the body of the TVIS treadmill and replacing it with the new unit delivered on STS-116. After the R&R, Thomas and L-A have an additional two hours for activating the TVIS and performing a checkout of it.

In support of CDRA (Carbon Dioxide Removal Assembly) activation from the ground, the CDR will connect the CDRA's coolant line to the ITCS LTL (Internal Thermal Control System/Low Temperature Loop) at the LAB1D6 rack.

Since without Ku-band downlink the ground has currently no insight into MELFI (Minus-Eighty Laboratory Freezer for ISS), with Brayton motor running), Mike L-A will check up on its status. *[This involves actuating the Dewar 1 & Dewar 2 adjust switches and verifying the -95 deg setpoint.]*

Today is the second of two big cargo transfer days for Joan, Nick Patrick, Mikhail and Thomas, with several hours scheduled again for Shuttle-to-ISS and ISS-to-Shuttle transfers. *[As of this morning, 39% of transfers were completed, plus the transfer of two CWCs (Contingency Water Containers) from Shuttle to ISS. Return cargo is being configured in the Shuttle Middeck and in the Spacehab module. A tagup with transfer specialists at MCC-H will again be conducted 11:20pm tonight to report progress.]*

The FE-1 conducts the remaining routine daily maintenance of the SM SOZh system (Environment Control & Life Support System, ECLSS), including ASU toilet facilities systems/replaceables.

Misha is also assigned to the daily update/edit of the standard IMS (Inventory Management System) "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The crew has a reduced physical exercise program today, on the TVIS treadmill (FE-2), RED resistive exerciser (CDR), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Misha will copy his, L-A's and Thomas' exercise data files to the MEC

(Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~2:35pm, Tyurin is scheduled to downlink congratulatory TV greetings to the employees of "Department 3" on their 35th Anniversary.

O₂ (oxygen) transfer was completed yesterday, for a total of 69 lbs. In addition, 20 lbs of N₂ nitrogen) have been transferred so far (total transfer will be 50-60 lbs).

P6 SAW Retraction Update: Solar Array Wing 4B retraction last night stopped short when guide wires snagged on the grommets, and could not be completed. Retraction came to a halt at bay 17.5. This provides enough clearance to allow a nominal SARJ (Solar Alpha Rotary Joint) rotation (which successfully executed). However, permissible loads on the partially retracted structure would be exceeded during the docking of Soyuz TMA-10/14S after its planned relocation to the FGB nadir port in April 2007. Ground teams are currently assessing IVA (Intravehicular Activity) and EVA options, either a 12A.1 EVA-4 or a later Stage 12A.1 EVA (but prior to 14S relocation). For the first case, consideration is currently given to a back-to-back EVA after EVA-3, i.e., on next Sunday, 12/17.

Solar flare Update: On 12/12, a solar flare was detected after the EVA-1 crew's nominal ingress into ISS. In order to avoid a possible overnight wake-up call to alert the crew, the ground provided them with a list of recommended locations in the ISS and the Orbiter before sleep time. Subsequently, high energy particles have diminished from the previous flare event. *[If there were another significant solar event tonight, EVA get-ahead tasks would not be performed, an earlier ingress would be considered, and the use of the SSRMS would be prohibited if its radiation limit is exceeded (there are no concerns with the Shuttle's SRMS usage)*

No CEO (Crew Earth Observation) photo targets uplinked for today. *[CEO ops are suspended for the duration of the STS-116 mission. Generation of daily target uplinks will resume on 12/20 assuming a nominal landing on 12/19].*

CEO photography can be viewed and studied at the websites:

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ISS Orbit (as of this morning, 7:19am EST [= epoch]):

Mean altitude -- 342.1 km

Apogee height -- 358.0 km

Perigee height -- 326.2 km

Period -- 91.38 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0023653

Solar Beta Angle -- 27.4 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in last 24 hours -- 125 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46161

Significant Events Ahead (all dates Eastern and subject to change):

12/14/06 -- 12A.1 EVA-2 (6 hrs, EV1-Curbeam/EV2-Fuglesang)

12/16/06 -- 12A.1 EVA-3 (6 hrs, EV1-Curbeam/EV3-Williams)

12/18/06 -- STS-116/12A.1 undocking (4:17pm)

12/21/06 -- STS-116/12A.1 landing @ KSC (4:17pm EST)

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch

01/20/07 -- Progress M-59/24P docking (DC1)

02/02/07 -- US EVA-6

02/06/07 -- US EVA-7

02/10/07 -- US EVA-8

03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

03/16/07 -- STS-117/13A launch -- S3/S4 trusses

03/18/07 -- STS-117/13A docking

03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

04/06/07 -- Progress M-59/24P undocking (DC1) & reentry

04/09/07 -- Progress M-60/25P launch

04/11/07 -- Progress M-60/25P docking (DC1)

04/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3

09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/13/06
Date: Wednesday, December 13, 2006 3:01:04 PM
Attachments:

ISS On-Orbit Status 12/13/06

All ISS systems continue to function nominally, except those noted previously or below.

**P5 spacer installation at the P4 truss was nominal, with no issues.
All EVA-1 objectives were accomplished ahead of schedule, plus some work targeted for EVA-2.**

After crew wakeup at 10:50am EST, the ten station occupants today are working a very busy schedule. Sleep time is at 1:10am.

Last night, EVA-1 was completed successfully. It began at 3:31pm EST and ended at 10:07pm, lasting 6h 36m. It was the 74th spacewalk for ISS assembly & maintenance and the 26th from the "Quest" Airlock. As of now, 49 NASA astronauts, 14 Russians and six astronauts representing Japan, Canada, France, Germany and Sweden have logged 450 hrs 50 min outside the station on building and maintaining it. *[During EVA-1, Shuttle Mission Specialists Bob Curbeam and Christer Fuglesang released launch restraint locks on the P5 spacer before its placement by the SSRMS (Space Station Remote Manipulator System), tightened the P5 attachment bolts, mated the P5-P4 umbilicals, relocated the PVRGF (Photo Voltaic Radiator Grapple Fixture), cycled the CLA (Capture Latch Assembly), replaced the S1 outboard lower TV camera, and removed two of the four P5 outboard launch locks (corners 3 & 4) as get-ahead tasks. Although the bolt of the PVRGF ground strap did not achieve the expected preflight turn count, ground specialists determined that it could be left "as is" with about eight bolt turns. A 5/8" EVA wrench socket extension was lost near the end of the EVA, preventing the removal of the other two P5 outboard launch locks (corners 1 & 2). At this writing, radar has not yet acquired the debris for trajectory analysis, but downlinked video provides some data. At the end of yesterday's spacewalk, the ISS MT (Mobile Transporter) and SSRMS (Space Station Remote Manipulator System) were relocated from WS-8 (Workstation 8) to WS-3 in preparation for today's P6 solar*

array retraction.]

After wakeup, before breakfast, FE-2 Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. Later today, he will also conduct skin measurements to evaluate the past treatment and fill out the experiment questionnaire. (Last time done: 11/29). *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit. The noninvasive medical equipment used by the experiment are the Tewameter (from TEWL = transepidermal water loss, one of the most important biophysical parameters for evaluating the efficiency of the human skin water barrier), the Corneometer (to accurately determine the hydration level of the skin surface) and the VisioScan which takes direct measurements of the skin topography (structure & level of dryness) with a special UV-A (Ultraviolet A) light video camera with high resolution.]*

Also before breakfast, CDR Lopez-Alegria, FE-1 Tyurin and Reiter performed their sixth periodic Russian biomedical assessments PZeh-MO-7 (Calf Volume Measurement) and PZeh-MO-8 (Body Mass Measurement), using the IM mass measurement device, later breaking it down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference points, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G, where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

The retraction of the portside SAW (Solar Array Wing) on the P6 truss began at 1:28pm EST and is proceeding haltingly at the time of writing. Full retraction, if it can be accomplished, is expected to take approximately 6 hours. *[A minimum of 40% of the array (~12.6 bays) must be retracted to provide enough clearance for activation of the P4 SARJ (Solar Alpha Rotary Joint) tested during STS-115. It will be redeployed after the P6 truss is relocated to the end of the P5 truss during 10A in 2007. The P6 starboard array will be retracted during 13A.]*

Today is the first of two big cargo transfer days for Joan Higginbotham, Nick Patrick, Mikhail Tyurin and Thomas Reiter, with several hours scheduled for Shuttle-to-ISS and ISS-to-Shuttle transfers. *[Hardware deliveries include a new TVIS gyroscope, to be installed in the treadmill tomorrow, a SAFER (Simplified Aid for EVA Rescue) unit for being checked out by L-A, and two full CWCs (Contingency*

Water Containers). Return cargo is being configured in the Shuttle Middeck and in the Spacehab module. A tagup with transfer specialists at MCC-H will be conducted 12:20am to discuss progress.]

About 50 lbs of O₂ (oxygen) have been transferred to ISS tankage. Mike L-A and Thomas will re configure the O₂ transfer equipment to support the next Campout tomorrow morning by Curbeam and Fuglesang for EVA-2 plus the additional three crewmembers in the A/L during EVA preps (Suni, L-A, Bill Oefelein).

In preparation for the A/L stay, Lopez-Alegria will replace the expired PBA (Portable Breathing Apparatus) units with new ones.

Mike will also prepare powering off systems in anticipation of the reconfiguration of power channels 2 & 3 by the two spacewalkers during EVA-2, which requires shutting down power to the two channels beforehand.

To reconfigure the A/L for the powerdown, the CDR will temporarily shut off its PCS (Portable Computer System) A31p laptop.

L-A also will switch off the PDIM (Power/Data Interface Module) of the MedOps defibrillator equipment and temporarily turn off the OpsLAN (Operations Local Area Network) for relocating SSC (Station Support Computer) laptops 4,5,7,8 and FS (File Server) to an alternate power source.

Lopez-Alegria and Williams have ~2.5 hrs set aside for handover activities, i.e., L-A familiarizing Suni with onboard equipment and procedures.

Williams also has another two-and-a-half hours scheduled for ISS familiarization and adaptation, to help in adjusting to their new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

Misha Tyurin will perform the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water from an EDV containing water from the BKO multifiltration/purification column unit. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh-8 Liquid Unit where they could cause Elektron shutdown.]*

The FE-1 conducts the remaining routine daily maintenance of the SM SOZh system (Environment Control & Life Support System, ECLSS).

Thomas and Suni, as a handover activity, are scheduled for the daily update/edit of the standard IMS (Inventory Management System) "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

As usual, time is set aside for the crew to conduct their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Misha will copy his, L-A's and Thomas' exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At 12:40pm, Tyurin downlinked TV greetings to the participants of an upcoming gala dinner dedicated to the 100th Anniversary of the Birth of Sergei P. Korolev, to take place on 1/12/07 at the Kremlin State Palace. Afterwards, all ISS crewmembers joined in reading a message of greetings in Russian. The downlink was recorded at TsUP/Moscow for replay at the dinner.

No CEO (Crew Earth Observation) photo targets uplinked for today. *[CEO ops are suspended for the duration of the STS-116 mission. Generation of daily target uplinks will resume on 12/20 assuming a nominal landing on 12/19].*

CEO photography can be viewed and studied at the websites:

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ISS Orbit (*as of this morning, 10:16am EST [= epoch]*):

Mean altitude -- 342.2 km

Apogee height -- 358.2 km

Perigee height -- 326.2 km

Period -- 91.38 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0023856

Solar Beta Angle -- 28.2 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in last 24 hours -- 140 m
Revolutions since FGB/Zarya launch (Nov. 98) -- 46147

Significant Events Ahead (all dates Eastern and subject to change):

12/14/06 -- 12A.1 EVA-2 (6 hrs, EV1-Curbeam/EV2-Fuglesang)
12/16/06 -- 12A.1 EVA-3 (6 hrs, EV1-Curbeam/EV3-Williams)
12/18/06 -- STS-116/12A.1 undocking (4:17pm)
12/21/06 -- STS-116/12A.1 landing @ KSC (4:17pm EST)
01/17/07 -- Progress M-57/22P undocking (DC1) & reentry
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02/02/07 -- US EVA-6
02/06/07 -- US EVA-7
02/10/07 -- US EVA-8
03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
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03/16/07 -- STS-117/13A launch -- S3/S4 trusses
03/18/07 -- STS-117/13A docking
03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/12/06
Date: Tuesday, December 12, 2006 2:15:46 PM
Attachments:

ISS On-Orbit Status 12/12/06

All ISS systems continue to function nominally, except those noted previously or below.

STS-116/Discovery docked smoothly last night at the PMA-2 (Pressurized Mating Adapter-2) port at 5:12pm EST, and the station hosts ten occupants again. *[All docking hooks were closed at 5:24pm, and the station was reoriented as planned to minimize the risk of micrometeoroid/debris impacts upon the Shuttle (-x-axis in local vertical, -z-axis in velocity vector). Hatches were open at 6:53pm, and the new crew was welcomed aboard the ISS and given the mandatory safety briefing. Later, the P5 truss was unberthed in the Shuttle PLB (Payload Bay) with the SRMS (Shuttle Remote Manipulator System), with auto-release of the LEE (Latching End Effector) working again, lifted out of the PLD and parked in its overnight position.]*

Sunita Williams officially replaced Thomas Reiter as Expedition 14 FE-2 at midnight EST upon completion of the installation of her Soyuz TMA-9 seat liner and transfer of her Sokol suit equipment in place of Reiter's equipment. Reiter is now considered a member of the 12A.1 crew. *[Thomas joined the Expedition 13 crew on 7/6/06 arriving on Flight ULF1.1 and then transferred to Expedition 14 on 9/20 during Expedition 13/14 joint ops. With his planned departure on 12/18, Reiter will have spent 166 days on ISS.]*

Wakeup time for the ISS crew, now comprising four, shifted once more, to 11:18am EST, with sleep time tomorrow morning at 2:18am.

Preparations are getting underway for tonight's EVA-1, to be conducted by Shuttle Mission Specialists Bob Curbeam (EV1, red stripe) and Christer Fuglesang (EV2, all white). The spacewalk is currently scheduled to begin at ~3:37pm EST and to end at ~9:30pm. *[Major objectives: (1) install the P5 spacer (EV1/EV2 first to remove launch locks, then guide the alignment & installation of P5 at the P4 truss by Williams on the SSRMS, and finally tighten P5 attachment bolts with the PGT/*

Pistol Grip Tool); (2) remove the PVRGF (Photovoltaic Radiator Grapple Fixture from P5 and stow it for the time being on the MBS (Mobile Base System) until it can be transferred to the P6 aft radiator on a later spacewalk; and (3) remove & replace a TV camera located at port 3 of the S1 truss element that is needed to view clearances during future truss installations.]

CDR Lopez-Alegria and PLT Oefelein are spending several hours under “Campout” conditions (10.2 psi) in the Airlock (A/L) with Curbeam and Fuglesang, purging the EMUs (Extravehicular Mobility Units) for prebreathing (nitrogen desaturation), then repressing the A/L to ISS cabin pressure and opening the hatch to the Node (starboard) while continuing the prebreathe. Next steps include outfitting EV1 and EV2 with their SAFER (Simplified Aid for EVA Rescue) units, then entering the A/L CL (Crewlock) and conduct its depressurization prior to EVA begin (~3:37pm). *[During the overnight Campout, a current spike occurred on the MCA (Major Constituents Analyzer) ion pump, causing a momentary shift in O₂ readings (slight increase). Nitrogen (N₂) was added to compensate. No violations or issues to crew or EVA. Ground controllers are considering to control this manually for EVA-2 and -3. The EV2 suit was found to have one of its four helmet light bulbs failed. Christer is good with three.]*

The new FE -2, Suni Williams, is in charge of the SSRMS for the EVA, first configuring it for the P5 and moving it to the lock removal position, then maneuvering it with extreme precision for the P5 coarse alignment cone to capture the P4 soft capture pin, assisted by Mike L-A and Joan Higginbotham. *[EV1 & EV2, hovering nearby, will then drive the attachment bolts, attach grounding straps on each corner, connect six cables and remove the soft capture pins. The SSRMS will finally be maneuvered to P6 SAW (Solar Array Wing) retract position (the ~5-hr. retraction of the P6 port SAW will be done tonight before crew sleep. Retraction of the starboard SAW is planned during STS-117 next March).]*

Williams also will undertake her first session with the new PMDIS (Perceptual Motor Deficits in Space) experiment, which she brought on board, setting it up, installing the hardware and conducting the first data collection. Results will then be copied to CD and the equipment stowed for the next run. *[PMDIS investigates why Shuttle astronauts experience difficulty with hand-eye coordination while on orbit. PMDIS will attempt to distinguish between the three current theories for this initial decline in hand-eye coordination in space {the current explanations are as follows: The brain isn't adapting to the weightlessness of space; the difficulty of performing fine movements when floating in space; and stress due to factors such as space sickness and sleep deprivation}. PMDIS first measures the Shuttle astronaut's hand-eye coordination prior to docking with ISS (transition from 1-g to zero-g). Measurements are taken while the astronaut's arm is securely supported or floating*

free in three conditions: Tapping targets on a computer screen with a stylus and moving a cursor between the targets with a joystick, performing these tasks while responding to tones presented via earphones with a button press. The experiment will test the theory that the loss of eye-hand coordination during spaceflight is due to the disruption of certain neural circuits in the human brain, arising from a disruption in the vestibular system.]

FE-2 Reiter powered down the amateur radio equipment in the FGB to prevent RF interference during the spacewalk.

Afterwards he and FE-1 Tyurin are to assist Suni Williams in size-fitting her Russian “Kentavr” (Centaur) suit, in preparation for a Soyuz return to Earth. The activity will be supported by a tagup with ground specialists via S-band, as required. *[The Russian Kentavr garment is a protective anti-g suit ensemble to facilitate the return of a long-duration crewmember into the Earth gravity. Sizing consists of adjusting lacing on the outer side of the shorts and on the inner side of the gaiters to achieve a tight fit.]*

Misha will also work with Suni on her Sokol spacesuit, checking it for proper size, conducting a leak check and later setting it up for dry-out, then doing the same for the gloves.

In the Service Module (SM), Tyurin is to perform maintenance on the Onboard Equipment Control System (SUBA) by removing and replacing an SR2 lighting fixture (panel 307).

Thomas Reiter, with Misha’s assistance, will performed the periodic (monthly) functional closure test of a spare emergency vacuum valve (AVK) for the Vozdukh CO₂ removal system, in the spare parts kit. *[The AVKs are critical because they close the Vozdukh's vacuum access lines in the event of a malfunction in the regular vacuum valves (BVK) or a depressurization in the Vozdukh valve panel (BOA). Access to vacuum is required to vent carbon dioxide (CO₂) during the regeneration of the absorbent cartridges (PP). During nominal operation, the AVK valves remain open.]*

Reiter is also assigned to do the daily update/edit of the standard IMS (Inventory Management System) “delta file”, including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Williams has two-and-a-half hours set aside on today’s schedule for ISS familiarization and adaptation, to help in adjusting to their new surroundings and

activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

Suni's schedule also includes ~45 min. of handover activity with FE-2 Reiter.

Tyurin will take photography of two panels in the SM to help the ground making the best choice for stowage of Matryoshka experiment gear (the anthropomorphic "Phantom") inside the SM for the duration of Expedition 15.

When not otherwise occupied, all crewmembers also are busy with Shuttle-to-ISS and ISS-to-Shuttle cargo transfers.

Shortly before dinner time (12:50am), Mike L-A and Thomas will configure the equipment for transferring O₂ from Shuttle to the ISS and then initiate the transfer (~70 lbs).

As usual, time is set aside for the crew to conduct their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2/only), and RED resistive exerciser (CDR), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Misha will copy his, L-A's and Thomas' exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

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12/14/06 -- 12A.1 EVA-2 (6 hrs, EV1-Curbeam/EV2-Fuglesang)
12/16/06 -- 12A.1 EVA-3 (6 hrs, EV1-Curbeam/EV3-Williams)
12/18/06 -- STS-116/12A.1 undocking (4:17pm)
12/21/06 -- STS-116/12A.1 landing @ KSC (4:17pm EST)
01/17/07 -- Progress M-57/22P undocking (DC1) & reentry
01/18/07 -- Progress M-59/24P launch
01/20/07 -- Progress M-59/24P docking (DC1)
02/02/07 -- US EVA-6
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04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/11/06
Date: Monday, December 11, 2006 2:56:04 PM
Attachments:

ISS On-Orbit Status 12/11/06

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 12 of Increment 14. Most onboard activities today are to prepare for 12A.1 arrival. [Today 34 years ago, Gene Cernan & Jack Schmitt of Apollo 17 walked on the Moon, the last humans for a while (a rather long one, though).]*

STS-116/Discovery continues to catch up with the ISS, with its crew of CDR Mark Polansky, PLT Bill Oefelein, and MSs Nick Patrick, Bob Curbeam, Joan Higginbotham, Christer Fuglesang and Suni Williams, for docking tonight at 5:05pm EST. *[In preparation for the docking, the station maneuvered to docking attitude (LVLH, Yaw/Pitch/Roll 0/0/0) at 1:52pm and will go into free drift immediately before the linkup. The RPM (Rendezvous Pitch Maneuver) will be performed at ~4:05-4:16pm for the ISS crew to take photo and video documentation of the TPS (Thermal Protection System). With the docking, station occupancy temporarily increases to ten persons, and ISS Stage 12A.1 begins. Objective of the 12-day mission: Deliver and install the P5 truss segment (serving as a spacer at the end of P4), exchange an ISS crewmember for another, reconfigure and activate the electrical power system and thermal control system, and transfer extra oxygen for EVA prebreathing and nitrogen to storage tanks on the outside of the Airlock (A/L). There will be three EVAs (on FD4, FD6, and FD8). Landing will nominally take place at KSC on 12/21 at 4:17pm EST.]*

The ISS crew's day/sleep cycle remains shifted at 10:20am - 2:50am EST.

FE-1 Tyurin performed final STTS communications configuration checks, while CDR Lopez-Alegria connected the UOP DCP (utility outlet panel/display & control panel) bypass power cable at the Lab RWS (Robotics Work Station) for the Robotics/SSRMS (Space Station Remote Manipulator System) video coverage of the docking and subsequent P5 transfer operations.

Afterwards, L-A set up and configured the IWIS (Internal Wireless Instrumentation System) hardware for measuring and recording structural dynamics during the docking. IWIS will be removed again tonight after the safety briefing of the new arrivals.

Mikhail Tyurin performed a status check of the Russian TP2 laptop in preparation for an upcoming continuity test on ASN satellite navigation system cabling.

FE-2 Reiter completed the daily update/edit of the standard IMS (Inventory Management System) "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Steps being undertaken by the crew to prepare for STS-116 arrival include the following:

- Ensure Lab window shutter closure;
- Conduct final comm checks with the headsets for the RPM;
- Complete preparations for photo and video coverage of the RPM and of the docking from the ISS external and internal cameras; and
- Make final preparations for the RPM documentation.

Prior to final approach, Mark Polansky will take the Discovery through the scheduled RPM at ~600 ft distance under the ISS, a 360-deg. backflip to allow digital imagery of its TPS from the ISS by Tyurin and Reiter, commencing at 4:05am and ending at 4:13pm, still in local daylight. *[The ISS crew has about 100 seconds shooting time to photograph the Orbiter TPS. Mikhail operates the 800mm-lens DCS (digital camera system) and Thomas uses the 400mm camera, each one attempting to obtain about 150 pictures. After the docking, the images will be downlinked for further analysis. Preliminary after orbit insertion have not indicated any signs of damage.]*

After the docking and conclusion of the regular leak checks of the PMA-2 (Pressurized Mating Adapter 2), US-RS communications will be configured to include the docked Shuttle. Hatches will be opened at ~6:30pm, followed by Crew Welcome.

As is standard practice, Tyurin is to collect air samples with the Russian AK-1M sampler in the Orbiter, prior to the installation of the connecting air ducts.

After the standard safety briefing for the entire crew, the Flight Engineers will complete the swapping out of Suni Williams' and Thomas Reiter's IELKs (Individual Equipment & Liner Kits) in the individual's seat in Soyuz TMA-9, including the

tailored Sokol suits, and the transfer of EMU spacesuits and EVA tools from the Shuttle to the A/L, including the ETVCG (External TV Camera Group) hardware and lights.

CDR Polansky and MS Patrick meanwhile focus their efforts on P5 transfer, using the SRMS (Shuttle Remote Manipulator System) to grapple the P5 truss element in the cargo bay (expected at ~8:25pm) and lift it over for its handoff to the SSRMS, operated by Suni Williams with Joan Higginbotham and Mike L-A. The SSRMS will later deliver the P5 to its installation site at the end of the P4 truss by means of the MT (Mobile Transporter) railcar. *[The Shuttle crew noted during early checkout activities that the auto-release capability of the SRMS LEE (Latching End Effector) is failed, but both manual and backup capabilities remain functional. The crew was advised to use manual release on the SRMS for the P5 handoff.]*

Other post-docking activities by both crews will include:

- Transfer and stow new SODF (Station Operations Data File) procedures updates;
- Disconnect the CDRA LTL (Carbon Dioxide Removal Assembly/Low Temperature Loop) of the thermal control system; and
- Configure the Shuttle to provide oxygen to the A/L PHA (Airlock Prebreathe Hose Assembly) ports for the EVA campouts at 10.2 psi.

Mike L-A is to do a maintenance reboot on the SSC (Station Support Computer) File Server.

The crew will conduct a one-hour procedures review for tomorrow's EVA-1.

Before turning in tonight, the new ISS Flight Engineer, Suni Williams, begins her participation in the SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) experiment by donning the Actiwatch unit. *[The experiment is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the FE-2's sleep/wake patterns and light exposure, her special Actiwatch device measures the light levels encountered by her as well as her patterns of sleep and activity throughout the Expedition.]*

Misha Tyurin is assigned to perform today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables, the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/Moscow.

As usual, time is set aside for the crew to conduct their regular 2.5-hr. physical

exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-1), TVIS treadmill (CDR, FE-2), and RED resistive exerciser (CDR, FE-1, FE-2). *[Due to power constraints in the SM, TVIS exercise is not allowed during the docking ops, and there will also be no exercise while the SRMS and SSRMS are both grappled to the P5.]*

Afterwards, Thomas will copy his, L-A's and Misha's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

A new activity, installation of an IMV (Intermodular Ventilation) valve at the Lab forward port, has been added to the discretionary "job jar" task list for L-A.

No CEO (Crew Earth Observation) photo targets uplinked for today. *[CEO ops are suspended for the duration of the STS-116 mission. Generation of daily target uplinks will resume on 12/20 assuming a nominal landing on 12/19].*

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

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ISS Orbit *(as of this morning, 7:45am EST [= epoch]):*

Mean altitude -- 342.6 km

Apogee height -- 358.4 km

Perigee height -- 326.8 km

Period -- 91.39 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0023548

Solar Beta Angle -- 28.2 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in last 24 hours -- 97 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46114

Significant Events Ahead (all dates Eastern and subject to change):

2/11/06 -- STS-116/12A.1 docking (5:05pm)

12/11-19/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss

12/12/06 -- 12A.1 EVA-1 (6 hrs, EV1-Curbeam/EV2-Fuglesang)

12/14/06 -- 12A.1 EVA-2 (6 hrs, EV1-Curbeam/EV2-Fuglesang)

12/16/06 -- 12A.1 EVA-3 (6 hrs, EV1-Curbeam/EV3-Williams)
12/18/06 -- STS-116/12A.1 undocking (4:17pm)
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06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/10/06
Date: Sunday, December 10, 2006 2:42:01 PM
Attachments:

ISS On-Orbit Status 12/10/06

All ISS systems continue to function nominally, except those noted previously or below. *Sunday – not quite an off-day for CDR Mike Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Thomas Reiter. Ahead: Week 12 of Increment 14. Most onboard activities today are to prepare for 12A.1 arrival.*

STS-116/Discovery lifted off on time at 8:47pm EST last night flawlessly on Mission ISS-12A.1 and is currently catching up with the ISS, carrying the great 5-rookie crew of Commander Mark Polansky, Pilot William (Bill) Oefelein (Commander, USN), and Mission Specialists Nicholas Patrick, Robert (Bob) Curbeam (Captain, USN), Joan Higginbotham, Christer Fuglesang (ESA/Sweden) and Sunita Williams (replacing Thomas Reiter on Expedition 14). **We are off to a tremendous mission!** *[Docking is scheduled for tomorrow evening (Monday, 12/11) at about 5:05pm EST. With the docking, ISS Stage 12A.1 begins. After hatch opening, first tasks are safety briefing, swapping out the rotating crewmembers' IELKs (individual equipment and liner kits) in the individual's seat in Soyuz TMA-9, including the tailored Sokol suits, and transfer of the EMU spacesuits. Objective of the 12-day mission: Deliver and install the P5 truss segment (serving as a spacer at the end of P4), exchange an ISS crewmember for another, reconfigure and activate the electrical power system and thermal control system, and transfer extra oxygen for EVA prebreathing and nitrogen to storage tanks on the outside of the Airlock (A/L). There will be three EVAs (on FD4, FD6, and FD8). Landing will nominally take place at KSC on 12/21 at 4:17pm EST.]*

With the Shuttle on its way, the ISS crew could sleep for ten hours, with their day/sleep cycle shifted by 1h 50 m, now at 10:20am - 2:50am EST.

After wakeup, before breakfast, FE-2 Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to*

already-known effects on the skin of long duration stays in orbit.]

In preparation for the Shuttle arrival, FE-1 Tyurin worked on the Elektron oxygen (O₂) generator, deactivating the system and purging its BZh Liquid Unit with nitrogen (N₂) at 0.65 kg/cm² via its KE3 and VN3 valves.

FE-2 Reiter is getting the DCS (Digital Camera System) ready for the RPM (Rendezvous Pitch Maneuver) tomorrow afternoon, charging the camera batteries and configuring the still camera. The DCS is then to be stowed. *[Prior to docking, the 360-degree RPM will allow a photographic survey of the Orbiter with the ISS DCS cameras by the two Flight Engineers from ~600 ft distance, using 400 & 800mm focal length lenses to focus on tile acreage and door seals. Time available for the shooting will be very limited, requiring great coordination between the two headset-equipped photographers and the Shuttle.]*

CDR Lopez-Alegria will assist in configuring the video camcorder for the RPM.

The CDR will also install the ISS-side string of the BPSMU (Battery Powered Speaker Microphone Unit). *[After Shuttle docking, cables connected to the Shuttle half of the dragthrough QD (quick disconnect) will be installed by the Shuttle crew.]*

After the Discovery launch last night, Mike L-A offloaded water from the Lab condensate tank to a CWC (Contingency Water Container), to prepare the collection tank for the increased crew load. Before the transfer, he collected water samples in three bags (0.28 kg each) two for return to Earth, one for purging the transfer gear.

Also post-launch, the CDR secured a sample of the ITCS (Internal Thermal Control System) coolant, using the MTL (Moderate Temperature Loop) sample port in the Lab.

In preparation for using the Canadian SSRMS (Space Station Remote Manipulator System) tomorrow and during the week, Mikhail Tyurin will power up the PCS (Portable Computer System) laptops in the A/L and at the Cupola RWS (Robotics Work Station) in the Lab. *[The SSRMS, moving on the MT (Mobile Transporter) cart along the P4 truss, will be required - among else - for the installation of the P5 short spacer.]*

Afterwards, Lopez-Alegria will set up and check out the DOUG (Dynamic Onboard Ubiquitous Graphics) application for the crew's review of upcoming extravehicular ops. *[DOUG is a periodically updated software program on the MSS (Mobile Service System) RWS laptops that provides a graphical birdseye-view image of the*

external station configuration and the SSRMS arm, showing its real-time location and configuration on a laptop during its operation.]

Working in the A/L "Quest", FE-2 Reiter is to remove the #10A2 panel as a get-ahead for the oxygen (O₂) transfer setup scheduled for FD3. *[Shuttle O₂ (~100 lbs) will be transferred to the ISS A/L PHA (Prebreathe Hose Assembly) ports during the EVA prebreathing periods.]*

L-A is scheduled for the periodic atmospheric status checks for ppO₂ (Partial Pressure Oxygen) and ppCO₂ (pp Carbon Dioxide), using the CSA-O₂ (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO₂ Monitoring Kit). Batteries are to be replaced if necessary. *[CSA-CP measurements are to be gathered with units #1055 (prime) at the SM Central Post & #1053 (backup) in the Node, CSA-O₂ (#1042, #1063) in the Lab, and CDMK (#1009) in SM and Lab. The instruments will be turned off afterwards, except for #1055, and returned to their regular locations.]*

Later, Mike is to start the repressurization process on PMA-2 (Pressurized Mating Adapter #2) in preparation for ingress and stowage after the Shuttle's arrival. *[PMA-2 will be the docking port for Discovery tomorrow.]*

Misha Tyurin is assigned to perform today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables, the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/Moscow.

As usual, time is set aside for the crew to conduct their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), and RED resistive exerciser (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

No CEO (Crew Earth Observation) photo targets uplinked for today. *[In preparation for tomorrow's planned STS-116 launch, CEO ops are suspended for the duration of the STS-116 mission. Generation of daily target uplinks will resume on 12/20 assuming a nominal landing on 12/19].*

In preparation for their filling with NH₃ (ammonia) during the joint mission, flight controllers in Houston have begun venting the EATCS (External Active Thermal Control System) Loops A & B of its nitrogen pad from the center radiators and the rest of the system, a most critical step. *[The EATCS, which has never been tested*

as an integrated system in its on-orbit configuration, will be activated during EVA2 and EVA3, before the most important MBSUs (Main Bus Switching Units), which provide power to the cooling system in the first place, can overheat; the MBSUs can run OK without cooling for an estimated one hour. Nominally, there will be about 24 procedure steps to activate the EATCS for the first time. Filling the system with NH₃ coolant, pressurized by N₂, and activating it will be one of the major challenges that flight controllers and engineers will face during the mission.]

CEO photography can be viewed and studied at the websites:

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<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

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ISS Orbit (*as of this morning, 7:37am EST [= epoch]*):

Mean altitude -- 342.7 km

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Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0023896

Solar Beta Angle -- 27.4 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.76

Mean altitude loss in last 24 hours -- 160 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46098

Significant Events Ahead (all dates Eastern and subject to change):

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12/11-19/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss

12/12/06 -- 12A.1 EVA-1 (6 hrs, EV1-Curbeam/EV2-Fuglesang)

12/14/06 -- 12A.1 EVA-2 (6 hrs, EV1-Curbeam/EV2-Fuglesang)

12/16/06 -- 12A.1 EVA-3 (6 hrs, EV1-Curbeam/EV3-Williams)

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09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/09/06
Date: Saturday, December 09, 2006 12:58:27 PM
Attachments:

ISS On-Orbit Status 12/09/06

All ISS systems continue to function nominally, except those noted previously or below.

The crew's work/rest cycle remains shifted at 8:30am-12:00midnight EST until STS-116/12A.1 launch (scheduled for tonight at ~8:47pm EST).

After wakeup, before breakfast, FE-2 Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

The crew conducted the regular weekly three-hour task of thorough station cleaning, wearing protective garment. *["Uborka", normally done every Saturday, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with "Fungistat" disinfectant wipes; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

Afterwards CDR Lopez-Alegria retrieves and stows the two FMKs (Formaldehyde Monitoring Kits) deployed by him on 12/07 in the Lab (below CEVIS cycle) and SM (most forward handrail).

FE-1 Tyurin will transfer log file data from the Service Module Central Post (SM CP) RS1 laptop to a CD ROM for subsequent downlink to the ground via U.S. OCA assets.

FE-2 Reiter is scheduled to perform the periodic equipment performance check on

the running ESA/RSC-Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS).

At ~3:05pm EST, the crew is scheduled for their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/ audio, reviewing upcoming activities and any concerns about future on-orbit events.

Mikhail is assigned to do the routine daily maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

If STS-116/Discovery is launched tonight, Mike L-A will offload water from the Lab condensate tank to a CWC, to prepare the collection tank for the increased crew load. Before the transfer, L-A will collect water samples in three bags (0.28 kg each) two for return to Earth, one for purging the transfer gear. *[This must be done as close to 12A.1 launch as possible.]*

Also depending on launch, the CDR will secure a sample of the ITCS (Internal Thermal Control System) coolant, using the MTL (Moderate Temperature Loop) sample port in the Lab. *[This must be done as close to 12A.1 launch as possible.]*

Mike is scheduled today for doing the regular maintenance reboots on the SSC (Station Support Computer) File Server and OCA Comm Router laptops.

Thomas Reiter will swap the SSC-8 (Station Support Computer 8) A31p shell, which has failed, with a new shell (#1086). *[The hard disk drive (HDD) remains the same.]*

As usual, time is set aside for the crew to conduct their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-1), TVIS treadmill (CDR, FE-2/only), and RED resistive exerciser (CDR, FE-1).

Afterwards, L-A will copy his, Thomas' and Misha's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Weekly Science Update (*Expedition Fourteen -- 11th*)

ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):
ALTCRISS activities have been performed on 12/06 and 12/07. Awaiting report.

ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System): Planned.

BASE: Complete.

BCAT-3 (Binary Colloidal Alloy Test-3): Planned.

CAR-2 (Investigating Mechanisms of Heart Disease in Micro-G, ESA): Last session for Thomas Reiter was performed successfully on 11/29.

CBOSS (Cellular Biotechnology Support Systems): Complete.

CFE (Capillary Flow Experiment): Complete.

CULT (Cultural Factors Questionnaire): Last (sixth) session for Thomas Reiter was successfully performed on 11/29.

DAFT (Dust & Aerosol Measurement Feasibility Test): Complete.

Earth Knowledge Acquired by Middle School Students (EarthKAM): In progress.

ETD (Eye Tracking Device): Last session (eighth) for Thomas Reiter was performed successfully on 12/04.

GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology): Planned

IMMUNO (Saliva Sampling): Last session for Thomas Reiter was successfully performed on 12/05 and 12/06.

LEUKIN: Complete.

MISSE (Materials ISS Experiment): Ongoing.

MTR-2 (Russian radiation measurements): Passive dosimeters measurements in DC1 "Pirs". Removal of passive dosimeters from the MATRYOSHKA Phantom was performed on 12/07, with a download on STS-12A.1. Awaiting report.

NOA (Nitric Oxide Analyzer): Last session for Thomas Reiter was successfully performed on 11/30.

Nutrition: Planned.

PK-3 (Plasma Crystal 3): In progress.

POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G): Planned.

RC (Refrigerated Centrifuge): Planned.

RS (Renal Stone): Planned.

SAMPLE: Complete.

SEM (Space Experiment Module): Complete.

SLEEP: Lopez-Alegria successfully downloaded his Actiwatch data and prepared Suni Williams' watch for her arrival. The SLEEP team appreciates the bonus video produced by L-A during the activity.

SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite): In progress.

Swab (Characterization of Microorganisms & Allergens in Spacecraft): Planned.

TROPI (Study of Novel Sensory Mechanism in Root Phototropism): No on-orbit activities are planned for Tropi during this week. Looking forward to having some of the frozen samples returned on STS-116. Also looking forward to the third Tropi experiment run in late December.

YING (Yeast in No Gravity): Complete.

CEO (Crew Earth Observations): Planned.

Sleep time again will be at 12:00midnight.

Conjunction advisory: MCC-H ballistics specialists are monitoring a conjunction with orbital debris (Delta 2 rocket body, Object 29488), with TCA (time of closest approach) on tonight at ~11:35 pm. Current predictions show a miss distance of ~20 km, with increasing trend. No DAM (Debris Avoidance Maneuver) considered.

No CEO (Crew Earth Observation) photo targets uplinked for today. (In preparation for tomorrow's planned STS-116 launch, CEO ops are suspended for the duration of the STS-116 mission. Generation of daily target uplinks will resume on 12/20 assuming a nominal landing on 12/19).

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

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<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 7:22am EST [= epoch]*):

Mean altitude -- 342.8 km

Apogee height -- 358.8 km

Perigee height -- 326.9 km

Period -- 91.39 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0023755

Solar Beta Angle -- 26.1 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.75

Mean altitude loss in last 24 hours -- 168 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46082

Significant Events Ahead (all dates Eastern and subject to change):

12/09/06 -- STS-116/12A.1 launch (8:47pm)

12/12/06 -- STS-116/12A.1 docking (~1:10am)

12/12-19/06 -- STS-116/12A.1 docked mission w/ISS -- P5 truss

12/13/06 -- 12A.1 EVA-1 (6 hrs, EV1-Curbeam/EV2-Fuglesang)

12/15/06 -- 12A.1 EVA-2 (6 hrs, EV1-Curbeam/EV2-Fuglesang)

12/17/06 -- 12A.1 EVA-3 (6 hrs, EV1-Curbeam/EV3-Williams)

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01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

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02/10/07 -- US EVA-8

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03/16/07 -- STS-117/13A launch -- S3/S4 trusses

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06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/08/06
Date: Friday, December 08, 2006 2:29:16 PM
Attachments:

ISS On-Orbit Status 12/08/06

All ISS systems continue to function nominally, except those noted previously or below.

The crew's work/rest cycle remains shifted at 8:30am-12:00midnight EST until STS-116/12A.1 launch (last night's attempt at 9:35pm EDT was scrubbed due to low cloud cover; next attempt: tomorrow, 12/9, at 8:47pm EDT).

After wakeup, before breakfast, FE-2 Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

Thomas Reiter checked out the U.S. Sound Level Meter (SLM) instrument and then used it to conduct the periodic noise level measurements program in the station interior for a 1h 30m acoustic survey, later transferring the recorded data to the MEC (Medical Equipment Computer). *[Acoustic measurements were obtained at 13 locations in the Lab (including in the TESS {Temporary Sleep Station}, with door closed), three locations in the DC1 Docking Compartment, and 15 locations in the SM. The survey also includes five crew preference locations taken at their perceived loudest locations in the station. The SLM gives instantaneous noise levels and their frequency spectra, which are transferred to the MEC laptop via an RS232 cable and later downlinked with regular CHeCS (Crew Health Care Systems) data dump or via OCA.]*

CDR Lopez-Alegria and Thomas Reiter are performing the third session of the NASA/JSC investigation SWAB (Surface, Water and Air Biocharacterization), a comprehensive characterization of microorganisms and allergens in spacecraft environment for evaluating the environmental ecology to assess potential threats to the ISS crew, its systems, and spacecraft integrity. Today's run is intended to

obtain the biosamples before the Shuttle arrival, including at four random sites chosen. Photography is taken before swabbing. Afterwards surface, water and air samples plus equipment will be stowed. *[Using the battery-powered ASD (Air Sampling Device), the SWAB Tube and SWAB Water Bag, the crewmember collects surface, air and water samples at various station locations in the station. The water bag is then treated with a fixative.]*

Mike will also record documentary video of the TROPI samples stowed inside MELFI (Minus-Eighty Laboratory Freezer for ISS) Dewar 1 to support the ground team in selecting the best option for packing the double Coldbag for return.

With about 5 hours reserved between them, the two Flight Engineers are busy stowing discarded hardware and waste in the Progress M-57/22P cargo ship, with concurrent IMS (Inventory Management System) updating.

After the particulate “scrubbing” of the EMUs (Extravehicular Mobility Units, #3008, #3015) on 12/6, CDR Lopez-Alegria is setting up the EMUs and SCUs (Service & Cooling Umbilicals) in the Airlock (A/L) again, for the job of iodinating their coolant lines using a biocide filter, a 2-hr process. *[The iodination of the EMU and A/L lines, originally planned for the same time as the post-12A.1 scrubbing of the EVA gear, was moved forward to today to ensure that its expiration date will not be exceeded due to a launch delay like last night's. Nominal requirements: Pre-EVA -- scrub A/L SCU lines using ion and 3-micron filters for 1 hr within 2 weeks of the first EVA; post-EVA -- scrub EMU and A/L SCU lines using ion and 3-micron filters for 1 hr within two weeks of end of the last EVA and iodinate EMU & SCU lines using biocide filter for 2 hrs; 90-Day Maintenance -- scrub EMUs using ion and 3-micron filters for 1 hr and iodinate the EMUs for 2 hrs.]*

L-A is also scheduled for another filling out of the regular weekly FFQ (Food Frequency Questionnaire) on the MEC, his tenth, which keeps a personalized log of his nutritional intake over time on special MEC software. *[The FFQ records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins. IBMP/Moscow (Institute of Biomedical Problems, Russian: IMBP – Institute of Medico-Biological Problems) recommended average daily caloric value of the crew's food intake is 2200-2300 cal. If larger quantities of juices and fruits are taken into account, the value can go to 2400-2500 cal.]*

FE-1 Tyurin conducts the remaining routine daily maintenance of the SM SOZh system (Environment Control & Life Support System, ECLSS).

Mikhail is charged with the daily update/edit of the standard IMS (Inventory

Management System) “delta file”, including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

As usual, time is set aside for the crew to conduct their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Mike will copy his, Misha’s and Thomas’ exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~10:15am EST, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~9:05pm, the crewmembers are scheduled for their regular weekly tagup with the Lead Flight Director at JSC/MCC-H.

At ~5:00pm, Misha Tyurin will set up the SM's ham radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, power supply) to field questions from German school children at the Erweiterte Realschule Weiskirchen, Germany, via the ARISS amateur radio service, with Thomas acting as interpreter. [*“When was the last time you had a shower?”; “When you play the guitar, does it sound in space like it does on Earth?”*]

Yesterday’s scheduled ITCS (Internal Thermal Control Systems) water sampling and Lab condensate tank offloading activities were deferred until the next launch attempt.

Solar Activity Update: The large sunspot 930 continues to be a source of strong solar activity. The active region has produced two X-class flares and several lesser flares since it appeared only two days ago. Forecasters estimate a 50% chance of another X-flare during the current 24 hours. Teams are continuing to track solar activity, and there is no impact to the crew at this time. A potential impact exists to the 12A.1 EVA timelines, which could move earlier by a few hours (dependent on launch date and future solar activity).

Sleep time for the crew will again be at 12:00midnight.

No CEO (Crew Earth Observation) photo targets uplinked for today. (In preparation for tomorrow’s planned STS-116 launch, CEO ops are suspended for

the duration of the STS-116 mission. Generation of daily target uplinks will resume on 12/20 assuming a nominal landing on 12/19).

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Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0023906

Solar Beta Angle -- 24.2 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.75

Mean altitude loss in last 24 hours -- 170 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46066

Significant Events Ahead (all dates Eastern and subject to change):

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12/12/06 -- 12A.1 EVA-1 (6 hrs, EV1-Curbeam/EV2-Fuglesang)

12/14/06 -- 12A.1 EVA-2 (6 hrs, EV1-Curbeam/EV2-Fuglesang)

12/16/06 -- 12A.1 EVA-3 (6 hrs, EV1-Curbeam/EV3-Williams)

12/18/06 -- STS-116/12A.1 undocking (5:05pm)

12/21/06 -- STS-116/12A.1 landing @ KSC: ~3:47pm)

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch

01/20/07 -- Progress M-59/24P docking (DC1)

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From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/07/06
Date: Thursday, December 07, 2006 1:22:16 PM
Attachments:

ISS On-Orbit Status 12/07/06

All ISS systems continue to function nominally, except those noted previously or below.

The crew's work/rest cycle remains shifted at 8:30am-12:00midnight EST until STS-116/12A.1 launch.

After wakeup (1:00am EST), before breakfast & first exercise, CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Thomas Reiter completed the regular monthly session with the Russian crew health-monitoring program's medical assessment MO-9/Biochemical Urinalysis. Afterwards, Tyurin stowed the Urolux hardware. *[PZE MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

Also before breakfast, FE-2 continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

FE-1 performed Part 2 of his second onboard Russian "PROFILAKTIKA" (MBI-8, "Countermeasures") preventive health maintenance fitness test series, a 2h 30m session. *[Today's fitness test was performed on the TVIS treadmill in unmotorized (idle) mode, with free choice of speeds within the range permitted. The test differs from the normal TVIS session by the use of the TEEM-100 gas analyzer (via a mask equipped with a pneumotachometer sensor), measurement of blood lactate*

level and subjective evaluation of physical exertion levels during the test. The lactate blood samples were taken twice at the end of the session, using the ACCUSPORT analyzer and REFLOTRON-4 accessories. Results were entered on a log sheet. TEEM and ECG (electrocardiograph) data were transferred to the RSE-Med laptop, also on a tape cassette (Cardiocassette-2000), and prepared for later downlink via Regul-Packet comm. Results were also called down to specialists standing by at TsUP.]

Thomas Reiter performed his fourth periodic O-OHA (On-Orbit Hearing Assessment) test, a 30-min. NASA environmental health systems examination to assess the efficacy of acoustic countermeasures, using a special MEC laptop application. L-A and Misha had their second sessions on 11/27. *[The O-OHA audiography test involves minimum audibility measurements for each ear over a wide range of frequencies (0.25-10 kHz) and sound pressure levels, with the crewmembers using individual-specific Prophonics earphones, Bose ANC headsets and the SLM (sound level meter). To conduct the testing, the experimenter is supported by special EarQ software on the MEC, featuring an up/down-arrow-operated slider for each test frequency that the crewmember moves to the lowest sound pressure level at which the tone can still be heard. The baseline test is required not later than about Flight Day 14 for each new Expedition and is then generally performed once per month.]*

In the Lab, Lopez-Alegria deactivated the ER4 (EXPRESS Rack 4) laptop, in anticipation of subsequent ground-commanded ER4 powering down during 12A.1 Joint Ops.

Tyurin conducted the periodic sampling of cabin air with the Russian AK-1M adsorber to sample the air in the SM (Service Module) and FGB.

Later, the CDR completes the periodic atmospheric sampling for subsequent analysis on the ground by collecting air samples with a GSC (Grab Sample Container) at the center of the SM and Lab.

In addition, Lopez-Alegria will deploy two passive FMK (formaldehyde monitoring kit) sampling assemblies in the Lab (below CEVIS) and SM (most forward handrail), to catch any atmospheric formaldehyde on a collector substrate for subsequent analysis on the ground.

The CDR is also scheduled to secure a sample of the ITCS (Internal Thermal Control System) coolant, using the MTL (Moderate Temperature Loop) sample port in the Lab as close to the 12A.1 launch as possible.

FE-2 Reiter completed the periodic monitoring on the ESA/RSC-Energia experiment

ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS), downlinking the experiment's data file from its PCMCIA memory card to TsUP/Moscow via OCA and then replacing the memory card in the AST. *[ALTCRISS uses the AST spectrometer employed originally by VC8 guest cosmonaut Roberto Vittori last year, to monitor space radiation in the Russian segment (RS).]*

Thomas is preparing eight DCS (Digital Camera System) batteries for the STS-116 RPM (R-bar Pitch Maneuver), charging them in two groups of four for at least three hours each, and is concurrently formatting eight 1GB EVA flash memory cards for storage of the RPM imagery, each PCMCIA (Personal Computer Memory Card International Association) taking about 5 min for setting up.

Mikhail Tyurin, in part assisted by Reiter, is scheduled for a five-hour job of dismantling the Russian Matryoshka "phantom" in the SM and removing the nuclear radiation tracking detector assemblies and 356 thermoluminescent detectors from the Phantom enclosure and its individual layers (slices) for return to Earth. The Phantom will then be reassembled. Also, any Matryoshka hardware in the US Airlock (A/L) is to be cleared out to the Russian segment (RS). *[The complex Matryoshka payload suite is designed for sophisticated radiation studies. Besides spherical containers in the SM, there is the Phantom, a human torso assembled from individual horizontal slice-like (body cross-sectional) layers with 356 thermoluminescent detectors (TLDs) and five nuclear radiation tracking detectors (NTDPs). The mannequin is covered with a "poncho" and "hood" and used for studies of on-orbit radiation and long-term dose accumulation. The payload collects radiation measurements every 15 minutes of each hour around the clock. Note: Matryoshka is the name for the traditional Russian set of nested dolls.]*

Continuing get-ahead preparations for the STS-116 spacewalks, CDR Lopez-Alegria and FE-2 Reiter today are equipping the Airlock with five PBA sets (Portable Breathing Apparatus), to remain in the A/L for the duration of the 12A.1 docked period. *[During the 10.2 psi EMU donning procedure, there will be five crewmembers in "Quest".]*

Also, Mike will terminate the second round of EVA battery charging in the A/L BSA (Battery Stowage Assembly). *[The various batteries -- REBA (Rechargeable EVA Battery Assembly), PGT (Pistol Grip Tool), EHIP (EMU Helmet Interchangeable Portable) lights -- and the METOX (Metal Oxide) CO₂ absorber canisters are to be stowed in separate EVA staging mesh bags.]*

As close to 12A.1 launch as possible, L-A is to switch the Lab CCAA (Common Cabin Air Assembly) air conditioner system from the starboard to the portside unit.

Thomas has another 1 hr. set aside on his timeline to prepare his personal provisions for return to Earth. *[Reiter, to be replaced by Sunita Williams, has been approved to return one single bag and one half bag of personal items. Other return gear, such as personal clothing, hygiene items etc., will either have to be packed for return or trashed. All dispositions have to be barcode-tracked for keeping the IMS (Inventory Management System) up to date.]*

The crew has ~4h 25m blocked out for more hardware prepacking for return on the Shuttle, as discussed yesterday with ground specialists in an S-band conference and supported by an updated list uplinked overnight.

Mike L-A will conduct the weekly audit/inventory of the available CWCs (Contingency Water Containers) and their contents, to keep track of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week. The current cue card lists 33 water containers (~1061.6 liters total) for the four types of water identified on board: technical water (for Elektron, flushing, hygiene; ~915 liters), flush (~90 liters), condensate water (for processing, 28.03 liters) and other (TCS fluid, EMU waste water, 28.6 liters). Water was delivered by 12A and is re-supplied from processed condensate. 12A.1 will deliver 2 CWCs with 86 liters, followed in January by 24P with 100 liters. There was no water on 23P.]*

In preparation for 12A.1, L-A will connect the CDRA LTL (Carbon Dioxide Removal Assembly/Low Temperature Loop) supply line at the Lab RIP (Rack Interface Panel), to provide ITCS (Internal Thermal Control System) cooling to the CDRA when it is turned on as close to 12A.1 launch as possible.

Afterwards, to prepare the Lab condensate collection tank for the increased crew load, Mike will offload water from the tank to a CWC, after collecting condensate samples in three bags (0.28 kg each) two for return to Earth, one for purging the transfer gear.

Misha Tyurin conducts the remaining routine daily maintenance of the SM SOZh system (Environment Control & Life Support System, ECLSS), which today includes the periodic checkout/verification of IP-1 airflow sensors in the various Russian segment (RS) hatch openings in the SM, FGB and DC1.

The crew is performing their daily physical exercise program on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1/only, FE-2/only) and RED resistive exerciser (CDR). *[Misha's treadmill protocol today supports his MBI-8 test.]*

Afterwards, L-A will copy his, Misha's and Thomas' exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the

workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~1:05pm EST, Reiter discussed payload operations with ESA science centers in an audio conference via S-band.

At ~1:35pm, Thomas will support another live LDM (Long-Duration Mission)/PAO video downlink event, his last in-flight call for this mission, from the University of Stuttgart/Germany, with hundreds of students plus press media and public visitors. Moderation will be provided by former German astronauts Reinhold Ewald (Mir) and Ernst Messerschmid (Shuttle). *[The audio/video connection will be made by the SM's automated onboard program sequencer (SPP) over RGS (Russian Ground Site), and the VHF-1/TV signal is routed from there through TsUP/Moscow and Ostankino TV satellite to Stuttgart via IGS network.]*

ERCA Thumbscrew Update: Mike's repair of the thumbscrew of the ERCA (EMU RF Camera Assembly) which failed during ERCA installation on the EMU helmet lights, was completed last night, and the unit is ready for the upcoming 12A.1 EVAs.

Solar Flare Update: Teams are tracking solar activity (flares). No impact to crew at this time. Potential impact to EVA timelines (could move earlier by a few hours as it depends on the Sun's rotation.)

STS-116 Launch Update: Probability of KSC weather prohibiting tonight's launch: 60%;

Probability of KSC weather prohibiting launch for 24-hour delay: 70%

Probability of KSC weather prohibiting launch for 48-hour delay: 60%

Sleep time for the crew will again be at 12:00midnight.

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Mean altitude loss in last 24 hours -- 154 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46051

Significant Events Ahead (all dates Eastern and subject to change):

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12/09/06 -- STS-116/12A.1 docking (6:15pm)

12/09-16/06 -- STS-116/12A.1 docked mission w/ISS -- P5 truss

12/10/06 -- 12A.1 EVA-1 (~4:30pm, 6 hrs., EV1-Curbeam/EV2-Fuglesang)

12/12/06 -- 12A.1 EVA-2 (~4:00pm, 6 hrs., EV1-Curbeam/EV2-Fuglesang)

12/14/06 -- 12A.1 EVA-3 (~3:30pm, 6 hrs., EV1-Curbeam/EV3-Williams)

12/16/06 -- STS-116/12A.1 undocking (5:05pm)

12/19/06 -- STS-116/12A.1 landing (@ KSC: ~4:36pm)

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From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/06/06
Date: Wednesday, December 06, 2006 1:20:13 PM
Attachments:

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Before breakfast and exercise, CDR Lopez-Alegria, FE-1 Tyurin and the FE-2 completed their second session with the periodic Russian MedOps test "Hematokrit" (MO-10), measuring red cell count of the blood. *[The blood samples were drawn from a finger with a perforator lancet, then centrifuged in two microcapillary tubes in the M-1100 kit's minicentrifuge, and its hematocrit value was read off the tubes with a magnifying glass. It is a well-known phenomenon of space flight that red blood cell count (normal range: 30-45%) tends to go down over time. After the exam, the data were saved in the IFEP software (In-Flight Examination Program) on the MEC (Medical Equipment Computer), and Misha Tyurin stowed the equipment.]*

Thomas Reiter also finished Part 2 of his second stress test plus saliva and blood sampling of the ESA/Russian biomed experiment "IMMUNO", today completing remaining urine sample collections. Specimens were then stowed in a special urine containment bag (blood samples were secured yesterday in the MELFI {Minus Eighty Degree Celsius Laboratory Freezer for ISS} in cold packs). *[IMMUNO is a 24-hr. test of human immune system changes, with the objective to investigate immune neuro-endocrine reactions in the space environment by studying samples*

of saliva, blood and urine using collection kits and the biomedical (MBI) protection kit. Also included are entries in a fluid/medications intact log, and a stress-test questionnaire to be filled out by the subject at begin and end of the first day.]

Later, Reiter conducted the post-IMMUNO air sampling using the IDP-NH3 Draeger tube for testing for NH₃ (ammonia), required after the 24-hour urine collection.

Mikhail Tyurin worked on the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system of the SM SOGS (Pressure Control & Atmospheric Monitoring System), first switching it off to reconfigure a cable for the CO sensor, then reactivating and recalibrating it, and finally taking real-time measurement readings. *[GANK tests for Methane (CH₄), Ammonia (NH₃), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO₂), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

The FE-1 is also scheduled for a 2h 30m session of Part 1 of his second onboard "Profilaktika" (MBI-8, "Countermeasures") preventive health maintenance fitness test series, starting with the VELO stationary cycle ergometer. *[Misha will do an additional part of the test tomorrow (12/7), on the TVIS treadmill. Test procedure for MBI-8 is identical to the Russian MO-5 assessment, but in addition to the nominal procedure it uses the TEEM-100M gas analyzer with breathing mask, a blood lactate test with the ACCUSPORT analyzer and REFLOTRON-4 accessories, and a subjective evaluation of physical exertion levels during the test (using the Borg Perceived Exertion Scale, viz., 10 steps from very light over hard and very hard to maximum). Results are entered on a log sheet. TEEM and ECG (electrocardiograph) data are transferred to the Laptop 3, also on a tape cassette (Cardiocassette-2000), and prepared for later downlink via Regul-Packet comm. Results were also called down to specialists standing by at TsUP.]*

Later tonight, Tyurin will unstow and set up the equipment for tomorrow's (12/7) planned "Urolux" biochemical urine test (PZE MO-9) for the three crewmembers. *[MO-9 is conducted regularly every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for US crewmembers for IMG (Integrated Medical Group) PHS evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. The data are then entered in the Medical Equipment Computer (MEC)'s special IFEP software (In-Flight Examination Program).]*

Mike L-A worked on the SSC FS (Station Support Computer/File Server) A31p laptop, loading an uplinked iPV upgrade package (SSC FS Service Pack v8.01). *[After the installation, L-A rebooted the laptop. Replacing v8.00, the upgrade*

incorporates a new Package Manager for managing the expected larger Procedures volume on the FS for Expedition 14 and subs.]

In the late afternoon, the two Flight Engineers are scheduled to work in the Progress-358/23P vehicle, dismantling the Kurs-A rendezvous & approach radar system of its motion control & navigation system (SUDN) and removing it from the transport drone, a 3-hr. job. These valuable components, stowed in the FGB, will be returned to Earth on the Shuttle for reuse. *[KURS-A is the active half of the Russian space program's proven S-band radar system for automated flight, which measures relative motion parameters between Progress (or Soyuz) and the ISS during rendezvous operations, to enable the autopilot's calculation of corrective impulses. The system's passive transponder counterpart (KURS-P) is on the Service Module (SM), with one antenna each at the tip of the two solar array wings.]*

Continuing get-ahead preparations in the Airlock (A/L) for the STS-116 FD-4, -6 & -8 spacewalks, CDR Lopez-Alegria today sets up and starts the periodic scrubbing of the EMU (Extravehicular Mobility Unit) and A/L cooling water loops, by initiating their ionic and particulate filtration. The activity, performed on two suits (#3008, #3015) simultaneously, requires one hour. *[Purpose of the scrubbing, including iodination for biocidal maintenance, is the elimination of any biomass and particulate matter that may have accumulated in the loops.]*

Concurrently, Mike will also perform the degassing procedure on the two EMU PWRs (Payload Water Reservoirs, #1013/24 lbs water & #1018/22 lbs water), afterwards review SAFER (Simplified Aid for EVA Rescue) training material and perform a checkout of the SAFER units (#1003, #1005).

Later, the CDR will attempt to repair the thumbscrew of the right ERCA (EMU RF Camera Assembly) which failed during installation on the EMU helmet lights, following uplinked instructions. L-A will also relocate the EMUs from the A/L to the Node, stowing them in a place of his choosing.

FE-2 Reiter is scheduled to prepare the Russian comm headsets with an extension cable from the FGB and perform a checkout of the configuration, with MCC-H, for the 12A.1 RPM (R-bar Pitch Maneuver) photography by himself and Misha. *[The comm connection will later be extended to the SM.]*

FE-21 Tyurin will unstow the Russian BIORISK-MSN payload, check it for possibly lost accessories (one or two handles) and search for any that are missing.

The crew had time reserved for conducting another joint review of the 12A.1 cargo transfer and stowage plan, then tagging up with ground specialists via S-band for a transfer plan conference.

Later tonight, Thomas has another 1 hr. scheduled to prepare his personal provisions for return to Earth. *[Reiter, to be replaced by Sunita Williams, has been approved to return one single bag and one half bag of personal items. Other return gear, such as personal clothing, hygiene items etc., will either have to be packed for return or trashed. All dispositions have to be barcode-tracked for keeping the IMS (Inventory Management System) up to date.]*

Misha Tyurin is going to conduct his second session of the Russian "Uragan" (hurricane) earth-imaging program. *[Using the Nikon D1X digital camera with f400 mm lens and SIGMA 300-800 telephoto lens, Misha is to take photographs of parts of Australia and Tasmania to obtain data characterizing conditions of natural environment and man-made impacts to nature. Today's targets were the south coastline with the cities of Adelaide and Melbourne, and the coastal area of Tasmania.]*

For the KPT-3 aerial photography experiment of Russia's Environmental Safety Agency (ECON), the FE-1 will perform a checkout of new software from USB disk and floppy on the RSK1 laptop. *[KPT-3 photography is an ISS earth observing experiment for ECON.]*

L-A is to reconfigure the ESA/Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS) by changing the position of its AST spectrometer in the SM (90 deg rotation in its place on panel 437). The activity will be photo-recorded, with imagery downlinked afterwards. *[ALTCRISS uses the AST spectrometer to monitor space radiation in the Russian segment (RS).]*

Mike is also assigned to do the periodic routine inspection of the Italian ALTEA (Anomalous Long-Term Effects on Astronauts' Central Nervous System) experiment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected.

Misha Tyurin will conduct the remaining routine daily maintenance of the SM SOZh system (Environment Control & Life Support System, ECLSS), which today includes the periodic checkout/verification of IP-1 airflow sensors in the various Russian segment (RS) hatch openings in the SM, FGB and DC1.

Working off his discretionary "job jar" task list, Lopez-Alegria is to perform the daily update/edit of the standard IMS (Inventory Management System) "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The crew is performing their daily physical exercise program on the CEVIS cycle

ergometer (CDR), TVIS treadmill (FE-2), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1, as part of his MBI-8 testing today).

Afterwards, L-A will copy his, Misha's and Thomas' exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

SARJ Update: The patch for the SARJ (Solar Alpha Rotary Joint) toothcrash autorecovery software was uplinked yesterday to the P3 MDMs (Multiplexer/Demultiplexer computers). Subsequent on-orbit testing was completely successful with a nominal FDIR (Fault Detection, Isolation, & Recovery) response on all three checkouts performed. No further testing is required, and SARJ is Go for 12A.1.

STS-116 Launch Update: Probability of KSC weather prohibiting 12/7 launch: 60%;
Probability of KSC weather prohibiting launch for 24-hour delay: 70%
Probability of KSC weather prohibiting launch for 48-hour delay: 60%

Sleep time for the crew will again be at 12:00midnight.

Today's CEO photo target, from the Lab nadir/science window, were **Patagonian Glaciers, South America** (*passage of a frontal zone should leave the eastern face of the Patagonian ranges clear for photography of mountain glaciers. As ISS passed over the crest of the mountains, the crew was to look for icefields and small glaciers near the peaks and upper slopes – snow cover and ice margins are sensitive indicators of regional climate change. Overlapping mapping frames along-track were requested. The center point of the area of interest is located at 49S, 73.5W*).

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 7:45am EST [= epoch]*):

Mean altitude -- 343.3 km

Apogee height -- 359.4 km

Perigee height -- 327.3 km

Period -- 91.40 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0023895
Solar Beta Angle -- 19.3 deg (magnitude increasing)
Orbits per 24-hr. day -- 15.75
Mean altitude loss in last 24 hours -- 47 m
Revolutions since FGB/Zarya launch (Nov. 98) -- 46035

Significant Events Ahead (all dates Eastern and subject to change):

12/07/06 -- STS-116/12A.1 launch (9:35:44pm)
12/09/06 -- STS-116/12A.1 docking (6:15pm)
12/09-16/06 -- STS-116/12A.1 docked mission w/ISS -- P5 truss
12/10/06 -- 12A.1 EVA-1 (~4:30pm, 6 hrs., EV1-Curbeam/EV2-Fuglesang)
12/12/06 -- 12A.1 EVA-2 (~4:00pm, 6 hrs., EV1-Curbeam/EV2-Fuglesang)
12/14/06 -- 12A.1 EVA-3 (~3:30pm, 6 hrs., EV1-Curbeam/EV3-Williams)
12/16/06 -- STS-116/12A.1 undocking (5:05pm)
12/19/06 -- STS-116/12A.1 landing (@ KSC: ~4:36pm)
01/17/07 -- Progress M-57/22P undocking (DC1) & reentry
01/18/07 -- Progress M-59/24P launch
01/20/07 -- Progress M-59/24P docking (DC1)
02/02/07 -- US EVA-6
02/06/07 -- US EVA-7
02/10/07 -- US EVA-8
03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses
03/18/07 -- STS-117/13A docking
03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/05/06
Date: Tuesday, December 05, 2006 12:55:31 PM
Attachments:

ISS On-Orbit Status 12/05/06

All ISS systems continue to function nominally, except those noted previously or below.

The crew's work/rest cycle remains shifted at 8:30am-12:00midnight EST until STS-116/12A.1 launch.

After wakeup, FE-2 Thomas Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin lotion. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

FE-1 Tyurin serviced the Russian BMP Harmful Impurities Removal System, starting the "bake-out" cycle to vacuum on absorbent bed #2 of the regenerable dual-channel filtration system. The bake-out will be terminated tonight before sleep time (~11:15pm EDT). *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

Reiter and CDR Lopez-Alegria had another two hours reserved between them for prepacking hardware slated for return on STS-116/Discovery, assisted by uplinked prepack lists.

Thomas Reiter's activities today are dominated by his second stress test plus saliva, urine and blood sampling of the ESA/Russian biomed experiment "IMMUNO". He is being assisted by FE-1 Tyurin where required for venous blood collection and blood sample processing (smear and in the Plasma-03 centrifuge). *[The sequence is run twice during the day. Samples are secured in the MELFI (Minus Eighty Degree Celsius Laboratory Freezer for ISS) in cold packs in their KB-03 container, and the CDR will also tape a video of the MELFI stowage to help the ground team to develop better packing plans for samples to be returned. IMMUNO*

is a 24-hr. test of human immune system changes, with the objective to investigate immune neuro-endocrine reactions in the space environment by studying samples of saliva, blood and urine using collection kits and the biomedical (MBI) protection kit. Also included are entries in a fluid/medications intact log, and a stress-test questionnaire to be filled out by the subject at begin and end. As per Flight Rule, the invasive (blood drawing) event is timed to be at a thruster-inhibited period.]

Later tonight, Mikhail Tyurin is scheduled to take the periodic (generally monthly) health test with the cardiological experiment PZEh MO-1 "Study of the Bioelectric Activity of the Heart at Rest" on the TVIS (Treadmill with Vibration Isolation & Stabilization), assisted by Reiter. *[During the 30-min. test, the crew tags up with ground specialists on Russian ground site (RGS) passes on Daily Orbit 1 (~2:40pm EST) via VHF and downlinked data from the Gamma-1M ECG (electrocardiograph) for about 5-6 minutes.]*

The CDR will start his third seven-day SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) sleep log and questionnaire entries in the experiment's laptop application, later downloading data and initializing the device for another run. Afterwards, L-A will power down the laptop. *[The experiment is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the CDR's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the CDR as well as his patterns of sleep and activity throughout the Expedition.]*

Before sleep time, the FE-1 will unstow and install the equipment for the periodic Russian MO-10 "Hematokrit" testing that is scheduled tomorrow for all three crewmembers. *[MO-10 measures the hematocrit (red blood cell mass) value of the blood (it is a well-known phenomenon of space flight that red blood cell mass {normal range: 30-45%} tends to go down over time).]*

Tyurin today conducts "Week 11" sampling of potable water for chemical and microbial analysis from the SVO-ZV tap and the SRV-K warm tap, the latter after preliminary heating of the water (two heating cycles) and flushing. The samples will be returned on 12A.1. *[From each port, Misha collects two 225 mL microbial samples for on-board processing and two 750 mL chemical archival (post-flight) samples for return to Earth, using Russian collection procedures. The flush water, collected in a water bag, is to be reclaimed for technical use.]*

After yesterday's leak check of the pressurized Progress 22P "Rodnik" BV2 tank bladder, the FE-1 today performs another urine transfer from four filled EDV-U liquid waste containers to the BV2 water tank of the cargo ship-turned-trash can for disposal. *[Each of the two spherical Rodnik tanks (BV1 & BV2) consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder*

is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane and is leak-tested before receiving the liquid waste.]

Mike L-A will relocate the ESA LDM (Long Duration Mission) Astrolab educational robotic (ROBoT) from the Airlock (A/L) to the Node for stowage, with documentary photography. *[This activity in preparation for the 12A.1 EVAs was originally scheduled on 11/29. Recorded demo sessions with ROBot are used to develop DVD-4, the fourth in a series of DVDs distributed to schools in ESA member countries. In continuation of a pedagogical series of lessons initiated on previous ESA missions.]*

Also as get-ahead activity in the A/L for the STS-116 FD 4, 6 & 8 spacewalks, Mike will terminate the first round of battery charging in the BSA (Battery Stowage Assembly), begun on 12/3, and start the second round. *[The various batteries -- REBA (Rechargeable EVA Battery Assembly), PGT (Pistol Grip Tool), EHIP (EMU Helmet Interchangeable Portable) lights -- and the METOX (Metal Oxide) CO₂ absorber canisters will then be stowed in separate EVA staging mesh bags.]*

On the RED (Resistive Exercise Device), L-A is to inspect the canister cords and accessories, then check whether the bolts are still tight. The maintenance today also includes tightening the RED hardmount plate (done once every 6 months).

In addition, Mike's assignments today include the standard weekly maintenance on the TVIS (Treadmill with Vibration Isolation & Stabilization) with SLD (Subject Loading Devices) contingency configuration, primarily inspecting the condition of the SLDs, SLD cables and SPDs (Subject Positioning Devices), lubricating as required, plus recording time & date values.

The CDR also will replace the battery on the CSA-CP (Compound Specific Analyzer-Combustion Products) prime unit (#1055) with a fresh one.

Thomas has another 1 hr. scheduled to prepare his personal provisions for return to Earth. Other periods of departure preps will be scheduled during the remaining two weeks. *[Reiter, to be replaced by Sunita Williams, has been approved to return one single bag and one half bag of personal items. Other return gear, such as personal clothing, hygiene items etc., will either have to be packed for return or trashed. All dispositions have to be barcode-tracked for keeping the IMS (Inventory Management System) up to date.]*

Misha Tyurin is timelined to conduct today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including

ASU toilet facilities systems/replaceables.

Mike L-A will do the daily update/edit of the standard IMS (Inventory Management System) "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The crew is performing their daily physical exercise program on the TVIS treadmill (CDR, FE-1, FE-2/only) and RED resistive exerciser (CDR, FE-1).

Afterwards, L-A will copy his, Misha's and Thomas' exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~4:00pm EST, FE-2 Thomas Reiter will be interviewed live during an LDM PAO event arranged by German Phoenix TV (Michael Krons/Conny Czymoch) about the "Astrolab" mission at Col-CC (Columbus Control Center), plus ZDF TV's "Morgenmagazin". Questions have been uplinked beforehand ("Mr. Reiter, how strong is your longing to be back on Earth?"; "You are living under very crowded conditions. What do you most dislike about this life in space?"). *[The audio/video connection will be made by the SM's automated onboard program sequencer (SPP) over RGS, and the VHF/TV signal is routed from there through TsUP/Moscow and Ostankino TV satellite to Col-CC at Oberpfaffenhofen/Bavaria via IGS network.]*

Last night's makeup reboost, a single perigee burn with the Progress 23P DPO thrusters, was successfully performed at 4:36pm EST. Burn time: 22 min 44 sec, for a delta-V of 5.3 m/s, an approximate 8% overburn from the planned delta-V (4.9 m/s), or an additional 700 m in altitude, for a total delta-altitude of +9.25km (4.99 nm) *[The reboost established ISS into a phase angle (=angular orbital separation from Shuttle at launch) condition such that STS-116 can rendezvous with the station on FD3 for any launch date between 12/7-21 (local). The additional delta-V may extend this range through 12/23.]*

The BCC (Backup Control Center) Dry Run early this morning failed (thereby serving its purpose). The activity had to be stopped prematurely when the BCC command server could not be configured in the current Libra 1.0.1 activity. The Libra 1.0.1 program was updated yesterday, which may have contributed to the abort. Troubleshooting is underway. *[Purpose of this periodic exercise is to check on and demonstrate BCC functionality under Russian assets while providing proficiency training for Moscow-HSG (Houston Support Group) personnel at the HSR (Houston Support Room) and TsUP-Moscow specialists.]*

Sleep time for the crew will again be at 12:00midnight.

Today's CEO photo targets, from the Lab nadir/science window, were **Lake Poopo, Bolivia** (*looking to the right of track for Lake Poopo. Cloud cover should have been minimal at the time of this overpass. Overlapping mapping frames along-track are desired to capture shoreline features. The target center point is located at 19.5S, 67.5W*), and **Pilcomayo River dynamics, Northern Argentina** (*this river flows ESE from the Andes, and has changed its course significantly over time. Mapping frames along the existing river course and adjacent flood plain to the left of track are desired to assess changes in river position over time. The ISS orbit pass occurred in the morning when cloud cover was predicted to be minimal. The center point of the target area is located at 24S, 61W*).

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 7:23am EST [= epoch]*):

Mean altitude -- 343.4 km

Apogee height -- 359.8 km

Perigee height -- 327.0 km

Period -- 91.40 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0024402

Solar Beta Angle -- 16.2 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.75

Mean altitude gain in last 24 hours -- 9000 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46019

Significant Events Ahead (all dates Eastern and subject to change):

12/07/06 -- STS-116/12A.1 launch (9:35:44pm)

12/09/06 -- STS-116/12A.1 docking (6:15pm)

12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss

12/10/06 -- 12A.1 EVA-1 (~4:30pm, 6 hrs., EV1-Curbeam/EV2-Fuglesang)

12/12/06 -- 12A.1 EVA-2 (~4:00pm, 6 hrs., EV1-Curbeam/EV2-Fuglesang)

12/14/06 -- 12A.1 EVA-3 (~3:30pm, 6 hrs., EV1-Curbeam/EV3-Williams)

12/16/06 -- STS-116/12A.1 undocking (5:05pm)
12/19/06 -- STS-116/12A.1 landing (@ KSC: ~4:36pm)
01/17/07 -- Progress M-57/22P undocking (DC1) & reentry
01/18/07 -- Progress M-59/24P launch
01/20/07 -- Progress M-59/24P docking (DC1)
02/02/07 -- US EVA-6
02/06/07 -- US EVA-7
02/10/07 -- US EVA-8
03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses
03/18/07 -- STS-117/13A docking
03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/04/06
Date: Monday, December 04, 2006 1:44:03 PM
Attachments:

ISS On-Orbit Status 12/04/06

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 11 of Increment 14.*

The crew's work/rest cycle remains shifted at 8:30am-12:00midnight EST until 12A.1 launch.

After wakeup, Thomas Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

FE-1 Tyurin serviced the Russian BMP Harmful Impurities Removal System, starting the "bake-out" cycle to vacuum on absorbent bed #1 of the regenerable dual-channel filtration system. Before sleep time tonight (9:15pm EST) the bake-out will be terminated. Regeneration of bed #2 follows tomorrow. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

Thomas Reiter is scheduled for his 8th and final session of the regular monthly ETD (Eye Tracking Device) experiment, which studies the coordination of eye and head movements in zero-G, i.e. the adaptation of the human vestibular (balance) system, and takes place in the Docking Compartment (DC-1)'s central sphere. *[After a calibration with the calibrating unit, the experiment investigates horizontal eye and head movement coordination, measures Listing's plane, and determines the orientation of the vestibulo-ocular coordinate system, using five target marks on a visual target board on the EV-2 hatch on the horizontal plane. For the experiment, Thomas first has to check the setup of the left and right video cameras, then establish his most comfortable and stable body position relative to the visual target (60 cm for the first part of the experiment, 100 to 150 cm in parts two & three).*

Each step requires another prior calibration run, using visual target cues or the calibration unit.]

Doing regular maintenance on the ASU toilet facilities in the SM, Tyurin completed the periodic replacement of the toilet's urine receptacle (M-P) and filter insert (F-V), stowing the old units for disposal.

Reiter and Tyurin are timelined with one hour each for doing the standard Russian PFE (Physical Fitness Evaluation) test MO-3, Thomas' third, Mikhail's second time, using the TVIS treadmill for workout (in unmotorized mode) and wearing the Cardiocassette KK-2000 belt with three chest electrodes. *[The test, controlled from the RSE-Med laptop, yields ECG (electrocardiogram) readings to the Cardiocassette-2000, later to be downlinked via U.S. OCA. For the ECG, the FEs will work out on the TVIS, first walking 3 min. up to 3.5 km/h, then running at a medium pace of 6.5 km/h, followed by the maximum pace not exceeding 10 km/h, then walking again at gradually decreasing pace.]*

Tonight, the FE-1 will unstow the REFLOTRON-4 hardware and subject it to a function/health check, in preparation for another round of MBI-8 PROFILAKTIKA sessions coming up this week. *[Reflotron-4 is a sophisticated clinical analyzer used for periodic biochemical blood and saliva analysis to monitor crew health or to be used diagnostically on Flight Surgeon request. Built in earlier versions originally by Boehringer in Mannheim/Germany for the Mir program, the Reflotron-4 consists of the analyzer itself, which has a mass of 13-lbs. and uses 40W power, a set of measuring strips and a small equipment kit.]*

In preparation for the upcoming urine transfer to the Rodnik BV2 water tank of Progress M-57 (22P), Mikhail will set up the necessary "plumbing" to the compressor and then inflate and pressurize the cargo ship's BV2 tank bladder. *[The pressurization of the collapsed bladder of the Rodnik water storage tank is conducted as a leak check, to last ~4h 30min, preparatory to the liquid waste transfer to the tank for disposal. Each of the two spherical Rodnik tanks consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane.]*

Afterwards, Tyurin transfers the crew's standard Russian TEK (thermal protection) jackets to the Soyuz TMA-9 and stows them in a recess in the Descent Module (backup parachute recess). *[These warm coats would come in handy in case of an unscheduled landing in cold Kazakhstan.]*

For his second and last session of the ESA/Russian biomed experiment "IMMUNO",

scheduled for tomorrow, Thomas Reiter today takes air samples with the IPD- NH₃ Draeger tubes sampler, testing for ammonia (NH₃) in the SM. Afterwards, he sets up the IMMUNO urine collection hardware. *[IMMUNO is a 24-hr. test of human immune system changes, with the objective to investigate immune neuro-endocrine reactions in the space environment by studying samples of saliva, blood and urine using collection kits and the biomedical (MBI) protection kit. Also included are entries in a fluid/medications intact log, and a stress-test questionnaire to be filled out by the subject at begin and end.]*

Misha Tyurin is scheduled to perform the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water from an EDV containing water from the BKO multifiltration/purification column unit. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh-8 Liquid Unit where they could cause Elektron shutdown.]*

For today's workout by Thomas on the RED (Resistive Exercise Device) in the Node, which is to be video taped and measured for its structural dynamics response, CDR Lopez-Alegria will set up the IWIS (Inertial Wireless Instrumentation System) after replacing its RSU (Remote Sensor Unit) in the Node with a new one, and the Sony PD-100 camcorder. After the RED DTO (Development Test Objective), the video equipment will be deactivated and IWIS powered down. *[Reiter's exercise protocol is regularly uplinked to the MEC (Medical Equipment Computer) and periodically changed. For the correlation of today's session with structural measurements, Reiter "shows" his wristwatch to the video camera at the start. The data will help to calculate how the crew loading on the ISS affects structure life and fatigue estimates.]*

Mike L-A and Thomas have time set aside to work in the Lab on consolidating available stowage volume in preparation for 12A.1 cargo stowage.

L-A and Misha also conducted a training/review of new uplinked SODF (Station Operations Data File) procedures dealing with Solar Array constraints for 12A.1 and beyond. Afterwards, they held a 20-min teleconference with the ground to clear up any questions. *[Station ops are impacted by newly introduced and updated SARJ (Solar Alpha Rotary Joint) and BGA (Beta Gimbal Assembly) constraints for three situations: thruster pluming on arrays, longeron shadowing in the event of a BGA failure, and momentum resulting from starting/stopping the SARJ. Flight rules are being updated with lists of priorities for array pointing, and a number of new planning tools and ground software tools are being developed to help address the problem, both short term and long term.]*

The crew is also scheduled for another review of the ISS/Shuttle docked ops timeline and a following tagup at ~6:00pm EST with the ground via S-band.

The CDR is scheduled to conduct today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables, the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/Moscow.

Mike L-A will also perform the daily update/edit of the standard IMS (Inventory Management System) "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The crew is performing their daily physical exercise program on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A will copy his, Misha's and Thomas' exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Later tonight, another ISS reboost will be attempted, using the eight Progress 23P rendezvous & docking thrusters (DPO) in pulsed mode ("Method 1"). Objective: to adjust the station's orbital phase angle such that STS-116/12A.1 can rendezvous with ISS on FD3 for any launch date between 12/7-23 (local). Time of reboost burn ignition: 4:36pm EST; burn duration 21min 29s, for a delta-V of 4.9 m/s (16.1 ft/s) and delta-height of 8.6 km (4.6 nmi). *[To allow for the new mass properties of the asymmetrical station, the yaw angle limit band for the jets in the motion control software has been opened up from 4 to 8 deg, and the pulse delay reduced from 16 to 13s.]*

MCC-Houston is setting up for another BCC (Backup Control Center) dry run in test mode early tomorrow, with no involvement of the ISS crew or vehicle. The seven-hour exercise will start at 1:00am EST. *[Purpose of this periodic exercise is to demonstrate BCC functionality under Russian assets while providing proficiency training for Moscow-HSG (Houston Support Group) personnel at the HSR (Houston Support Room) and TsUP-Moscow specialists.]*

Sleep time again will be at 12:00midnight.

No CEO (Crew Earth Observations) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

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Eccentricity -- 0.0011836

Solar Beta Angle -- 12.9 deg (magnitude increasing)

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Mean altitude loss in last 24 hours -- 98 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 46003

Significant Events Ahead (all dates Eastern and subject to change):

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12/09-16/06 -- STS-116/12A.1 docked mission w/ISS -- P5 truss

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12/14/06 -- 12A.1 EVA-3 (~3:30pm, 6 hrs., EV1-Curbeam/EV3-Williams)

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01/20/07 -- Progress M-59/24P docking (DC1)

02/02/07 -- US EVA-6

02/06/07 -- US EVA-7

02/10/07 -- US EVA-8

03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

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04/09/07 -- Progress M-60/25P launch
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06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/03/06
Date: Sunday, December 03, 2006 1:13:57 PM
Attachments:

ISS On-Orbit Status 12/03/06

All ISS systems continue to function nominally, except those noted previously or below. *Sunday -- off-duty day for CDR Mike Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Thomas Reiter, except for regular maintenance and voluntary work. Ahead: Week 11 of Increment 14.*

The crew's work/rest cycle remains shifted at 8:30am-12:00midnight EST until STS-116/12A.1 launch.

After wakeup, Thomas Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

Mikhail Tyurin is scheduled to perform today's routine maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables, the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/Moscow.

Winding down his get-ahead activities for the spacewalks on STS-116 FDs 4, 6 & 8, Mike Lopez-Alegria will terminate the last round of EMU (Extravehicular Mobility Unit) battery maintenance and start the first round of EVA battery charging for 12A.1. *[Before STS-116 arrival, all EVA batteries will be fully charged, requiring two rounds in the Airlock BSA (Battery Stowage Assembly, scheduled on 12/4 & 12/5. The various batteries -- REBA (Rechargeable EVA Battery Assembly), PGT (Pistol Grip Tool), EHIP (EMU Helmet Interchangeable Portable) lights -- and the METOX (Metal Oxide) CO₂ absorber canisters will then be stowed in separate EVA staging mesh bags.]*

Working off his discretionary "free time" task list, in the DC1 docking compartment Misha Tyurin is to conduct the periodic check of the Mosfet (metal oxide semiconductor field-effect transistor) radiation sensor reader/display of the MATRYOSHKA-R anthropomorphic (human torso) "phantoms" located inside the ISS. *[The reader automatically records radiation readings at strictly defined times (:00, :15, :30, :45 minutes). The complex Matryoshka payload suite is designed for sophisticated radiation studies. Besides the Phantom Sphere containers in the SM, the human torso in the DC1 is equipped with individual horizontal slice-like layers with 356 thermoluminescent detectors (TLDs) and five nuclear radiation tracking detectors (NTDPs). The mannequin is covered with a "poncho" and "hood" and used for studies of on-orbit radiation and long-term dose accumulation. The payload collects radiation measurements every 15 minutes of each hour around the clock. Note: Matryoshka is the name for the traditional Russian set of nested dolls.]*

At ~11:24am EST, Reiter had his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop),

The crew is performing their daily physical exercise program on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Sleep time again will be at 12:00midnight.

No CEO (Crew Earth Observations) photo targets uplinked for today.

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Eccentricity -- 0.0011895

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Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 98 m
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12/09/06 -- STS-116/12A.1 docking (6:15pm)
12/09-16/06 -- STS-116/12A.1 docked mission w/ISS -- P5 truss
12/10/06 -- 12A.1 EVA-1 (~4:30pm, 6 hrs., EV1-Curbeam/EV2-Fuglesang)
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09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/02/06
Date: Saturday, December 02, 2006 2:37:13 PM
Attachments:

ISS On-Orbit Status 12/02/06

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 14 crew CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Thomas Reiter.*

The crew's work/rest cycle remains shifted at 8:30am-12:00midnight EST until STS-116/12A.1 launch.

After wakeup, FE-2 Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

The crew conducted the regular weekly three-hour task of thorough station cleaning, wearing protective garment. *["Uborka", normally done every Saturday, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with "Fungistat" disinfectant wipes; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of today's *uborka*, FE-1 Tyurin performed preventive maintenance cleaning on the ventilation system in the FGB (*Funktsionalnyi-Grusovoi Blok*).

Afterwards, Mikhail Tyurin worked an hour in Progress M-57/22P, docked at the DC1 "Pirs" airlock, installing a ventilation unit with an air heater (VN) in its cargo compartment (GrO).

At ~11:00am EST, the crew engaged in their regular weekly planning conference

(WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

In the late afternoon, CDR Lopez-Alegria is to fill out the regular weekly FFQ (Food Frequency Questionnaire) on the MEC (Medical Equipment Computer), his ninth, which keeps a personalized log of his nutritional intake over time on special MEC software. *[The FFQ records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

Mike is also assigned to do the routine daily maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

As usual, time is set aside for the crew to conduct their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Thomas will copy his, L-A's and Misha's' exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

For the traditional ESA LDM (Long Duration Mission) "Symbolic Program", Thomas Reiter and Misha Tyurin will set up the camcorder for taping their activities, then unpack, sign and certify/stamp a number of commemorative items. *[These include ESA flags (1 large, 1 small), 29 ESA patches, German flags (1 large, several small), a stuffed toy mouse (German children's "Maus" for WDR TV), and a stuffed rabbit toy (German children's "Felix").]*

At the Kenwood radio in the SM, with VHF transceiver, headset and power supply, Mike L-A conducted a ham radio session at ~9:22am EST, chatting with the National Weather Service (NWS)'s ham radio station.

Sleep time again will be at 12:00midnight.

SARJ Update: Ground testing, subsequently confirmed by on-orbit testing, of the SARJ (Solar Alpha Rotary Joint) toothcrash auto recovery demo has provided sufficient data for analyses to determine the cause of the failure of the toothcrash auto recovery operation to complete the action. The cause has been determined to

be a “bug” in the auto recovery software related to actual RJMC (Rotary Joint Motor Controller) hardware which is not present in the RJMC simulation against which the software was verified. A software patch is in work; it is being tested over this weekend and a special software Control Board will be held on 12/4 (Monday) for approval to uplink the patch to the ISS.

TRRJ Update: It has been determined that the code for TRRJ (Thermal Radiator Rotary Joint) toothcrash auto recovery is sufficiently similar to the SARJ code (see above) that a failure of this test would be expected also. In order to verify this, a test of the TRRJ toothcrash was to be conducted last evening from which data will be taken for analysis.

Attitude Error Update: The ISS vehicle was maneuvered back to the nominal attitude during the night of 11/30 using the USTO (US Thruster Only) controller after which the previously utilized momentum management controller was re-loaded. Vehicle attitude control has been nominal since that load was completed.

Reboost Update: A preliminary plan has been developed for a 4.9 m/s reboost on 12/4 (Monday) at ~4:35pm EST. This 21-minute burn of Progress 23P’s eight DPO rendezvous & docking jets would recover the STS-116 FD3 docking opportunities (for 12/7 liftoff) which are unavailable due to the current ISS orbit. RSC-Energia will expand yaw control limits in the FDIR (Fault Detection, Isolation & Recovery) software.

Nonretracted Progress Antenna Update: RSC-Energia is considering another Russian EVA (typically in January) to remove the nonretracted Progress KURS orientation antenna (AO-VKA) between SM aft port and Progress front end. A suitable cutter tool will be delivered by 12A.1.

Weekly Science Update (*Expedition Fourteen – 10th*)

ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS): Nothing to report. Next activities are currently planned on 12/06 and 12/07.

ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System): Planned.

BASE: Complete.

BCAT-3 (Binary Colloidal Alloy Test-3): Planned.

CAR-2 (Investigating Mechanisms of Heart Disease in Micro-G, ESA): Last session for Thomas Reiter was performed on 11/29. Awaiting report.

CBOSS (Cellular Biotechnology Support Systems): Complete.

CFE (Capillary Flow Experiment): Complete.

CULT (Cultural Factors Questionnaire): Last (sixth) session for Thomas Reiter was performed on 11/29. Awaiting report.

DAFT (Dust & Aerosol Measurement Feasibility Test): Complete.

Earth Knowledge Acquired by Middle School Students (EarthKAM): In progress.

ETD (Eye Tracking Device): Last session (eighth) for Thomas Reiter is currently scheduled on 12/04.

GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology): Planned

IMMUNO (Saliva Sampling): IMMUNO samples of first session in MELFI Dewar2-TrayA-Section 4. Last session for Thomas Reiter is currently scheduled on 12/05 and 12/06. This session will include urine collection.

LEUKIN: Complete.

MISSE (Materials ISS Experiment): Ongoing.

MTR-2 (Russian radiation measurements): Passive dosimeters measurements in DC1 "Pirs". Removal of passive dosimeters from the MATRYOSHKA Phantom is currently scheduled on 12/07, with a download on STS-12A.1.

NOA (Nitric Oxide Analyzer): Last session for Thomas Reiter was performed on 11/30. Awaiting report.

Nutrition: Planned.

PK-3 (Plasma Crystal 3): In progress.

POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G): Planned.

RC (Refrigerated Centrifuge): Planned.

RS (Renal Stone): The Renal Stone team has received the Excel file created by

Thomas Reiter for his diet logging and appreciates the thoroughness of his entries.

SAMPLE: Complete.

SEM (Space Experiment Module): The SEM payload completed its final requirement on 11/2, and all operations have been completed successfully. The ground team has reviewed the photos, and “they look great! The SEM team wishes to thank the crew for a great job, and a special thank you from the SEM students for being so willing to answer their questions throughout SEM’s flight. Your dedication to science is very much appreciated. We look forward to future opportunities on ISS”.

SLEEP: Next week Lopez-Alegria will conduct the monthly data download for his Actiwatch. In anticipation of Suni Williams’ arrival, L-A will also initialize her Actiwatch during his download session.

SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite): In progress.

Swab (Characterization of Microorganisms & Allergens in Spacecraft): Planned.

TROPI (Study of Novel Sensory Mechanism in Root Phototropism): I No on-orbit activities are planned for Tropi during this week. Looking forward to having some of the frozen samples returned on STS-116. Also looking forward to the third Tropi experiment run in late December.

YING (Yeast in No Gravity): Complete.

CEO (Crew Earth Observations): Through 11/24, the ground has received a total of 1,880 of ISS CEO images for review and cataloging. The quality of the imagery with all lens settings remains high in terms of composition and focus. “We are particularly pleased with progress of attaining consistently good focus with the long lens settings so early in your increment. We also want to thank you for your efforts in resolving the issue of the best available time on the ISS for setting camera times. Thanks for your fine support of our payload.”

Today's CEO photo target, from the Lab nadir/science window, was **Moorea Coral Reef, Tahiti** (*this roughly triangular island is part of the Society Islands group in the equatorial Pacific Ocean. The surrounding coral reef ecosystems are the primary focus of the Long Term Ecological Research [LTER] site based on Moorea Island. Scattered clouds may be present, but this near-nadir pass with a high sun elevation was ideal for photography of the island and surrounding reef structures. Looking to the left of track for the island. The center point of the target is located at 17.5S,*

149.83W),

CEO photography can be viewed and studied at the websites:

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From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 12/01/06
Date: Friday, December 01, 2006 2:50:14 PM
Attachments:

ISS On-Orbit Status 12/01/06

All ISS systems continue to function nominally, except those noted previously or below.

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After wakeup, FE-2 Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

FE-1 Tyurin began his day with the routine checkup of Docking Compartment (DC1) circuit breakers and fuses. *[The monthly checkup in the "Pirs" DC1 looks at AZS circuit breakers on the BVP Amp Switch Panel (they should all be On) and the LEDs (light-emitting diodes) of 14 fuses in Fuse Panels BPP-30 & BPP-36.]*

Later today, Tyurin is scheduled for another 3-hour repair session on the Russian ASN-M Satellite Navigation System, removing and replacing a transmission cable on the antenna feeder unit (AFU), to recover the latter. *[Mikhail had prepared for this task on 11/27 by taking (and downlinking) situational photography of AFU cable connectors. ASN-M will be required for prox ops during the arrival of the European ATV (Automated Transfer Vehicle) "Jules Verne" next year.]*

Continuing his get-ahead activities for the spacewalks on STS-116 FDs 4, 6 & 8, CDR Lopez-Alegria today is performing more charge/discharge maintenance work on EMU (Extravehicular Mobility Unit) batteries. *[Before 12A.1 arrival, all EVA batteries will be fully charged, requiring two rounds in the Airlock BSA (Battery Stowage Assembly, scheduled on 12/4 & 12/5. The various batteries -- REBA (Rechargeable EVA Battery Assembly), PGT (Pistol Grip Tool), EHIP (EMU Helmet*

Interchangeable Portable) lights -- and the METOX (Metal Oxide) CO₂ absorber canisters will then be stowed in separate EVA staging mesh bags.]

After preparing 8-9 empty EDV containers, Mikhail Tyurin started the transfer of potable water still remaining in the BV2 tank of Progress M-57/22P (docked at the DC1 docking compartment). *[After hooking up the plumbing from the 22P water tank BV2 via the SM Rodnik tankage, the water was transferred to the EDVs, at first in self-flow (under its own tank pressure), then using a compressor pump via a GZhS gas/liquid separator, to remove air bubbles in the water. Filling of the empty Progress BV1 & BV2 tanks with urine will be scheduled later.]*

For Mike L-A and Thomas Reiter, today's major activity is prepacking hardware slated for return on STS-116/Discovery, assisted by uplinked prepack lists. Between the two of them, about 8 hours worktime are set aside for this job.

Tonight (~8:19pm EST), the crew will also engage in a telecon with STS-116 crewmembers Joan Higginbotham (MS4) and Nick Patrick (MS1) plus transfer team members at MCC-H to discuss resupply, transfer and stowage details, including uplinked material on resupplies, Spacehab ascent layouts and Shuttle-ISS-Shuttle transfer choreography.

FE-2 Reiter has another 1 hr. scheduled to prepare his personal provisions for return to Earth. Other periods of departure preps will be scheduled during the remaining two weeks. *[Reiter, who will be replaced by Sunita Williams, has been approved to return one single bag and one half bag of personal items. Other return gear, such as personal clothing, hygiene items etc., will either have to be packed for return or trashed. All dispositions have to be barcode-tracked for keeping the IMS (Inventory Management System) up to date.]*

At 10:30am Mike L-A conducted the periodic VHF1 emergency communications check over NASA VHF (very high frequency) sites at Dryden (~10:33am) and White Sands (~10:38am) and Wallops Island (3:22pm), talking with Houston/Capcom, MSFC/PAYCOM (Payload Operation & Integration Center Communicator) and Moscow/Glavni (TsUP Capcom) in the normal fashion via VHF radio from a handheld microphone and any of the U.S. segment ATUs (audio terminal units). *[The test is to verify signal reception and link integrity, and to ensure minimum required link margin during emergency and special events (such as a Soyuz relocation). Last time done: 10/30/06.]*

Later tonight, L-A is scheduled to reconfigure the OCA (Orbiter Communications Adapter) Router from APS-1 (Automated Payload Switch #1) to APS-2, after ground commanding from POC (Payload Operations Center/Huntsville)

Afterwards, the CDR performs the periodic atmospheric status checks for ppO₂ (Partial Pressure Oxygen) and ppCO₂ (pp Carbon Dioxide), using the CSA-O₂ (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO₂ Monitoring Kit).

Batteries are to be replaced if necessary. *[CSA-CP measurements are to be gathered with units #1055 (prime) at the SM Central Post & #1053 (backup) in the Node, CSA-O₂ (#1042, #1063) in the Lab, and CDMK (#1009) in SM and Lab. The instruments will be turned off afterwards, except for #1055, and returned to their regular locations.]*

FE-1 Tyurin is assigned to do the routine daily maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM, including ASU toilet facilities systems/replaceables.

Working off his “time permitting” discretionary task list, Misha will also perform the daily update/edit of the standard IMS (Inventory Management System) “delta file”, including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

As usual, time is set aside for the crew to conduct their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Mike will copy his, Thomas’ and Misha’s’ exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~10:00am EST, Tyurin linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing transfer details and stowage locations. *[Today’s issues included the whereabouts of KBO trash bags containing the discarded EVA gloves, stowage location and ID numbers of removed light fixtures, quantity and numbers of stowed fan dampers, etc.]*

At ~10:45am, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~3:30pm, the crew is scheduled for their regular weekly tagup with the Lead

Flight Director at JSC/MCC-H.

This will be followed after lunch, at 4:50pm, by a 30-min. telecon with the STS-116 Shuttle crew via S-band, to discuss aspects of the 12A.1 docked period starting next week on Saturday (12/9).

At ~2:40pm, Thomas will support another live interactive LDM (Long-Duration Mission)/PAO video event, fielding questions from three press media,- German Sat1/Pro7 TV news, DER SPIEGEL magazine, and ESA ESTEC TV for a pooled final edit. *[The audio/video connection will be made by the SM's automated onboard program sequencer (SPP) over RGS (Russian Ground Site), and the VHF-1/TV signal was routed from there through TsUP/Moscow and Ostankino TV satellite to ESTEC (Noordwijk/Holland) via IGS network.]*

After the CDR made sure that the Lab window shutter was closed and the external water vent was properly preheated (to prevent ice buildup), surplus water from the Lab condensate tank was vented into space (starting at ~12:00pm EST, via time-tagged, i.e., prestored, ground commands). This was preceded by attitude control handover to Russian MCS for maneuvering to dump attitude and subsequent return of control to US Momentum Management. *[For this particular vent, the IMMT (ISS Mission Management Team) yesterday granted a one-time waiver for lowering the Flight Rule limit of condensate tank depletion from 10% to 3%.]*

Sleep time again will be at 12:00midnight.

Reboost Update: The cause of the aborted station reboost by Progress 23P on 11/29 is believed to be incorrect ISS post-12A mass properties leading to exceedance of the Progress thrusters' preset yaw attitude limits (this was the first reboost after the 12A asymmetric mass addition). Corrective measures are being taken, with FDIR (Fault Detection, Isolation & Recovery) control limits expanded. Tentative plans are to make another reboost attempt on 12/4 (Monday), using the same "Method 1", i.e., eight rendezvous & docking (DPO) jets in the "off-pulsing" mode. If successful, this would permit FD3 dockings for launches on 12/7-12/21, 12/23 and 12/25.

Attitude Error Update: When attitude control was returned to the US MCS (Motion Control System) after the failed reboost, the MCS commanded the station to its new attitude with an error in the yaw plane of 0.6 degrees. After the handover, a new Momentum Management controller (math program) capable of Inertial Scaling (i.e., able to read dynamic mass properties of the vehicle such as Mobile Transporter movements or Progress dockings) was loaded and utilized for the first time. This routine sought out a TEA (Torque Equilibrium Attitude) differing from the expected nominal TEA and has since been unable to hold the vehicle attitude in yaw within

Flight Rule limits. The station afterwards stabilized at 7.5 deg offnominal in yaw (which did not cause any thermal or structural issues at the currently benign solar Beta environment). It was decided to return to a non-inertial scaling controller yesterday (which required an attitude change maneuver last night at 6:05pm EST).

Nonretracted Progress Antenna Update: RSC-Energia is considering another Russian EVA (typically in January) to remove the nonretracted Progress KURS AO-VKA orientation antenna between SM aft port and Progress front end. A suitable cutter tool will be delivered by 12A.1.

Today's CEO photo targets, from the Lab nadir/science window, were **Navassa Island reef, Caribbean** (*a few seconds after crossing eastern Cuba near Guantanamo ISS encountered this tiny teardrop-shaped island that is located in the Windward Passage between Jamaica and the SW tip of Haiti near 18.24N 75.01W. Shooting right of track with the long lens settings for details of the subtle coral reef structures of this target*), **Lake Poopo, Bolivia** (*as the weak El Niño event continues in the Pacific, observers are monitoring these features and nearby basins for changes in water levels. The center for Lake Poopo is near 19.5S 67.5W. Looking left of track using the long lens settings for details*), **Palmerston Island reef, Central S Pacific** (*this almost rhombus-shaped atoll is part of the Cook Island group and situated in the equatorial South Pacific near 18.04S 163.10W. The central lagoon is about seven miles across. ISS had a nadir pass this time in high sun offering optimum illumination of the details of the coral reef structures, and the crew was to use the long lens with the doubler*), and **N Mariana Islands, & Guam** (*the station's fair-weather track was over the extreme NE tip of this target area, so the crew was to try to look right of track for the Maug Islands centered near 20.01N 145.22E. These three small islets are the remains of a collapsed volcanic cone. Using the long lens settings for details*).

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 7:53am EST [= epoch]*):

Mean altitude -- 334.7 km

Apogee height -- 342.8 km

Perigee height -- 326.7 km

Period -- 91.23 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0012002
Solar Beta Angle -- 1.4 deg (magnitude increasing)
Orbits per 24-hr. day -- 15.78
Mean altitude loss in last 24 hours -- 160 m
Revolutions since FGB/Zarya launch (Nov. 98) -- 45956

Significant Events Ahead (all dates Eastern and subject to change):

12/07/06 -- STS-116/12A.1 launch (9:35:44pm)
12/09/06 -- STS-116/12A.1 docking (6:15pm)
12/09-16/06 -- STS-116/12A.1 docked mission w/ISS -- P5 truss
12/10/06 -- 12A.1 EVA-1 (~4:30pm, 6 hrs., EV1-Curbeam/EV2-Fuglesang)
12/12/06 -- 12A.1 EVA-2 (~4:00pm, 6 hrs., EV1-Curbeam/EV2-Fuglesang)
12/14/06 -- 12A.1 EVA-3 (~3:30pm, 6 hrs., EV1-Curbeam/EV3-Williams)
12/16/06 -- STS-116/12A.1 undocking (5:05pm)
12/19/06 -- STS-116/12A.1 landing (@ KSC: ~4:36pm)
01/17/07 -- Progress M-57/22P undocking (DC1) & reentry
01/18/07 -- Progress M-59/24P launch
01/20/07 -- Progress M-59/24P docking (DC1)
02/02/07 -- US EVA-6
02/06/07 -- US EVA-7
02/10/07 -- US EVA-8
03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses
03/18/07 -- STS-117/13A docking
03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/30/06
Date: Thursday, November 30, 2006 2:16:49 PM
Attachments:

ISS On-Orbit Status 11/30/06

All ISS systems continue to function nominally, except those noted previously or below.

The crew's work/rest cycle remains shifted at 8:30am-12:00midnight EST until STS-116/12A.1 launch.

After wakeup, FE-2 Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

Reiter set up for his eleventh (of 13 planned) biweekly NOA/Nitric Oxide Analyzer session and undertook the procedure, later filling in the electronic log book on the RSE1 laptop. *[Purpose of the ESA experiment ESANO1, consisting of the "Platon" analyzer and its power supply, is to monitor expired nitric oxide (NO) in the subject's exhaled air to detect signs of airway inflammation and indications of venous gas emboli (bubbles) that may be caused by inhalation of pollutants in the closed environment of the ISS cabin and increased risk of decompression sickness.]*

On the HRF-2 (Human Research Facility 2) rack, Thomas Reiter was scheduled to break out and install OUM-PFE (Oxygen Uptake Measurement/Periodic Fitness Evaluation) equipment to obtain measurements on himself according to protocol, with Misha Tyurin acting as OUM-PFE operator. Later in the day, he will update the evaluation protocol, deactivate & store the gear and power down the OUM-PFE laptop.

FE-1 Tyurin is to check out the TEEM-100M gas analyzer, part of the Russian MBI-8 PROFILAKTIKA ("Countermeasures") equipment. *[This checkout is motivated by an error message that appeared after TEEM-100M activation on 10/18 when Misha*

performed the last part of his first MBI-8 fitness assessment, consisting of the usual blood-letting before breakfast (to determine lactate and creatine kinase levels in the blood with the AccuSport equipment), later in the day by a physical exercise session on the TVIS treadmill.]

CDR Lopez-Alegria conducted the periodic inspection of the Italian ALTEA (Anomalous Long-Term Effects on Astronauts' Central Nervous System) experiment, checking the status of dosimeter LEDs (light emitting diodes) and making sure the hardware is properly mounted and cables are correctly connected.

Tyurin spends several hours today in the Soyuz-219 (TMA-9)/13S, docked at the FGB nadir port, to dismantle the Kurs-A rendezvous & approach radar system of its motion control & navigation system (SUDN) and remove it from the spacecraft. These valuable components, stowed in the FGB, will be returned to Earth on the next Shuttle for reuse. Mike L-A was to use the Nikon D1X digital camera with flash to photo-document the removal activities for subsequent downlink (to be used for evaluation and training purposes). *[KURS-A is the active half of the Russian space program's proven S-band radar system for automated flight, which measures relative motion parameters between Soyuz (or Progress) and the ISS during rendezvous operations, to enable the onboard calculation of corrective impulses. The system's passive transponder counterpart (KURS-P) is on the Service Module (SM), with one antenna each at the tip of the two solar array wings.]*

Also in the Soyuz TMA-9 spacecraft's Orbital Module, the FE-1 is to take care of the monthly cleaning of the screen/grid of its BVN fan & air heater assembly, to assure adequate air ventilation.

The CDR will be freeing space in the Lab (portside) to prepare stowage volume for accommodating CGBA (Commercial Generic Bioprocessing Apparatus) payload equipment arriving next week on STS-116.

All three crewmembers have time set aside for prepacking hardware to be returned on the Shuttle, assisted by uplinked prepack lists. The numerous important items include LSO and BIOEMULSION experiment hardware, radiation dosimeters, KURS components and other electronic gear, and the failed BZh-8 Liquid Unit of the Elektron. *[A new BZh-10 unit, currently in ground testing, may be ready in time to be shipped up on Progress 24P.]*

FE-2 Reiter has another 1 hr. scheduled to prepare his personal provisions for return to Earth. Other periods of departure preps will be scheduled during the remaining two weeks. *[Reiter, who will be replaced by Sunita Williams, has been approved to return one single bag and one half bag of personal items. Other return gear, such as personal clothing, hygiene items etc., will either have to be packed for*

return or trashed. All dispositions have to be barcode-tracked for keeping the IMS (Inventory Management System) up to date.]

Mike L-A is scheduled for more get-ahead work on 12A.1 EVA gear, today partially resizing FE-2 Sunita (Suni) Williams' LTA (Lower Torso Assembly) for 12A.1 EVA-3 and the subsequent 12A.1 Stage EVAs. *[The final LTA configuration will be completed after STS-116 docking when her boots are delivered. Today's work also installs two signal converters in Mike's and Misha's LCVGs (Liquid Cooling & Ventilation Garments) and a sternal harness in Mike's LCVG, and removes boots, legs and the REBA (Rechargeable EVA Battery Assembly) from EMU #3006 for temporary stowage.]*

The CDR also updated the four copies of the EMER-1 SODF (Emergency-1/Station Operations Data File) book by making P&I (pen & ink) changes to two procedures dealing with the use of CSA-CP (Compound Specific Analyzer-Combustion Products) instruments during gas mask donning/doffing.

In preparation for the STS-116 RPM (R-bar Pitch Maneuver) activities, Thomas Reiter will take one blank and one white image with each of the four DCS-760 digital cameras on a PCMCIA 1GB microdrive, then downlink all to MCC-H for analysis to determine which 760s to use for the RPM.

The FE-2 will also disconnect the EXPRESS Rack 1 Moderate Temperature Loop (ER1 MTL) jumper QDs (Quick Disconnects), hooked up earlier (11/28) to the Lab UIP (Utility Interface Panel) to support MAMS (Microgravity Acceleration Measurement System) data taking during CMG-3 testing and yesterday's station reboost (see below).

L-A conducted the weekly audit/inventory of the available CWCs (Contingency Water Containers) and their contents, to keep track of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week. The current cue card lists 33 water containers (~1061.6 liters total) for the four types of water identified on board: technical water (for Elektron, flushing, hygiene; ~915 liters), flush (~90 liters), condensate water (for processing, 28.03 liters) and other (TCS fluid, EMU waste water, 28.6 liters). Water was delivered by 12A and is re-supplied from processed condensate. 12A.1 will deliver 2 CWCs with 86 liters, followed in January by 24P with 100 liters. There was no water on 23P.]*

Over RGS (Russian Ground Site) at ~5:15pm EST, Thomas will run another VHF-1 (Russian: UKV-1) voice communications test with the ground to check the external telephone link with the COL-CC (Columbus Control Center) at Oberpfaffenhofen near Munich/Germany.

FE-1 Tyurin is assigned to do the routine daily maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM today, including ASU toilet facilities systems/replaceables.

Working off his “time permitting” discretionary task list, Misha should also be able to perform the daily update/edit of the standard IMS (Inventory Management System) “delta file”, including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

As usual, time is set aside for the crew to conduct their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2/only), RED resistive exerciser (CDR), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Reiter will copy his, L-A’s and Misha’s’ exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~3:05pm EST, Lopez-Alegria is scheduled for his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

Sleep time again will be at 12:00midnight EST.

Reboost Update: Last night’s station reboost by Progress 23P’s eight rendezvous & docking (DPO) thrusters was aborted prematurely after ~3m 16s of a planned 18m 22s burn. At this time, there is no identified cause for the early shutdown, but RSC-Energia’s leading theory appears to point to the use of incorrect post-12A station mass data. Joint assessment by US & Russian specialists of cause and next steps is underway. *[The aborted burn yielded a delta-V of 0.50 m/s (1.65 ft/s) instead of 4.2 m/s (13.8 ft/s) and a mean altitude gain of ~0.88 km (0.48 nmi) instead of 7.27 km (3.92 nmi). Preliminary trajectory analysis indicates that if there is no additional pre-STC-116 reboost, the 12/7 launch date and every other day thereafter until 12/13 will allow the desired FD3 (Flight Day 3) dockings. Afterwards, consecutive FD3 dates will follow for 12/15-22, and again every-other-day-FD3 for 12/24 and 12/26 launch. A make-up reboost maneuver on 12/1 would result in consecutive FD3 dockings for 12/7-12/21 launches, as would a 12/4 reboost. Both latter cases would have FD3 dockings only for 12/23 and 12/25 launch.]*

Attitude Error Update: When attitude control was returned to the US MCS (Motion Control System) after the failed reboost, the MCS commanded the station to its new

attitude with an error in the yaw plane of 0.6 degrees. This is a minute amount, which can easily be compensated by the MCS controller, but specialists at MCC-H are puzzled and have started an investigation into the cause of the command error.

Today's CEO photo targets, from the Lab nadir/science window, were **South Central Andean Snowpack** (*DYNAMIC EVENT: The summer growing season is only a few weeks away now for Pampas and northern Patagonia. The crew was to take advantage of an exceptional fair-weather pass to document the remaining snowpack of the south-central Andes and the spring green-up of plateaus and plains to the east. Using the short lens settings for oblique views to the south (right of track). Center point: 30.8S 70.5W*), and **Patagonian Glaciers** (*this was the best lighting of two passes today over this target area. Clouds were expected to persist over the western flank of the Southern Patagonian Ice Field. Therefore the crew was to use the long lens settings for details of the visible glacial features on the east side, trying for near-nadir views only. Center point: 49.00S 73.50W*).

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 7:31am EST [= epoch]*):

Mean altitude -- 334.9 km

Apogee height -- 342.8 km

Perigee height -- 326.9 km

Period -- 91.23 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0011877

Solar Beta Angle -- -2.9 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude gain in last 24 hours -- 700 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45924

Significant Events Ahead (all dates Eastern and subject to change):

12/07/06 -- STS-116/12A.1 launch (9:35:44pm)

12/09/06 -- STS-116/12A.1 docking (6:15pm)

12/09-16/06 -- STS-116/12A.1 docked mission w/ISS -- P5 truss

12/16/06 -- STS-116/12A.1 undocking (5:05pm)

12/19/06 -- STS-116/12A.1 landing (@ KSC: ~4:36pm)

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch
01/20/07 -- Progress M-59/24P docking (DC1)
02/02/07 -- US EVA-6
02/06/07 -- US EVA-7
02/10/07 -- US EVA-8
03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses
03/18/07 -- STS-117/13A docking
03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/29/06
Date: Wednesday, November 29, 2006 2:31:53 PM
Attachments:

ISS On-Orbit Status 11/29/06

All ISS systems continue to function nominally, except those noted previously or below.

The crew's work/rest cycle remains shifted at 8:30am-12:00midnight EST until STS-116/12A.1 launch.

After wakeup, FE-2 Reiter conducted post-sleep operations for his second 7-day session of CASPER (Cardiac Adapted Sleep Parameter Electrocardiogram Recorder), the new ESA experiment that had recorded his data overnight. Tonight, he will perform pre-sleep ops and activation before sleeptime for a third overnight data take. *[CASPER monitors the heart rates of an ISS crewmember during sleep in order to determine if there is any physiological reason for sleep disturbances.]*

Afterwards Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. Later today, he will also conduct skin measurements to evaluate the past treatment and fill out the experiment questionnaire. (Last time done: 11/15). *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit. The noninvasive medical equipment used by the experiment are the Tewameter (from TEWL = transepidermal water loss, one of the most important biophysical parameters for evaluating the efficiency of the human skin water barrier), the Corneometer (to accurately determine the hydration level of the skin surface) and the VisioScan which takes direct measurements of the skin topography (structure & level of dryness) with a special UV-A (Ultraviolet A) light video camera with high resolution.]*

This is the third & final day for Reiter's current RENAL STONE experiment session (his fourth), collecting one final urine sample in the morning, finishing his dietary/metabolic log entries and then stowing all equipment. *[This long-range preventive*

medicine investigation features regular daily ingestion of either potassium citrate or placebo tablets at dinnertime. It is a double blind research study by NASA/JSC, investigating statistically whether potassium citrate is as effective in zero-G in preventing formation of kidney stones as it is on the ground. The experiment requires keeping a metabolic diet log (food & fluid intake), followed by collection of urine samples several times per day during the three-day session, with collections ending today.]

Thomas has two hours set aside for unstowing and setting up the equipment for the BTC-10 CARDIOCOG experiment, then performing his first session of the procedure. *[CARDIOCOG studies changes in the human cardiovascular system in micro-G, expressed in the peripheral arteries, and the vegetative regulation of arterial blood pressure (BP) and heart rate (HR) plus ECG (electrocardiogram). For the experiment, Thomas had to take systolic & diastolic blood pressure measurements, heart rate data and ECG, using a finger cuff, the Cardiopocog-CARD kit with PTP-10 Portapress power and an electrode vest, and then stored the data on the RSE1 laptop for subsequent copying to a PCMCIA card and downlinking to the ground via OCA. Thomas was also to check/verify the contents of a CULT and CARD equipment box to be returned to Earth on 12A.1.]*

FE-1 Tyurin has two major IFM (Inflight Maintenance) jobs on his hands, each one taking up two hours: removing two failed 800A storage batteries in the RS (Russian Segment) and replacing them with spare Blok 800A units - #1 in the Service Module (SM), restoring it to its full complement of eight batteries, and #3 in the FGB module, restoring it to six units. The removed units were to be discarded. *[The ZRU charge/discharge units in each case were deactivated by TsUP/Moscow beforehand and later reactivated. The batteries were then to be placed in Cycle mode for conditioning.]*

CDR Lopez-Alegria is working several EVA-related tasks in preparation for the upcoming 12A.1 spacewalks:

- Starting the 85-day maintenance cycle on the first of two sets of EMU (Extravehicular Mobility Unit) batteries in the Airlock *(required prior to their charging for 12A.1; consists of fully charging and then discharging the storage units to prolong their useful life. After end of the maintenance cycle, L-A will restore the SSC laptop, which is used in DOS mode for the automated procedure, to nominal ops.);*
- Checking out three PGTs (Pistol Grip Tools) using a charged PGT battery;
- Preparing 12A.1 EVA tools *(clean NH₃ vent tool, transfer a square scoop to another location, locate tape & Velcro caddy, etc.);* and
- Configuring EVA systems *(begin organizing 12A.1 EVA staging bags, remove ECOKs (EMU Crew Options Kits) from one of the EMUs, verify*

REBA (Rechargeable EVA Battery Assembly) location, etc.).

Mike L-A also relocated the ESA LDM (Long Duration Mission) Astrolab educational robotic (ROBoT) from the Airlock to the Node. *[Recorded demo sessions with ROBot are used to develop DVD-4, the fourth in a series of DVDs distributed to schools in ESA member countries. In continuation of a pedagogical series of lessons initiated on previous ESA missions.]*

After putting on protective gear, Mikhail Tyurin is to perform routine service on the ASU toilet facility in the SM by replacing its pretreat container (E-K) plus hose with a new assembly and discarding the old one. *[E-K contains five liters of pre-treat solution, - a mix of H₂SO₄ (sulfuric acid), CrO₃ (chromium oxide, for oxidation and purple color), and H₂O (water). The pre-treat liquid is mixed with water in a dispenser (DKiV) and used for toilet flushing.]*

Later, the CDR will conduct the remaining routine daily maintenance of the SM SOZh system (Environment Control & Life Support System, ECLSS), which today includes the periodic checkout/verification of IP-1 airflow sensors in the various Russian segment (RS) hatch openings in the SM, FGB and DC1.

The FE-2 is charged with the daily update/edit of the standard IMS (Inventory Management System) "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Thomas is scheduled for his sixth (and final) session with the ESA experiment CULT, by filling out its "cultural" questionnaire on the RSE1 laptop. *[CULT is a study conducted currently by Russia for ESA. The multi-Increment investigation, which eventually will involve 12 subjects, including Thomas Reiter, is dedicated to the study of cultural aspects and different leadership styles of on-board crews as a function of mission duration, including interactions within multinational crews. Results from this experiment may provide valuable recommendations on how to interact with future multinational crews. The questionnaire is contained on a PCMCIA memory card, to be used for all subjects and sessions. Compressed data files are downlinked via OCA.]*

The FE-2 has another 1 hr. scheduled to prepare his personal provisions for return to Earth. Other periods of departure preps will be scheduled during the remaining two weeks. *[Reiter has been approved to return one single bag and one half bag of personal items. Other return gear, such as personal clothing, hygiene items etc., will either have to be packed for return or trashed. All dispositions have to be barcode-tracked for keeping the IMS (Inventory Management System) up to date.]*

As usual, time is set aside for the crew to conduct their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Mike L-A will copy his, Misha's and Thomas' exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~4:45pm EST, the two Flight Engineers will tag up with ground specialists to discuss the imagery that resulted from their RPM (R-bar Pitch Maneuver) training session on 11/27 and was downlinked for analysis.

Sleep time again will be at 12:00midnight EST.

Reboost Update: A major station reboost by Progress 23P will be conducted tonight at 6:05pm EST to set up proper angular phasing conditions for the STS-116/12A.1 launch window. The preprogrammed burn (i.e., controlled by the SM's US-21 Matching Unit), with propellants from the 23P refueling tankage (SD), will be performed with the eight DPO rendezvous & docking thrusters ("Method 1"). The plan calls for an unusually long burn time of 19min 48sec, yielding a delta-V of 4.2 m/sec. *[Station attitude control authority will be handed over to the RS MCS (Russian Segment/Motion Control System) at 2:35pm and returned to USOS (US Segment) momentum management at 7:05pm. Readings will be taken on the US side with MAMS (Microgravity Acceleration Measurement System) and SDMS (Structural Dynamics Measurement System).]*

Today's CEO photo targets, from the Lab nadir/science window, were **Florida Coastal Everglades** (*this Long Term Ecological Research [LTER] site is primarily defined by the coastal margins of south Florida's Everglades region centered near 25.47N 80.85W. Although probably not cloud-free, this pass offered an excellent mapping opportunity as ISS paralleled the west coast just slightly left of track. Using the long lens with the doubler for maximum detail, Navassa Island reef, Caribbean* (within two minutes of the station's pass near Florida the crew encountered this tiny teardrop-shaped island which is located in the Windward Passage between Jamaica and the southwestern tip of Haiti near 18.24N 75.01W. With a nadir pass in good light and weather they were to continue with the long lens settings for details of the subtle coral reef structures of this target), and **Palmerston Island reef, central South Pacific** (*this almost rhombus-shaped atoll is part of the Cook Island group and situated in the equatorial South Pacific near 18.04S 163.10W. The central lagoon is about seven miles across. Although just left of*

track, the sun was very high on this pass offering optimum illumination of the details of the coral reef structures).

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 6:47am EST [= epoch]*):

Mean altitude -- 334.2 km

Apogee height -- 341.4 km

Perigee height -- 327.0 km

Period -- 91.22 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0010428

Solar Beta Angle -- -7.2 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.79

Mean altitude loss in last 24 hours -- 70 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45924

Significant Events Ahead (all dates Eastern and subject to change):

11/29/06 -- ISS Reboost (~6:05pm; ~4.2 m/sec)

12/07/06 -- STS-116/12A.1 launch (9:35:44pm)

12/09/06 -- STS-116/12A.1 docking (6:15pm)

12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss

12/16/06 -- STS-116/12A.1 undocking (5:05pm)

12/19/06 -- STS-116/12A.1 landing (@ KSC: ~4:36pm)

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch

01/20/07 -- Progress M-59/24P docking (DC1)

02/02/07 -- US EVA-6

02/06/07 -- US EVA-7

02/10/07 -- US EVA-8

03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

03/16/07 -- STS-117/13A launch -- S3/S4 trusses

03/18/07 -- STS-117/13A docking

03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/28/06
Date: Tuesday, November 28, 2006 1:26:26 PM
Attachments:

ISS On-Orbit Status 11/28/06

All ISS systems continue to function nominally, except those noted previously or below.

The crew's work/rest cycle remains shifted at 8:30am-12:00midnight EST until STS-116/12A.1 launch.

After wakeup, FE-2 Reiter conducted post-sleep operations for his second 7-day session of CASPER (Cardiac Adapted Sleep Parameter Electrocardiogram Recorder), the new ESA experiment that had recorded his data overnight. Tonight, he will perform pre-sleep ops and activation before sleeptime for a second overnight data take. *[CASPER monitors the heart rates of an ISS crewmember during sleep in order to determine if there is any physiological reason for sleep disturbances. To supplement this data, the crewmember completes questionnaires before and after the sleep period. The data collected from this investigation may help develop countermeasures for future long duration missions and patients on Earth who suffer from sleep disturbances. For this purpose, CASPER combines objective physiological data and subjective inputs. Physiological data is obtained through a specially adapted vest, worn by the astronaut, with embedded sensors and cabling that connects ECG (Electrocardiogram) electrodes, for measuring heart rate, to a PDA for storing the heart rate data. Subjective inputs are obtained via a questionnaire, which runs on the same PDA. A questionnaire is completed both prior to and after each sleep period that the heart rate is measured.]*

Afterwards Reiter also continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

This is the second day for Reiter's current Renal (kidney) Stone experiment

session, collecting urine samples throughout the day and keeping his dietary/metabolic log entries up to date. Last day of diet logging. *[This long-range preventive medicine investigation features daily random ingestion of either potassium citrate or placebo tablets at dinnertime. The NASA-JSC double-blind "Renal Stone" research study investigates methods to prevent formation of kidney stones in zero-G. Part of the experiment consists in keeping a metabolic diet log (food and fluid intake), followed by collection of urine samples several times per day during each session, which terminates tomorrow morning (10/5). The PI (Principal Investigator) receives the diet log data approximately 24 to 48 hours after the diet-logging session is completed.]*

Continuing post-EVA wrap-up activities, FE-1 Tyurin employed the battery charger (ZU-S) in the DC1 docking module to initiate discharging the second 28V battery pack (825M3) for the Orlan backpacks, to be terminated shortly before sleep time.

Afterwards, the FE-1 stowed the Glisser-M video equipment used for the GOLF promo/demo during the EVA-17, while CDR Lopez-Alegria worked in the Service Module Transfer Compartment (SM PkhO) to reconfigure its systems to their initial pre-EVA state.

Later today, Mike L-A and Mikhail continue restoration of the PkhO and the DC1 docking compartment to their initial states, stowing the Matryoshka payload, Orlan #26 and KURS hardware in the Node and returning other equipment from its temporary stowage locations.

The CDR will also connect the EXPRESS Rack 1 Moderate Temperature Loop (ER1 MTL) jumper QDs (Quick Disconnects) to the Utility Interface Panel (UIP) in the Lab, to support Huntsville/POC (Payload Operations Center)-commanded ER1 activation by for MAMS (Microgravity Acceleration Measurement System) data taking during tomorrow's station reboost. *[Readings will also be taken with the SDMS (Structural Dynamics Measurement System). The reboost by Progress M-58/23P DPO thrusters is scheduled for 6:02pm EST, for a delta-V of ~4 m/sec.]*

Preparatory to the planned 4B SAW (Solar Array Wing) retraction for 12A.1, Mike L-A is scheduled today for a 4B SAW photo/video survey/inspection at two occasions.

The crew conducted a study review of STS-116 ODF procedures to prepare themselves for the activities required during the 12A.1 docked phase. This review is followed up later today (~7:30pm) by an audio teleconference with ground specialists via S-band to discuss specifics.

Mikhail Tyurin is scheduled to perform the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal

loops' EDV container with water from an EDV containing water from the BKO multifiltration/purification column unit. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh-8 Liquid Unit where they could cause Elektron shutdown.]*

Reiter's assignments today also include the standard weekly maintenance on the TVIS (Treadmill with Vibration Isolation & Stabilization) with SLD (Subject Loading Devices) contingency configuration, primarily inspecting the condition of the SLDs, SLD cables and SPDs (Subject Positioning Devices), lubricating as required, plus recording time & date values. In addition, he will also inspect the Russian and U.S. tie-down harnesses (straps & buckles) and associated SBS (Series Bungee System) for any damage, as required for the regular monthly TVIS maintenance.

The FE-2 has another 1 hr. scheduled to prepare his personal provisions for return to Earth. Other periods of departure preps will be scheduled during the remaining two weeks. *[Reiter has been approved to return one single bag and one half bag of personal items. Other return gear, such as personal clothing, hygiene items etc., will either have to be packed for return or trashed. All dispositions have to be barcode-tracked for keeping the IMS (Inventory Management System) up to date.]*

Misha will conduct the routine daily maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM today, including ASU toilet facilities systems/replaceables.

L-A is charged with the daily update/edit of the standard IMS "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

As usual, time is set aside for the crew to conduct their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2/only), RED resistive exerciser (CDR), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Mike L-A will copy his, Misha's and Thomas' exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~3:15pm, Thomas Reiter supports an interactive PAO video event anchored from the European Astronaut Center (EAC) at Cologne/Germany and broadcast live online on the web. *[In cooperation with the T-Online firm, the in-flight call - the first of its kind worldwide - is the highlight of a full one-hour event at EAC, during which the web audience will be able to post questions via Internet to Thomas, sorted and*

filtered by an EAC moderator (Thorsten Duin).]

Sleep time again will be at 12:00midnight EST.

CEVIS Update: Lopez-Alegria aborted his CEVIS exercise session yesterday when the right pedal came loose from the crank. The crew was requested to take photos for engineering teams to assess hardware recovery options. The integrity of the threads was confirmed, with no damage apparent, and the crew was given the Go to reinstall the pedal prior to today's exercise period.

SARJ Update: Testing is underway on the SARJ (Solar Alpha Rotary Joint) tooth crash auto recovery software. The need for this test was derived from the signatures seen during the 12A SARJ checkout (9/14/06) and a desire to demonstrate the software developed for tooth crash recovery prior to its first use on the upcoming 12A.1 mission. The testing is intended to verify automated tooth crash recovery software functionality on-orbit by inducing tooth crash events and observing the software response. Six tooth crash cases are to be tested. *[On 9/14, multiple "tooth crashes" (i.e., gear teeth not meshing) on both DLAs (Drive Lock Assemblies) at first prevented SARJ (Solar Alpha Rotary Joint) rotation until alternate software commanding procedures were applied.]*

Today's CEO photo targets, from the Lab nadir/science window, were **Puerto Rico** (*most of this target area lied right of track. However, many of the best coral reef features were just off nadir on the northern and eastern coast of the island. Using the long lens settings for detail. Center Point is 18.23N 66.46W*), and **Patagonian Glaciers** (*although weather is marginal with clearing expected from the SW, this was a nadir pass over southern end of Southern Patagonian Ice Field centered near 49.00S 73.50W. Using the long lens for detail and trying for the less-photographed, southernmost glacial features on either side of the Andes Mountains*).

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

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<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 6:51am EST [= epoch]*):

Mean altitude -- 334.3 km

Apogee height -- 341.3 km

Perigee height -- 327.3 km

Period -- 91.22 min.

Inclination (to Equator) -- 51.63 deg
Eccentricity -- 0.0010428
Solar Beta Angle -- -11.7 deg (magnitude decreasing)
Orbits per 24-hr. day -- 15.79
Mean altitude loss in last 24 hours -- 145 m
Revolutions since FGB/Zarya launch (Nov. 98) -- 45908

Significant Events Ahead (all dates Eastern and subject to change):

11/29/06 -- ISS Reboost (~6:02pm; ~4 m/sec)
12/07/06 -- STS-116/12A.1 launch (9:35:44pm)
12/09/06 -- STS-116/12A.1 docking (6:15pm)
12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss
12/16/06 -- STS-116/12A.1 undocking (5:05pm)
12/19/06 -- STS-116/12A.1 landing (@ KSC: ~4:36pm)
01/17/07 -- Progress M-57/22P undocking (DC1) & reentry
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01/20/07 -- Progress M-59/24P docking (DC1)
02/02/07 -- US EVA-6
02/06/07 -- US EVA-7
02/10/07 -- US EVA-8
03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses
03/18/07 -- STS-117/13A docking
03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/27/06
Date: Monday, November 27, 2006 12:43:39 PM
Attachments:

ISS On-Orbit Status 11/27/06

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 10 of Increment 14.*

The crew's shifted work/rest cycle remains at 8:30am-12:00midnight EST until STS-116/12A.1 launch.

After wakeup FE-2 Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

CDR Lopez-Alegria, FE-1 Tyurin and Thomas Reiter, before breakfast, performed their fifth periodic Russian biomedical assessments PZEh-MO-7 (Calf Volume Measurement) and PZEh-MO-8 (Body Mass Measurement), using the IM mass measurement device, later breaking it down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference points, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G, where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

As part of post-EVA wrap-up activities, the FE-1 employed the battery charger (ZU-S) in the DC1 docking module to initiate discharging the first 28V battery pack (825M3) for the Orlan backpacks, to be terminated shortly before sleep time.

Thomas Reiter reinstalled the LAZIO (Low Altitude Zone/Ionization Observatory) experiment in the DC1, after its 11/7 relocation to the Service Module (SM) in preparation for EVA-17. *[LAZIO uses the AST spectrometer, EGLE magnetometer, MEB main electronics box, etc. for studying space radiation and the magnetic environment inside the ISS.]*

Later today, the CDR will remove the portable air repress bottle (BNP) that was installed in the repress line of the SM work compartment (SM RO) as backup in the event of a failure of the DC1/PkhO (SM transfer compartment) hatch's pressure equalization valve, and stow it for future use.

The crew conducted the regular fire drill/OBT (on-board training), a mandatory periodic one-hour exercise (including debrief), now again applicable to three-person occupancy. Primary goal of this Russian-led, interactive exercise is to provide the station residents with the most realistic emergency training possible. The drill is always conducted with the support of both MCCs in close coordination. *[OBT objectives are to (a) practice fire response procedures (FRPs) and all incorporated actions for the case of a software-detected fire to locate, extinguish, and verify extinguishing attempts; (b) browse through RS laptop and the Signal-VM fire detection system displays as well as the automated software (algorithms) response to the fire event; (c) practice crew communication necessary to perform emergency FRPs; (d) update the locations of support hardware (CSA-CP compound specific analyzer-combustion products, IPK-1M gas masks and OSP-4 fire extinguishers to be used for fire suppression in the FGB. These exercises do not actually use any fire equipment but simulate such actions to the maximum extent possible. The OBT concludes with a 15-min. debrief with Russian/U.S. ground specialists at ~2:30pm EST via S-band.]*

For Thomas Reiter, this is Day 1 of his fourth and final NASA/JSC Renal (kidney) Stone session, during which he starts his diet log and later sets up the experiment hardware for the 24-hr. void-by-void urine collection beginning tomorrow morning and ending on Wednesday morning (11/29). *[This long-range preventive medicine investigation features daily random ingestion of either potassium citrate or placebo tablets. It is Dr. Peggy Whitson's double-blind research study investigating methods to prevent formation of kidney stones in zero-G. Part of the experiment consists in keeping a metabolic diet log (food and fluid intake), followed by collection of samples several times per day. Thomas is to log all food/fluid consumed at every meal today and tomorrow. The PI (Principal Investigator) receives the diet log data approximately 24 to 48 hours after the diet-logging session is completed.]*

Mike L-A and Mikhail Tyurin are scheduled for another periodic on-orbit hearing assessment (O-OHA) test, a 30-min. NASA environmental health systems examination to assess the efficacy of acoustic countermeasures, using a special

MEC laptop application. It will be L-A's and Misha's second session. Thomas had his third on 11/15. *[The O-OHA audiography test involves minimum audibility measurements for each ear over a wide range of frequencies (0.25-10 kHz) and sound pressure levels, with the crewmembers using individual-specific Prophonics earphones, Bose ANC headsets and the SLM (sound level meter). To conduct the testing, the experimenter is supported by special EarQ software on the MEC, featuring an up/down-arrow-operated slider for each test frequency that the crewmember moves to the lowest sound pressure level at which the tone can still be heard. The baseline test is required not later than about Flight Day 14 for each new Expedition and is then generally performed once per month.]*

Reiter is timelined to set up his second run of the ESA experiment CASPER (Cardiac Adapted Sleep Parameter Electrocardiogram Recorder) and, upon sleeptime, to conduct pre-sleep ops and activation. Tyurin will take photo/video during the activity, showing Thomas putting on the electrode vest, checking out vest and PDA and demonstrating sleeping with the vest. *[CASPER monitors the heart rates of the ISS crewmembers while they sleep in order to determine if there is any physiological reason for sleep disturbances. To supplement this data, the crewmembers complete questionnaires before and after their sleep period. The data collected from this investigation may help develop countermeasures for future long duration missions and patients on Earth who suffer from sleep disturbances. For this purpose, CASPER combines objective physiological data and subjective inputs. Physiological data is obtained through a specially adapted vest, worn by the astronaut, with embedded sensors and cabling that connects ECG (Electrocardiogram) electrodes, for measuring heart rate, to a PDA for storing the heart rate data. Subjective inputs are obtained via a questionnaire, which runs on the same PDA. A questionnaire is completed both prior to and after each sleep period that the heart rate is measured.]*

Late tonight, the two Flight Engineers will undertake their third 30-min Shuttle RPM (R-bar Pitch Maneuver) skill training, using a Shuttle cut-out and DCS760 digital still cameras with 400 and 800mm lenses, to prepare themselves for the bottom side mapping of the Orbiter at arrival of STS-116/12A.1. At ~7:00pm, Thomas will downlink the obtained images to the ground for analysis. *[During the RPM at ~600 ft from the station, Misha and Thomas will have ~90 seconds for taking high-resolution digital photographs of all tile areas and door seals on the Orbiter, to be downlinked for launch debris assessment. The crew will be wearing headsets on extension cables for communicating during the maneuver.]*

In preparation for the upcoming R&R (removal & replacement) of a cable on the antenna feeder unit (AFU) of the Russian ASN-M Satellite Navigation System, required for ATV (Automated Transfer Vehicle) "Jules Verne" next year, Tyurin took situational photography of a connector (F7-22) for verification and prevention of

mistakes when demating/remating AFU connectors.

In the Lab module, Mike L-A will perform the periodically required transfer of water collected in the Lab condensate tank to a CWC (Contingency Water Container).

Thomas is scheduled for the monthly PEP (Portable Emergency Provisions) safety inspection, his fourth. *[The IMS-supported inspection involves verification that PFEs (Portable Fire Extinguishers), PBAs (Portable Breathing Apparatus), QDMAs (Quick-Don Mask Assemblies) and EHTKs (Extension Hose/Tee Kits) are free of damage to ensure their functionality, and to track shelf life/life cycles on the hardware. In the U.S. segment (USOS), there are a total of 5 PFEs and 7 PBAs, plus 7 QDMAs and 4 EHTKs. In the Node, Thomas made sure that no more than three PBA bottles are stowed in the locker, to reduce the risk of getting too much oxygen concentration inside the stowage area in case of bottle leakage.]*

To conduct his second MedOps WinSCAT (Spaceflight Cognitive Assessment Tool) session (plus one repetition), Mike L-A logged in on the MEC (Medical Equipment Computer) and performed the psychological evaluation exercise on the laptop-based WinSCAT experiment. *[WinSCAT is a time-constrained questionnaire test of cognitive abilities, routinely performed by astronauts aboard the ISS every 30 days before or after the PHS (periodic health status) test or on special CDR's, crewmembers or flight surgeons request.]*

The FE-2 has another 1 hr. scheduled to prepare his personal provisions for return to Earth. Other periods of departure preps will be scheduled during the remaining two weeks. *[Reiter has been approved to return one single bag and one half bag of personal items. Other return gear, such as personal clothing, hygiene items etc., will either have to be packed for return or trashed. All dispositions have to be barcode-tracked for keeping the IMS (Inventory Management System) up to date.]*

Thomas is also doing the routine daily maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the SM today, including ASU toilet facilities systems/replaceables.

The CDR has been assigned the daily update/edit of the standard IMS (Inventory Management System) "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The crew is expected to perform their daily physical exercise program on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Misha will copy his, L-A's and Thomas' exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

The FE-2 was scheduled to recharge and, with FE-1, to set up the Russian Sony DCR PD-150P and DCR PD-1P digital camcorders for the subsequent recording of SEM (Special Events Meals) imagery at ~3:00pm. *[The commercial SEM event involves a meal for each crewmember prepared by French celebrity chef Alain Ducasse, consisting of a starter, a main course, a vegetable side dish to the main course and a dessert, totaling 12 canned food products plus a user's manual. The SEM session concerns opening food cans and eating the food, to be performed by Thomas and photographed/videotaped by Mikhail. The photograph(s) will be published in the next CNES Magazine (Centre National d'Études Spatiales, the French national space agency).]*

At ~3:10pm, the crew will hold their standard weekly teleconference with the JSC Astronaut Office (Steven Lindsey [STS-121 Shuttle CDR]), via S-band S/G (space-to-ground).

Later (~4:40pm EST), a PAO downlink by Reiter via VHF, taped on the ground, will describe the crew's response to the Ducasse/SEM experience, along with the footage recorded earlier, to be presented to media at a press conference on 12/1 who will be served the same meal on the ground at that time.

Sleep time again will be at 12:00midnight EST.

Elektron Update: The Elektron was successfully activated after the EVA and is working nominally.

OpsLAN Update: The onboard Operations Local Area Network experienced a bevy of activities over the weekend: SSC (Station Support Computer) File Server shell was swapped out; the hard drive of SSC-8 was replaced & reloaded; software reconfig completed by crew improved IP phone performance; recovery of Lab printer by the crew via a software "trick" (to make the printer "think" it had more black ink); and an investigation is looking into how to retrieve needed files from SSC-2 hard drive. Specialists are assessing OpsLAN hardware age and failure rates.

EVA-17 MMOD Update: Four different debris objects from EVA-17 are currently being tracked, with their identification by Space Command expected at a later date.

Nonretracted AO-VKA Antenna Update: After the EVA-17 spacewalkers' inability to

break the mechanical contact of the Progress KURS antenna on the SM handrail, another EVA will be required to do the job prior to 23P undocking (possibly in February -- which would require "deconflicting" with planned US EVAs). Specialists are also assessing whether the antenna task could be accommodated in any of the three US Stage 12A.1 spacewalks (EVA-6, -7, -8) in February.

No CEO (Crew Earth Observation) photo targets uplinked for today.

ISS Orbit (*as of this morning, 7:41am EST [= epoch]*):

Mean altitude -- 334.4 km

Apogee height -- 341.7 km

Perigee height -- 327.1 km

Period -- 91.22 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0010868

Solar Beta Angle -- -16.3 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 125 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45893

Significant Events Ahead (all dates Eastern and subject to change):

11/29/06 -- ISS Reboost (~6:03pm)

12/07/06 -- STS-116/12A.1 launch (9:35:44pm)

12/09/06 -- STS-116/12A.1 docking (6:15pm)

12/09-16/06 -- STS-116/12A.1 docked mission w/ISS -- P5 truss

12/16/06 -- STS-116/12A.1 undocking (5:05pm)

12/19/06 -- STS-116/12A.1 landing (@ KSC: ~4:36pm)

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch

01/20/07 -- Progress M-59/24P docking (DC1)

02/02/07 -- US EVA-6

02/06/07 -- US EVA-7

02/10/07 -- US EVA-8

03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

03/16/07 -- STS-117/13A launch -- S3/S4 trusses

03/18/07 -- STS-117/13A docking

03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

04/06/07 -- Progress M-59/24P undocking (DC1) & reentry

04/09/07 -- Progress M-60/25P launch

04/11/07 -- Progress M-60/25P docking (DC1)

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/26/06
Date: Sunday, November 26, 2006 12:37:05 PM
Attachments:

ISS On-Orbit Status 11/26/06

All ISS systems continue to function nominally, except those noted previously or below. *Sunday -- off-duty day for CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Thomas Reiter, except for regular maintenance and voluntary work. Ahead: Week 10 of Increment 14.*

The crew's shifted work/rest cycle remains at 8:30am-12:00midnight EST until STS-116/12A.1 launch.

After wakeup the FE-2 continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

Thomas is also scheduled to perform the routine daily maintenance of the SOZh system (Environment Control & Life Support System, ECLSS) in the Service Module (SM), including ASU toilet facilities systems/replaceables, the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/Moscow.

The FE-1 deactivated the new SHADOW-BEACON (Tenj-Mayak) ham radio experiment in the SM after its overnight run. *[Objective of the experiment: Automatic retranslation of time tag (pre-planned executable) packets from ground stations. SHADOW is sponsored by Rosaviacosmos and its leading Moscow research organization TSNIMASH (Central Research Institute of Machine Building) and employs VHF amateur radio (ham) operators around the globe (via ARISS) to help in observing refraction/scattering effects in artificial plasmas using the method of RF (radio frequency) sounding in space experiments under different geophysical conditions.]*

Lopez-Alegria and Reiter had their weekly PFCs (Private Family Conferences) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop), Thomas at 10:25am EST, Mike L-A at 12:00pm.

The crew is performing their daily physical exercise program on the TVIS treadmill (FE-1, FE-2, CDR, RED resistive exerciser (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Sleep time again will be at 12:00midnight EST.

No CEO (Crew Earth Observation) photo targets uplinked for today.

Significant Events Ahead (all dates Eastern and subject to change):

11/29/06 -- ISS Reboost (~6:03pm)
12/07/06 -- STS-116/12A.1 launch (9:35:44pm)
12/09/06 -- STS-116/12A.1 docking (6:15pm)
12/09-16/06 -- STS-116/12A.1 docked mission w/ISS -- P5 truss
12/16/06 -- STS-116/12A.1 undocking (5:05pm)
12/19/06 -- STS-116/12A.1 landing (@ KSC: ~4:36pm)
01/17/07 -- Progress M-57/22P undocking (DC1) & reentry
01/18/07 -- Progress M-59/24P launch
01/20/07 -- Progress M-59/24P docking (DC1)
02/02/07 -- US EVA-6
02/06/07 -- US EVA-7
02/10/07 -- US EVA-8
03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses
03/18/07 -- STS-117/13A docking
03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/25/06
Date: Saturday, November 25, 2006 4:09:23 PM
Attachments:

ISS On-Orbit Status 11/25/06

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 14 crew CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Thomas Reiter.*

The crew's shifted work/rest cycle remains at 8:30am-12:00midnight EST until STS-116/12A.1 launch.

After wakeup, FE-2 Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

Reiter also initiated (and later terminated) the charging of the second battery for CASPER (Cardiac Adapted Sleep Parameter Electrocardiogram Recorder), the new ESA experiment that is on next week's schedule. Voltage checks followed. *[CASPER monitors the heart rates of the ISS crewmembers while they sleep in order to determine if there is any physiological reason for sleep disturbances. To supplement this data, the crewmembers complete questionnaires before and after their sleep period. The data collected from this investigation may help develop countermeasures for future long duration missions and patients on Earth who suffer from sleep disturbances. For this purpose, CASPER combines objective physiological data and subjective inputs. Physiological data is obtained through a specially adapted vest, worn by the astronaut, with embedded sensors and cabling that connects ECG (Electrocardiogram) electrodes, for measuring heart rate, to a PDA for storing the heart rate data. Subjective inputs are obtained via a questionnaire, which runs on the same PDA. A questionnaire is completed both prior to and after each sleep period that the heart rate is measured.]*

The crew conducted the regular weekly three-hour task of thorough station

cleaning, wearing protective garment. [*"Uborka", normally done every Saturday, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with "Fungistat" disinfectant wipes; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.*]

As part of today's *uborka*, FE-1 Tyurin performed preventive maintenance on the ventilation system in the FGB (*Funktsionalnyi-Grusovoi Blok*) by cleaning the detachable VT7 fan screens of the SOTR (Thermal Control System)'s gas-liquid heat exchangers (GZhT4), and on the SM's Group A ventilator fans and grilles.

At ~10:10am EST, the crew engaged in their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

Later today, Mikhail Tyurin is scheduled to perform the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water from an EDV containing water from the BKO multifiltration/purification column unit. [*The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh-8 Liquid Unit where they could cause Elektron shutdown.*]

The FE-1 will also complete the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

CDR Lopez-Alegria is assigned to do the regular maintenance reboots on the SSC (Station Support Computer) File Server and OCA Comm Router laptops.

Tonight, Tyurin will set up and activate the new SHADOW-BEACON (Tenj-Mayak) ham radio experiment in the SM, to be left running overnight for ground monitoring until tomorrow's deactivation. [*Objective of the experiment: Automatic retranslation of time tag (pre-planned executable) packets from ground stations. The experiment, sponsored by Rosaviakosmos and its leading research organization TSNIIMASH (Central Research Institute of Machine Building), has invited VHF amateur radio (ham) operators around the globe to help in observing refraction/scattering effects in artificial plasmas using the method of RF (radio frequency) sounding in space experiments under different geophysical conditions.*]

The crew is scheduled to perform their daily physical exercise program on the

CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED (CDR), and VELO bike with bungee cord load trainer (FE-1). *[Thomas exercise protocol has him use the TVIS for the full 2.5-hr period.]*

Later, L-A will copy his, Misha's and Thomas' exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~2:55pm EST, Mike L-A held his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop).

Sleep period will begin at ~12:00am midnight.

Weekly Science Update (*Expedition Fourteen – 9th*)

ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS): ALTEINO is confirmed to perform nominally. A downlink activity via OCA has been successfully completed on 11/17. File sizes are reported nominal, so apparently a faulty/badly formatted memory card would be the cause of previous smaller files occurrence.

ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System): Planned.

BASE: Complete.

BCAT-3 (Binary Colloidal Alloy Test-3): Planned.

CAR-2 (Investigating Mechanisms of Heart Disease in Micro-G, ESA): Last session for Thomas Reiter is currently scheduled on 11/29.

CBOSS (Cellular Biotechnology Support Systems): Complete.

CFE (Capillary Flow Experiment): Complete.

CULT (Cultural Factors Questionnaire): Last (sixth) session for Thomas Reiter is currently scheduled on 11/29.

DAFT (Dust & Aerosol Measurement Feasibility Test): Complete.

Earth Knowledge Acquired by Middle School Students (EarthKAM): In progress.

ETD (Eye Tracking Device): Seventh session for Reiter performed nominally on 11/13.

GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology): Planned

IMMUNO (Saliva Sampling): IMMUNO samples of first session in MELFI Dewar2-TrayA-Section4. Last session for Thomas Reiter is currently scheduled on 12/05 and 12/06. This session will include urine collection.

LEUKIN: Complete.

MISSE (Materials ISS Experiment): Ongoing.

MTR-2 (Russian radiation measurements): Passive dosimeters measurements in DC1 "Pirs". Removal of passive dosimeters from the MATRYOSHKA Phantom is currently scheduled on 12/07, with a download on STS-12A.1.

NOA (Nitric Oxide Analyzer): Last session has been performed on 11/16. An error code was received from the PLATON nitric oxide analyzer. No impact on science results, troubleshooting on-going.

Nutrition: Thanks to Mike L-A for completing another run.

PK-3 (Plasma Crystal 3): In progress.

POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G): Planned.

RC (Refrigerated Centrifuge): Planned.

RS (Renal Stone): Planned.

SAMPLE: Complete.

SEM (Space Experiment Module): Successfully completed off task list.

SLEEP: Last download of SLEEP Log to the PIs to be done on 11/27. L-A's dedication to this experiment is greatly appreciated by the investigators.

SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):

In progress.

Swab (Characterization of Microorganisms & Allergens in Spacecraft): Planned.

TROPI (Study of Novel Sensory Mechanism in Root Phototropism): In progress.

YING (Yeast in No Gravity): Complete.

CEO (Crew Earth Observations): An Expedition 14 image of North Carolina's Albemarle and Currituck Sounds has been posted on NASA's Earth Observatory website. The image shows the stark contrast between wetland and heavily built up zones along the Outer Banks. We would like to commend an excellent series of detailed images of the Pinacates, one of which may appear in a book on the volcanic zone to be published next year. Detailed images of far southern Patagonian coastlines, just cataloged, show deposits at the base of the sea cliff that do not appear on Landsat basic imagery. Researchers are investigating these deposits through local geologists.

Today's CEO photo targets, from the Lab nadir/science window, were **Mississippi Delta Region** (*efforts to document coastal change after Hurricane Katrina continue: a mapping swath of overlapping images was requested looking near nadir or just right of nadir. Site center point 30N 90W*), **Sao Paulo, Brazil** (*mapping images along the rural-urban margin of this vast city were requested. Greater Sao Paulo now has almost 29 million inhabitants, second only to Tokyo. The pace of change along the city margin is correspondingly fast. Nadir pass. Site center point 23.5S 46.5W*), and **Lima, Peru** (*mapping pass requested. Looking along the coast and inland of the port, all left of track. Only scattered clouds forecast. Site center point 12S 77.1W*).

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 11:55am EST [= epoch]*):

Mean altitude -- 334.7 km

Apogee height -- 341.8 km

Perigee height -- 327.5 km

Period -- 91.23 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0010591
Solar Beta Angle -- -25.7 deg (magnitude decreasing)
Orbits per 24-hr. day -- 15.78
Mean altitude loss in last 24 hours -- 150 m
Revolutions since FGB/Zarya launch (Nov. 98) -- 45864

Significant Events Ahead (all dates Eastern and subject to change):

11/29/06 -- ISS Reboost (~6:03pm)
12/07/06 -- STS-116/12A.1 launch (9:35:44pm)
12/09/06 -- STS-116/12A.1 docking (6:15pm)
12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss
12/16/06 -- STS-116/12A.1 undocking (5:05pm)
12/19/06 -- STS-116/12A.1 landing (@ KSC: ~4:36pm)
01/17/07 -- Progress M-57/22P undocking (DC1) & reentry
01/18/07 -- Progress M-59/24P launch
01/20/07 -- Progress M-59/24P docking (DC1)
02/02/07 -- US EVA-6
02/06/07 -- US EVA-7
02/10/07 -- US EVA-8
03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses
03/18/07 -- STS-117/13A docking
03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/24/06
Date: Friday, November 24, 2006 1:21:24 PM
Attachments:

ISS On-Orbit Status 11/24/06

All ISS systems continue to function nominally, except those noted previously or below.

The crew's shifted work/rest cycle remains at 8:30am-12:00midnight EST until STS-116/12A.1 launch.

After wakeup, FE-2 Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

After CDR Lopez-Alegria set up the MultiMeter and Scopemeter instruments to monitor BZh Liquid Unit temperature, FE-1 Tyurin was to reactivate the Elektron-VM oxygen generator, turned off on 11/22 for the EVA.

Mike L-A and Mikhail are scheduled to complete final post-EVA cleanup activities:

- Removing oxygen tanks (BK3), telemetry systems (BRTA) and 825-3M batteries from the Orlan-M suit backpacks,
- Refilling the spacesuits' feedwater bladders with water,
- Arranging the Orlans to dry out during the day's course, and
- Configuring the BSS interface units and Orlan suits, after drying, for storage and then stowing them.

The CDR will also reconnect the active PCS (Portable Computer System) A31p laptops and disconnect the UOP DCP (utility outlet panel/display & control panel) bypass power cable at the Lab RWS (Robotics Work Station).

The two Flight Engineers will perform the activities necessary to reintegrate Progress M-57/22P, docked at the DC1 "Pirs" airlock, into the ISS systems:

- One-hour leak check of 22P/DC1 interface,
- Open DC1/Vestibule (SU) and SU/22P transfer hatches (~3:40pm),
- Install QR (Quick Release) screw clamps to rigidize the docking interface,
- Deactivate Progress systems from standby mode, and
- Install 22P air duct into and through the DC1 (~4:30pm).

[During the period of Progress leak checking and hatch opening, RS (Russian segment) thrusters will be disabled and the automatic handover to RS MCS (Motion Control System) inhibited (2:25pm-5:20pm). Afterwards, U.S. CMGs (Control Moment Gyros) will re-assume Momentum Management control. The station remains in LVLH +XVV (local vertical/local horizontal/+x-axis in velocity vector) until the Progress 23P reboost on 11/29.]

Mike L-A is scheduled once more to conduct the weekly audit/inventory of the available CWCs (collapsible water containers) and their contents, to keep track of onboard water supplies. *[Updated "cue cards" based on the crew's water callowns are sent up every other week.]*

As a new item on the Russian "time permitting" task list, Thomas Reiter is to perform troubleshooting on CASPER (Cardiac Adapted Sleep Parameter Electrocardiogram Recorder), the new ESA experiment that has experienced incomplete data recording, perhaps due to poor/intermittent contact between the batteries terminals. Today, Thomas was to ensure that electrode contacts are nominal, take pictures of the PDA charger and charge one of the batteries (the second tomorrow). *[CASPER monitors the heart rates of the ISS crewmembers while they sleep in order to determine if there is any physiological reason for sleep disturbances. To supplement this data, the crewmembers complete questionnaires before and after their sleep period. The data collected from this investigation may help develop countermeasures for future long duration missions and patients on Earth who suffer from sleep disturbances. For this purpose, CASPER combines objective physiological data and subjective inputs. Physiological data is obtained through a specially adapted vest, worn by the astronaut, with embedded sensors and cabling that connects ECG (Electrocardiogram) electrodes, for measuring heart rate, to a PDA for storing the heart rate data. Subjective inputs are obtained via a questionnaire, which runs on the same PDA. A questionnaire is completed both prior to and after each sleep period that the heart rate is measured.]*

On the MEC (Medical Equipment Computer), L-A is to fill out the regular weekly FFQ (Food Frequency Questionnaire), his eighth, which keeps a personalized log of his nutritional intake over time on special MEC software. *[The FFQ records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish,*

meat, chicken, sauces & spreads, and vitamins.]

Before sleeptime tonight, Lopez-Alegria performs the periodic atmospheric status checks for ppO₂ (Partial Pressure Oxygen) and ppCO₂ (pp Carbon Dioxide), using the CSA-O₂ (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO₂ Monitoring Kit). Batteries are to be replaced if necessary. *[CSA-CP measurements are to be gathered with units #1055 (prime) at the SM Central Post & #1053 (backup) in the Node, CSA-O₂ (#1042, #1063) in the Lab, and CDMK (#1009) in SM and Lab. The instruments will be turned off afterwards, except for #1055, and returned to their regular locations.]*

FE-2 Reiter has 1 hr. scheduled to prepare his personal provisions for return to Earth. Other periods of departure preps will be scheduled during the remaining two weeks. *[Reiter has been approved to return one single bag and one half bag of personal items. Other return gear, such as personal clothing, hygiene items etc., will either have to be packed for return or trashed. All dispositions have to be barcode-tracked for keeping the IMS (Inventory Management System) up to date.]*

Later today, Mike L-A is scheduled to perform the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including ASU toilet facilities systems/replaceables.

FE-2 Reiter has been assigned the daily update/edit of the standard IMS "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Thomas will also designate 22P-delivered skip cycle food containers for immediate use by removing their white tape marking.

The crew is scheduled to perform their daily physical exercise program on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Later tonight, L-A will copy his, Misha's and Thomas' exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Sleep period will begin at ~12:00am midnight.

Ground controllers continue to uplink software updates in preparation for the upcoming Flight 12A.1. *[Today the Primary, Backup, and Standby C&C MDMs*

(Command & Control Multiplexer/Demultiplexers) are being loaded with files and also swapped to leave them in the configuration desired for 12A.1.]

Two new activities have been added to the discretionary US “job jar” task list for the weekend: “Real world” observational data capture by the crew preparatory to a 4B SAW (Solar Array Wing) inspection scheduled for 11/29; and shooting a short video at the MELFI (Minus-Eighty Laboratory Freezer for ISS) to capture the packing of contents inside MELFI Dewar 2.

No CEO (Crew Earth Observation) photo targets uplinked for today

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

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ISS Orbit *(as of this morning, 6:46am EST [= epoch]):*

Mean altitude -- 334.9 km

Apogee height -- 342.2 km

Perigee height -- 327.5 km

Period -- 91.23 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0010964

Solar Beta Angle -- -30.4 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 133 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45845

Significant Events Ahead (all dates Eastern and subject to change):

11/29/06 -- ISS Reboost (~6:03pm)

12/07/06 -- STS-116/12A.1 launch (9:38pm)

12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss

12/19/06 -- STS-116/12A.1 landing (@ KSC: ~4:37pm)

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch

01/20/07 -- Progress M-59/24P docking (DC1)

02/02/07 -- US EVA-6

02/06/07 -- US EVA-7

02/10/07 -- US EVA-8

03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses
03/18/07 -- STS-117/13A docking
03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/23/06
Date: Thursday, November 23, 2006 4:44:00 PM
Attachments:

ISS On-Orbit Status 11/23/06

All ISS systems continue to function nominally, except those noted previously or below. **Happy Thanksgiving Day!**

After last night's spacewalk, the crew's sleep cycle today remains shifted. The crewmembers were asleep most of the day, starting at 4:30am EST until 3:00pm this afternoon. The cycle will shift back gradually.

The EVA-17 spacewalk by Lopez-Alegria and Tyurin encountered unexpected difficulties and was concluded with some real-time replanning of the timeline and some objectives dropped. *[ISS attitude control was handed over to the Russian segment (RS) at 3:20pm and returned to US momentum management at 8:15pm. Egress began at 7:17pm EST, delayed more than an hour because of initially low flow in a cooling hose on L-A's Orlan #25 and no flow in a crimped hose of Tyurin's Orlans #27, plus some difficulty in opening the EV-1 hatch. The excursion ended at 12:55am this morning, for a total duration of 5h 38min. It was the 73rd spacewalk for station assembly & maintenance, the 45th EVA from the ISS, the 19th from DC1/Pirs, the 6th EVA for Michael Lopez-Alegria, the 4th for Mikhail Tyurin, and the first of four for Expedition 14. After last night's spacewalk, 48 NASA astronauts, 14 Russian cosmonauts and five space flyers from Japan (1), Canada (2), France (1) and Germany (1) have logged 444h 14min outside the station on building and maintaining it.]*

- For the GOLF promo/demo, FE-1 Tyurin was able to hit one of the 3-gram balls, after which the activity was terminated by the ground due to time constraints. *[Initial analysis of the golf ball's trajectory no possibility of recontact with the ISS (although it was sliced in an unintended direction).]*
- The spacewalkers reported that the Progress KURS 2AO antenna indeed was in contact with the Service Module (SM) handrail as expected, but they were unable to retract it by hand or with the prybar. Remote commanding

from TsUP also did not succeed. Photographs were taken and will be evaluated by specialists.

- L-A and Mikhail afterwards successfully repositioned the WAL-2 antenna for proximity operations with the European ATV (Automated Transfer Vehicle) next year which had blocked one of the SM's engine covers.
- The BTN-M1 "Neutron" unit was installed on the handrail, and the crew completed routing three cables to allow power but did not finish establishing data/telemetry connections. Two MLI thermal protection covers and the BTN blanket were jettisoned. *[The debris pieces are being tracked to ensure no interference with STS-116/12A.1 in two weeks.]*
- With time running out for the spacewalkers, the Strela-2 crane inspection and SKK materials sample container changeout was deferred to a later EVA, as was the issue of the unretracted KURS antenna.

After ingress, pre-EVA conditions were re-established for all station systems.

On today's short timeline, the CDR will reconfigure the DCS-760 photo cameras and subsequently downlink the imagery obtained from the GOLF promo and other spacewalk "highlights".

Meanwhile, FE-1 Tyurin will pack away the equipment of the MO-9/Biochemical Urinalysis session performed by him and L-A after ingress. *[MO-9 is conducted before and after EVAs (and also regularly every 30 days) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The clinical evaluation, performed yesterday by both crewmembers, is the second part of the PHS assessment. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

After wakeup, FE-2 Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

Reiter is also scheduled to perform the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including

ASU toilet facilities systems/replaceables.

Mikhail Tyurin will return the two Russian “Pille-MKS” radiation dosimeters A0309 & A0310 from the Orlan pockets (left calf), take their readings and those of the third “control” sensor A0307 (located in the SM), and restow the dosimeters. He will also transfer the ID-3 personal sensors from the Orlan chest pockets to the crew’s flight suits where they are worn permanently.

Later, the FE-1 is to wrap up EVA closeout operations and, at ~8:00pm, participate with Mike L-A in a debrief session with ground specialists.

The CDR is again scheduled to continue his support of the ALTEA (Anomalous Long-Term Effects on Astronauts) payload by checking its dosimeter instruments. *[Purpose of ALTEA is to define and measure descriptors for the electrophysiological brain functioning and to follow their dynamics, correlating it with space environments, and long-term unmanned real-time particle flux dosimetry (DOSI mode) inside the ISS using six particle detectors (originally introduced on Mir).]*

At ~3:10pm EST, Thomas Reiter supported a PAO audio event by downlinking greetings to and answering questions from the attendees of a press briefing at the ESA center ESRIN at Frascati, Italy, arranged by the Italian Space Agency ASI for “Astrolab” mission manager Aldo Petrivelli and ESA astronaut Paolo Nespoli (assigned to STS-120/Node 2), followed by a buffet dinner.

Later today, at ~5:55pm, Misha and L-A will tag up with the ground in a support of a live video conference on the “19th Hole Celebration”, providing some marketing remarks on golfing in general and the new scandium (element 21) alloy golf clubs in particular, following by a demo showing how the golf implements are being packed for return to Earth.

Physical exercise is scheduled today only for Mike L-A (abbreviated to 1.5 h) and Thomas, on the CEVIS cycle ergometer (CDR) and TVIS treadmill (FE-2).

Afterwards, L-A will copy his and Thomas’ exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts, followed by their erasure on the HRM storage medium (done six times a week).

Sleep period will begin at ~12:00am midnight.

No CEO (Crew Earth Observation) photo targets uplinked for today

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

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<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 7:41am EST [= epoch]*):

Mean altitude -- 335.0 km

Apogee height -- 342.4 km

Perigee height -- 327.6 km

Period -- 91.23 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0010967

Solar Beta Angle -- -35.2 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 106 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45830

Significant Events Ahead (all dates Eastern and subject to change):

11/29/06 -- ISS Reboost (~6:03pm)

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12/09-16/06 -- STS-116/12A.1 docked mission w/ISS -- P5 truss

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01/20/07 -- Progress M-59/24P docking (DC1)

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04/09/07 -- Progress M-60/25P launch

04/11/07 -- Progress M-60/25P docking (DC1)

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3

09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/22/06
Date: Wednesday, November 22, 2006 2:52:06 PM
Attachments:

ISS On-Orbit Status 11/22/06

All ISS systems continue to function nominally, except those noted previously or below.

After a final sleep cycle shift, workday began today at 10:00am EST, extending through 4:30am tomorrow morning. *[Wake-up is then set for 3:00pm and sleep period will start at a shifted 12:00 midnight, until 8:30am.]*

After morning inspection, all pre-EVA activities have proceeded smoothly and on schedule, starting out with Lopez-Alegria and Tyurin taking another MO-9 "Urolux" urine biochemistry test before breakfast. *[A second session with the Urolux equipment will be conducted by both crewmembers overnight (~1:00am) immediately after post-EVA station repress.]*

FE-2 Reiter meanwhile continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

The FE-1 worked on the Elektron oxygen generator, deactivating the system and purging its BZh Liquid Unit with nitrogen (N₂) at 0.65 kg/cm² via its KE3 and VN3 valves.

Thomas Reiter had about two hours set aside to configure ISS onboard system for pre-EVA mode, while Mike L-A and Mikhail finished EVA preps of the Service Module Transfer Compartment (SM PkhO) and the DC1 airlock.

As part of the preparations, the CDR also –

- powered down equipment in the FGB,

- installed the freshly recharged batteries in the Orlan helmet lights,
- disassembled the air duct in the DC1 (to gain room) while leaving the V3 fan in place for ventilation,
- opened the overhead hatch MPEV (Manual Pressure Equalization Valve) in the Node, and
- assisted the ground in deactivating the Lab CDRA (Carbon Dioxide Removal Assembly).

Next steps to be taken by L-A and Misha are: (a) checking out the Orlan-M spacesuits and their systems as well as the suit interface control panels (BSS) in DC1 & PkhO, (b) retesting the BK-3 primary and backup oxygen (O₂) tanks of the Orlans and DC1, and (c) setting up the communications links necessary for the spacewalk from the DC1. *[Most activities are paced by RGS (Russian ground site) comm window passes.]*

After a midday meal (~2:05-2:45pm), the crew is conducting final inspection of the suits, BSS interface units and biomedical parameter telemetry to RGS (~3:02pm), including VHF/voice and biomedical electrode belt and telemetry hookups via the BSS (later by the wireless in-suit Tranzit-B radio telemetry system) for vital signs and equipment monitoring.

The hatchways between SM RO/PkhO (Working Compartment/Transfer Compartment) and PkhO/SU (DC1 Transfer Vestibule) will be closed (~4:20pm), followed by donning of Orlans and ancillary gear, with sealing of backpacks at about 4:35pm, plus subsequent Orlan and BSS controls checks. *[Thomas Reiter remains in PkhO and will later close the hatch between the FGB PGO (Instrumentation Cargo Compartment) and the SM.]*

Next steps will be final checkout of suits and their controls, followed by successive stages of depressurization while checking for leaks. *[Pressure inside the Orlans will be reduced to 0.42 at (6.2 psi). After suit purge, a 30-minute oxygen prebreathe period starts at ~5:17pm, as pressures between DC-1 and the PkhO) are equalized and then further reduced.]*

A final leak check will be conducted of the BK-3 O₂ tanks. At end of prebreathe, DC1 pressure will be down to 15 mmHg (Torr), holding for 5 min for a final cabin leak check, followed by switching the Orlans to autonomous (battery) suit power (~5:58pm) and opening of EV hatch #1 at 6:00pm, near the end of the current night pass.

The spacewalk by Tyurin (EV1) and Lopez-Alegria (EV2) from DC1 will last an estimated 5h 54m. After egress, the crew will experience three orbital nights and

ingress after a fourth sunset (11:42pm). *[Objectives of the EVA-17 are: (1) GOLF promo/demo, (2) BTN-M1 "Neutron" experiment installation on the SM (small diameter section), (3) inspection & retraction of Progress KURS 2AO antenna, (4) relocation of WAL2 antenna on an SM handrail, (5) change-out of replaceable materials sample cassette container SKK-5 for SKK-9 on the SM (if time permits), and (6) inspection of the Strela-2 crane retention mechanisms and bolted joint assemblies.]*

In a special meeting this morning, the IMMT (ISS Mission Management Team) discussed the possibility that two of the items to be jettisoned during the spacewalk may not have decayed at the time of STS-116/12A.1 arrival, - both soft thermal covers of the BTN-M1 experiment. *[With a mass of 500 gram & 200 g and dimensions ~320x300 mm & ~200x200 mm, respectively, their orbital lifetime will depend on their (unpredictable) orientation after being thrown overboard (most likely: tumbling; least likely: stable at max cross section i.e. max drag). Since Moscow has determined that the EVA cannot be modified this late for retrieving the covers on board or temporarily stowing them outside, the IMMT approved the jettisoning with the proviso that attempts are to be made to (a) obtain a maximum amount of data from Space Command tracking, (2) capture video of the jettisoning without repositioning of the SSRMS, and (c) use the data to put together a risk probability to support the 12A.1 launch decision in two weeks (there is no concern about ISS recontact.)]*

After return from the EVA and DC1 airlock repressurization from SM cabin air, starting at ~12:00am, the crew will open hatches and reenter the SM for their second MO-9 "Urolux" biochemical urine test.

This will be followed by the crew resetting communications, conducting ISS activation operations and restoring systems configurations in the DC1 and other RS modules to pre-EVA conditions, then installing the DC1 air ducts.

At ~3:15pm EST, Thomas Reiter is scheduled for a PAO audio event, downlinking greetings to and answering questions from the attendees of ESA Director General Jean-Jacques Dordain's address to the Dinner of the European Leadership Forum in London, UK., moderated by former Astronaut Tom Henricks (now President of McGraw-Hill Aerospace & Defense).

Ground controllers continued to uplink software updates in preparation for the upcoming Flight 12A.1. *[Yesterday the Port (P)1-1 and P1-2 Multiplexer/ Demultiplexer (MDM)s were loaded with the required 12A.1 software. This load also required the P1 MDMs to be taken to Diagnostics in order to load the software patches and Pre-Positioned Load (PPL)s. The P1 MDMs have been re-initialized*

and are operating nominally. The P3 MDMs, the CCS (Command and Control System) and the EEPROM (Electrically Erasable Programmable Read Only Memory) loads are next in line.]

Sleep period will begin at ~4:30am tomorrow morning, to extend through 3:00pm.

No CEO (Crew Earth Observation) photo targets uplinked for today

CEO photography can be viewed and studied at the websites:

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Eccentricity -- 0.0010713

Solar Beta Angle -- -39.9 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 84 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45814

Significant Events Ahead (all dates Eastern and subject to change):

11/22/06 -- Russian EVA-17 [6:00pm (hatch open) – 11:54pm (hatch close)]

11/29/06 -- ISS Reboost (~6:03pm)

12/07/06 -- STS-116/12A.1 launch (9:38pm)

12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss

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06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

Have a great Thanksgiving Day!

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/21/06
Date: Tuesday, November 21, 2006 2:23:40 PM
Attachments:

ISS On-Orbit Status 11/21/06

All ISS systems continue to function nominally, except those noted previously or below.

After wakeup (8:30am EST), FE-2 Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

In preparation for tomorrow's Orlan EVA-17, CDR Lopez-Alegria, working off the "job jar" task list over the weekend, verified location and accessibility of a CTB (Cargo Transfer Bag) containing ITCS (Internal Thermal Control System) jumpers. *[While the three-person crew makes it unnecessary to configure the Lab ITCS to the "Unmanned Configuration" to adequately protect the US segment (USOS) in case of an ITCS leak, as during the past two-crewmember period, having the necessary jumper hoses readily at hand will allow quicker response by Mike L-A and Thomas in the unlikely event of a leak.]*

Also from the discretionary task list, L-A hooked up the UOP-DCP (Utility Outlet Panel-to-Display & Control Panel) bypass power cable at the RWS (Robotics Work Station) in support of tomorrow's video coverage of the EVA.

FE-1 Tyurin set up and prepared CCPKs (Crew Contamination Protection Kits; Russian: PNST), intended to protect the spacewalkers from incompletely-burnt fuel residue from thruster plumes. *[Protective gear kits for use during and after the EVA in case the Orlans are inadvertently contaminated, are extensively equipped with wet wipes, dry towels, goggles, IPK gas masks and half masks, latex gloves, high performance filters, trash containers, etc.]*

At ~2:00pm EST, the crew began a 1.5 hr period of EVA timeline review and tagup

with ground specialists via S-band. *[The spacewalk by Tyurin (EV1) and Lopez-Alegria (EV2) from DC1, estimated at 5h 54m duration, will begin tomorrow at 6:00pm with EV hatch opening (timed by RGS/Russian Ground Site acquisition and orbital sunrise at ~6:10pm) and last until an estimated ~11:54pm (hatch closing). After egress, the crew will experience three orbital nights and ingress after a fourth sunset (11:42pm). EVA objectives are: (1) GOLF promo/demo, (2) BTN-M1 "Neutron" experiment installation on S Following the zero calibration, the backup unit (#1045), attached to the sampling pump, was returned to the Node, while the prime unit's datalogger function was turned on to collect data at the SM Central Post as a spot check. After one hour, the datalogger was deactivated.] Service Module (SM, small diameter section), (3) inspection & retraction of Progress KURS 2AO antenna, (4) relocation of WAL2 antenna on an SM handrail, (5) change-out of replaceable materials sample cassette container SKK-5 for SKK-9 on the SM (if time permits), and (6) inspection of the Strela-2 crane retention mechanisms and bolted joint assemblies.]*

Lopez-Alegria performed the scheduled CSA-CP (Compound Specific Analyzer-Combustion Products) maintenance, today including verification that the sensors in the two new 23P-delivered CSA-CP units have completely outgassed (decontaminated). *[If so, L-A was to change out the prime unit's battery, then zero-calibrate both instruments. Following zero calibration, the backup unit was to be stowed, while the prime unit's datalogger function will be turned on to collect data at the SM Central Post as a spot check. After one hour, the datalogger will be deactivated, with the prime CSA-CP remaining on for continuous passive sampling.]*

Later today, L-A prints out newly uplinked ODF (Operations Data Files) procedures (on EVA Hazard/Warning) and replaces the hardcopy pages in the three onboard Warning Books, discarding the old pages as trash and restowing the books.

Also in preparation of the spacewalk, Misha Tyurin will work in the Soyuz 13S spacecraft to activate its ASU toilet facilities (for use by Reiter during the spacewalk).

Later, the FE-1 will retrieve three Russian "Pille-MKS" radiation dosimeters, record their dosages and equip each Orlan (in pocket on left calf) with a radiation sensor (A0309 & A0310). *[A third sensor, A0307, will be placed in the SM for background readings. Also, Misha will transfer his ID-3 personal dosimeter, normally worn on the flight suit, to the chest pocket of his Orlan's lining (near the DIDB) and later return it to the flight suit. On 11/24, after the EVA, readings from all dosimeters will be recorded and downlinked.]*

The FE-2 is scheduled to perform the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including

ASU toilet facilities systems/replaceables.

The CDR will do the periodic (once per month) routine inspection of the RED (Resistive Exercise Device) with canister cords, squat harness components, and accessory straps, and the canister bolts for re-tightening if required.

The crew is scheduled to perform their daily physical exercise program on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2/only), RED (CDR), and VELO bike with bungee cord load trainer (FE-1).

Later tonight, L-A will copy his, Misha's and Thomas' exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Before sleep time, Tyurin will break out and set up the equipment for tomorrow's planned "Urolux" biochemical urine test (PZE MO-9). *[MO-9 is conducted regularly every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for US crewmembers for IMG (Integrated Medical Group) PHS evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. The data are then entered in the Medical Equipment Computer (MEC)'s special IFEP software (In-Flight Examination Program).]*

At ~1:30pm EST, the station was turned 90 degrees as it maneuvered from earth-fixed LVLH -YVV (local vertical local horizontal/minus y-axis in velocity vector) to LVLH +XVV (plus x-axis in velocity vector). *[The maneuver was executed with the USTO (US Thruster Only) controller which commands the Russian thrusters without requiring handover between MCSs (motion control systems). At ~2:04pm, a brief (5 min.) free drift period was included to allow for photo analysis of the P4 SAWs (Solar Array Wings). After maneuvering back to TEA (Torque Equilibrium Attitude) with USTO, the U.S. CMGs (Control Moment Gyroscopes) reassumed momentum management.]*

Also scheduled for today, commanded by TsUP/Moscow, was the opening and pressurization of the BG1&2 and BO1&2 propellant tanks of the Progress M-58/23P refueling system (SD), as well as another remote-commanded session of the ESA/German commercial robotics experiment "RokvISS".

The Elektron oxygen generator shut down yesterday for several hours due to the de-ionized water container (KOV) running dry. The crew successfully reactivated the electrolysis machine which is currently operating nominally in the 32 Amp mode. Elektron will be turned off tomorrow (~11:20am) for the duration of the EVA.

Sleep time again will be at 12:00midnight EST.

Today's CEO (Crew Earth Observation) photo targets, from the Lab nadir/science window, were **Bosumtwi Impact Crater** (*weather is the best it has been in months for this target centered at 6.50N 1.25W. A lake fills this circular, 10.5km in diameter impact site. Looking left of track as ISS approached the coast of Ghana from the NW. Using the long lens settings for detail*), **Red River Basin, TX** (*trying for a contextual mapping pass this time. Shooting just right of track and beginning mapping the river course from just W of Lake Texoma until view became high oblique. Center point is 34.25N 98.00W*), **Mississippi Delta Region** (*looking just left of track and mapping in detail the course of the Mississippi River from just S of Baton Rouge to just W of New Orleans. Center point is 30.00N 90.00W*), and **Santa Barbara Coast, California** (*ISS had a nadir pass in good weather and light over this Long Term Ecological Research [LTER] site centered at 34.50N 119.91W. Trying for a detailed nadir mapping of the coast from Vandenberg AFB to Oxnard, California.*

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 7:20am EST [= epoch]*):

Mean altitude -- 335.2 km

Apogee height -- 342.4 km

Perigee height -- 328.0 km

Period -- 91.24 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0011082

Solar Beta Angle -- -44.6 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 97 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45798

Significant Events Ahead (all dates Eastern and subject to change):

11/22/06 -- Russian EVA-17 [6:00pm (hatch open) – 11:54pm (hatch close)]

11/29/06 -- ISS Reboost (~6:03pm)

12/07/06 -- STS-116/12A.1 launch (9:38pm)

12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss

12/19/06 -- STS-116/12A.1 landing (@ KSC: ~4:37pm)
01/17/07 -- Progress M-57/22P undocking (DC1) & reentry
01/18/07 -- Progress M-59/24P launch
01/20/07 -- Progress M-59/24P docking (DC1)
02/02/07 -- US EVA-6
02/06/07 -- US EVA-7
02/10/07 -- US EVA-8
03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses
03/18/07 -- STS-117/13A docking
03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/20/06
Date: Monday, November 20, 2006 3:18:48 PM
Attachments:

ISS On-Orbit Status 11/20/06

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 9 of Increment 14. >>>Happy Birthday, ISS! Today 8 years ago (Nov. 20, 1998), Khrunichev's FGB/Zarya control module, the first ISS element, was launched on the company's Russian Proton vehicle at Baikonur, marking the begin of the ISS Program.<<<*

After wakeup (8:30am EST), FE-2 Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

Crew preparations for the Orlan EVA on 11/22 (Wednesday) continue. *[Today's tasks required FE-1 Tyurin to set up and charge the batteries of the Russian Glisser-M videocam system, then to configure the Glisser for the spacewalk, while CDR Lopez-Alegria recharged the batteries for two U.S. DCS 760 digital cameras and configures the latter.]*

Mike L-A and Mikhail also had two hours reserved for reviewing uplinked technical material on the forward-facing KURS 2AO-VKA (orientation) antenna of the Progress M-58/23P cargo vehicle which failed to retract during the docking process on 10/26, and to tag up with ground specialists on the issue. *[The antenna between 23P and the Service Module (SM) aft end will be inspected, with subsequent remedial action as required by the situation encountered. SM thrusters will be inhibited for this task. Depending on whether the antenna's 4-bar linkage is insufficiently retracted or the antenna is caught in part on a handrail, the EV crew will attempt to use a screwdriver and manual rotation in the first case, or a crowbar and hammer in the latter event.]*

The Orlan spacewalk by Tyurin (EV1) and Lopez-Alegria (EV2) on 11/22 from DC1,

estimated at 5h 54m duration, will begin with EV hatch opening at 6:00pm (timed by RGS/Russian Ground Site acquisition) and end with hatch closing at ~11:54pm.

[Objectives of the spacewalk are: (1) GOLF promo/demo, (2) BTN-M1 "Neutron" experiment installation on SM (small diameter section), (3) inspection & retraction of Progress KURS 2AO antenna, (4) relocation of WAL2 antenna on an SM handrail, (5) change-out of replaceable materials sample cassette container SKK-5 for SKK-9 on the SM (if time permits), and (6) inspection of the Strela-2 crane retention mechanisms and bolted joint assemblies.]

Thomas Reiter worked on the recently installed SVG (Space Video Gateway) HDTV system, swapping two of its DC power cables. *[The activity removed the current 10-ft cable, required for the subsequent IWIS RSU installation, and replaced it with a 6-ft cable.]*

Afterwards, the FE-2 connected the RSU (Remote Sensor Unit) of the IWIS (Internal Wireless Instrumentation System) in the SM to an accelerometer cable and to stage power cables for future data take operations. *[When required for those data takes, the SM RSU will be plugged into one of two suitable Russian power ports.]*

In support of CDRA (Carbon Dioxide Removal Assembly) activation from the ground, Lopez-Alegria connected the ITCS LTL (Internal Thermal Control System/ Low Temperature Loop) supply line of the CDRA at the LAB1D6 rack.

Mike L-A also performed the weekly maintenance on the TVIS (Treadmill with Vibration Isolation & Stabilization), primarily checking the condition of the SPDs (subject positioning devices) and recording time & date values.

Later today, the FE-2 is to perform the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including ASU toilet facilities systems/replaceables.

At ~10:56am, Thomas Reiter conducted another LDM (long-duration mission) amateur radio session, sending down greetings to an opening event of the State Museum of Mannheim, Germany. *[Supported by ESA's Education Office and ESOC Communication Office, the opening of the museum's unique space exhibition, with 200 school kids attending, was arranged by ARISS (Amateur Radio on International Space Station) and the SWR (Südwestdeutscher Rundfunk) radio network.]*

At ~11:33am, the CDR used the SM's amateur radio equipment (Kenwood D-700 VHF transceiver, headset, power supply) to conduct, at 11:38am, a 10-min. ham radio exchange with students at Centre Hastings Secondary School of Madoc,

Ontario, Canada.

At ~5:15pm EST crew will convene for their weekly teleconference with ISS Program Management at JSC/Houston via S-band/audio.

At~6:30pm, Mike L-A is scheduled for a teleconference with FE Sunita L. Williams to discuss some early “handover” topics. [*“Sun” Williams will arrive on STS-116/12A.1 on 12/9 (NET) to replace FE-2 Thomas Reiter on the Expedition 14 crew.*]

The crew performed their daily physical exercise program on the TVIS (CDR, FE-1, FE-2), RED resistive exerciser (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Later tonight, L-A will copy his, Misha’s and Thomas’ exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Sleep time again will be at 12:00midnight EST.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 6:58am EST [= epoch]*):

Mean altitude -- 335.3 km

Apogee height -- 342.7 km

Perigee height -- 327.9 km

Period -- 91.24 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0011082

Solar Beta Angle -- -49.2 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 100 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45782

Significant Events Ahead (all dates Eastern and subject to change):

11/22/06 -- Russian EVA-17 [6:00pm (hatch open) – 11:54pm (hatch close)]
11/29/06 -- ISS Reboost (~6:03pm)
12/07/06 -- STS-116/12A.1 launch (9:38pm)
12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss
12/19/06 -- STS-116/12A.1 landing @ KSC
01/17/07 -- Progress M-57/22P undocking (DC1) & reentry
01/18/07 -- Progress M-59/24P launch
01/20/07 -- Progress M-59/24P docking (DC1)
02/02/07 -- US EVA-6
02/06/07 -- US EVA-7
02/10/07 -- US EVA-8
03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses
03/18/07 -- STS-117/13A docking
03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/19/06
Date: Sunday, November 19, 2006 1:59:41 PM
Attachments:

ISS On-Orbit Status 11/19/06

All ISS systems continue to function nominally, except those noted previously or below. *Sunday -- off-duty day for CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Thomas Reiter, except for regular maintenance and voluntary work. Ahead: Week 9 of Increment 14.*

After wakeup (8:30am EST), CDR Lopez-Alegria continued his second 7-day SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) log and questionnaire entries from the Actiwatch in the experiment's HRF1 laptop application. *[The experiment is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the CDR's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the CDR as well as his patterns of sleep and activity throughout the Expedition.]*

FE-2 Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

Thomas is also scheduled to perform the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the Service Module (SM), including ASU toilet facilities systems/replaceables, the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/Moscow.

The crewmembers had their weekly PFCs (Private Family Conferences) via S-band/ audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop), Mikhail at 9:50am EST, Thomas at 12:25pm and Mike L-A at 2:40pm.

The crew performed their daily physical exercise program on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Sleep time again will be at 12:00midnight EST.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 11:40am EST [= epoch]*):

Mean altitude -- 335.4 km

Apogee height -- 342.9 km

Perigee height -- 327.9 km

Period -- 91.24 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.001121

Solar Beta Angle -- -53.7 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 110 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45769

Significant Events Ahead (all dates Eastern and subject to change):

11/22/06 -- Russian EVA-17 [6:06pm (hatch open) – 11:47pm (hatch close)]

11/29/06 -- ISS Reboost (~6:03pm)

12/07/06 -- STS-116/12A.1 launch (9:38pm)

12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss

12/19/06 -- STS-116/12A.1 landing @ KSC

01/17/07 -- Progress M-57/22P undocking (DC1) & reentry

01/18/07 -- Progress M-59/24P launch

01/20/07 -- Progress M-59/24P docking (DC1)

02/02/07 -- US EVA-6

02/06/07 -- US EVA-7

02/10/07 -- US EVA-8

03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

03/16/07 -- STS-117/13A launch -- S3/S4 trusses
03/18/07 -- STS-117/13A docking
03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/18/06
Date: Saturday, November 18, 2006 10:56:28 AM
Attachments:

ISS On-Orbit Status 11/18/06

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 14 crew CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Thomas Reiter.*

After wakeup (8:30am EST), CDR Lopez-Alegria continued his second 7-day SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) log and questionnaire entries from the Actiwatch in the experiment's HRF1 laptop application. *[The experiment is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the CDR's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the CDR as well as his patterns of sleep and activity throughout the Expedition.]*

FE-2 Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

The crew conducted the regular weekly three-hour task of thorough station cleaning, wearing protective garment. *["Uborka", normally done every Saturday, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with "Fungistat" disinfectant wipes; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of today's *uborka*, the crew performed preventive maintenance in the *Funktsionalnyi-Grusovoi Blok* (FGB) by cleaning the ventilation mesh screens of the FGB's central ventilation fans (TsV1 & TsV2).

Later today, FE-1 Tyurin will complete the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

In preparation for Wednesday's (11/22) Orlan spacewalk, Mike L-A initiated (and later will terminate) charging the U.S. helmet light (EHIP/EMU Helmet Interchangeable Portable) batteries.

On the MEC (Medical Equipment Computer), the CDR is to fill out the regular weekly FFQ (Food Frequency Questionnaire), his seventh, which keeps a personalized log of his nutritional intake over time on special MEC software. *[The FFQ records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

Mikhail Tyurin is scheduled to perform the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water from an EDV containing water from the BKO multifiltration/purification column unit. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh-8 Liquid Unit where they could cause Elektron shutdown.]*

Mike L-A handles the regular maintenance reboot on the SSC (Station Support Computer) OCA Comm Router laptop.

The crew will perform their daily physical exercise program on the TVIS treadmill (CDR, FE-1, FE-2/only), RED resistive exerciser (CDR), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Thomas will copy his, Misha's and L-A's exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

The SSC-8 laptop suffered a failure of its hard drive. Forward action is being discussed.

Sleep time again will be at 12:00midnight EST.

Weekly Science Update (*Expedition Fourteen -- 8th*):

ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS): Off-

nominal encountered during ALTEINO activities on 10/26-27: smaller files than expected on last memory card. Check of the ALTEINO device by the crew has been performed on 11/10: ALTEINO confirmed to perform nominally.

ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System): The ALTEA team thanked Thomas Reiter for his assistance in the recovery of the DOSI science telemetry.

BASE: Complete.

BCAT-3 (Binary Colloidal Alloy Test-3): Planned.

CARD (Investigating Mechanisms of Heart Disease in Micro-G, ESA): CARD activities confirmed to be completed on 11/9-11/10 successfully. Only issue was the HRF Refrigerated Centrifuge (RC) not cooling during sample centrifugation. Scientists' initial assessment of the science loss would be in the order of 0-10%.

CBOSS (Cellular Biotechnology Support Systems): Complete.

CFE (Capillary Flow Experiment): Complete.

CULT (Cultural Factors Questionnaire): Fifth session for Thomas Reiter was performed nominally on 11/1.

DAFT (Dust & Aerosol Measurement Feasibility Test): Complete.

Earth Knowledge Acquired by Middle School Students (EarthKAM): In progress.

ETD (Eye Tracking Device): Seventh session for Reiter performed nominally on 11/13.

GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology): Planned

IMMUNO (Saliva Sampling): First session with Thomas Reiter performed nominally on 10/30. IMMUNO samples have been inserted in MELFI (Dewar2-TrayA-Section 4).

LEUKIN: Complete.

MISSE (Materials ISS Experiment): Ongoing.

MTR-2 (Russian radiation measurements): Passive dosimeters measurements in

DC1 "Pirs".

NOA (*Nitric Oxide Analyzer*): In progress.

Nutrition: Thanks to Mike L-A for completing another run.

PK-3 (*Plasma Crystal 3*): In progress.

POEMS (*Passive Observatories for Experimental Microbial Systems in Micro-G*): Planned.

RC (*Refrigerated Centrifuge*): Planned.

RS (*Renal Stone*): Planned.

SAMPLE: Complete.

SEM (*Space Experiment Module*): Successfully completed off task list.

SLEEP: The CDR successfully downloaded his Actiwatch data for this month. In conjunction with his next download, L-A will also initialize Sunita Williams' Actiwatch.

SPHERES (*Synchronized Position Hold, Engage, Reorient, Experimental Satellite*): In progress.

Swab (*Characterization of Microorganisms & Allergens in Spacecraft*): Planned.

TROPI (*Study of Novel Sensory Mechanism in Root Phototropism*): In progress.

YING (*Yeast in No Gravity*): Complete.

CEO (*Crew Earth Observations*): Through 10/29, the ground has received a total of 1695 of Inc14 CEO images for review and cataloging. *"This week we experienced a semi-annual phenomenon of low illumination of targets as the ISS orbit tracks temporarily parallel the terminator in the winter hemisphere. Thanks for your patience. Review of your imagery finds that you have acquired good seasonal imagery of our Pinacates Biosphere site and it can be retired until spring. You also acquired fine imagery of the crescent-shaped Gweni-Fada Impact crater in northern Africa. Good job! This week your recent, striking image of Currituck Sound, North Carolina will be published on NASA/GSFC's Earth Observatory website. Besides the variety of land use patterns in this area, a unique combination of sun glint, winds, and tides produced distinct, interesting patterns on water bodies in the area."*

Today's CEO photo targets, from the Lab nadir/science window, were **Konza Prairie, Kansas** (the ISS pass was generally NE of this Long Term Ecological Research [LTER] site, so the crew was asked to look right of track. Using the short lens settings for oblique, context views that are planned to be used with the crew in the future to indicate areas for detailed mapping. The center of this target area is 39.08N 96.56W), **Georgia Coastal Ecosystems** (ISS approached this target area from the NW. Looking left of track for oblique, contextual views of the Georgia coastal wetlands, estuaries, and islands using the short lens settings. The center of this target area is 31.43N 81.37W), **Barringer Impact Crater** (ISS had a nadir pass in good light and weather over this isolated impact site centered near 36.03N 111.02W. Using the long lens for detailed nadir views), and **Jornada Basin, New Mexico** (just over a minute after encountering the Barringer target the crew had a good shot of this LTER target. Looking left of track and try for detailed mapping of the area W of the Rio Grande River and NW of El Paso. Target center is 32.59N 106.84W).

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<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

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ISS Orbit (as of this morning, 7:52am EST [= epoch]):

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Apogee height -- 343.1 km

Perigee height -- 328.0 km

Period -- 91.24 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0011255

Solar Beta Angle -- -58.0 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 105 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45751

Significant Events Ahead (all dates Eastern and subject to change):

11/22/06 -- Russian EVA-17 [6:06pm (hatch open) – 11:47pm (hatch close)]

11/30/06 -- ISS Reboost

12/07/06 -- STS-116/12A.1 launch (9:38am)

12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss

12/19/06 -- STS-116/12A.1 landing @ KSC

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01/20/07 -- Progress M-59/24P docking (DC1)
02/02/07 -- US EVA-6
02/06/07 -- US EVA-7
02/10/07 -- US EVA-8
03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
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03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
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04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/17/06
Date: Friday, November 17, 2006 12:48:32 PM
Attachments:

ISS On-Orbit Status 11/17/06

All ISS systems continue to function nominally, except those noted previously or below.

Crew activities today are mostly centered on the suited dry run preparatory to next Wednesday's (11/22) Orlan spacewalk.

After wakeup (8:30am EST), FE-2 Reiter again conducted post-sleep operations for CASPER (Cardiac Adapted Sleep Parameter Electrocardiogram Recorder), the new ESA experiment that had recorded his data overnight. Later in the day he performed pre-sleep ops and activation before sleeptime for a third overnight data take. *[CASPER monitors the heart rates of the ISS crewmembers while they sleep in order to determine if there is any physiological reason for sleep disturbances. To supplement this data, the crewmembers complete questionnaires before and after their sleep period. The data collected from this investigation may help develop countermeasures for future long duration missions and patients on Earth who suffer from sleep disturbances. For this purpose, CASPER combines objective physiological data and subjective inputs. Physiological data is obtained through a specially adapted vest, worn by the astronaut, with embedded sensors and cabling that connects ECG (Electrocardiogram) electrodes, for measuring heart rate, to a PDA for storing the heart rate data. Subjective inputs are obtained via a questionnaire, which runs on the same PDA. A questionnaire is completed both prior to and after each sleep period that the heart rate is measured.]*

CDR Lopez-Alegria continued his second 7-day SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) log and questionnaire entries from the Actiwatch in the experiment's HRF1 laptop application. *[The experiment is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the CDR's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the CDR as well as his patterns of sleep and activity throughout the Expedition.]*

The FE-2 continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

After yesterday's completion of all EVA suit preparations, dry-run activities will begin today at ~1:30pm EST with CDR Lopez-Alegria tearing down and removing the air duct in the DC1 Docking Compartment/airlock, skipping ventilation fan V3, to make room for the subsequent suited translation exercise.

At the same time, FE-1 Tyurin will start configuring the communications system for the exercise. *[The suited run requires wireless Tranzit-B suit radio telemetry on both semisets and temporary deactivation of the Russian VHF channel 1 (Very High Frequency, Russian: UKV1, for ultra-shortwave) to avoid interference from extraneous radio stations to the Orlans while over Russian ground stations (RGS). All EVA preps are monitored by the ground via audio. Tranzit-B TM is to be turned off again tonight at ~5:15pm.]*

After another functionality and leak checking of the Orlan-Ms, their equipment and their interface units (BSS) in the DC1 and SM PkhO (Service Module Transfer Compartment), the crew will don EVA gear at ~2:20pm (estimated), including putting on personal gear bags, biomed harness, thermal underwear, LCG (liquid cooling garment), low-noise headset, gloves, etc.

After another checkout of comm hookups & biomedical parameter telemetry via the BSS interface system for vital signs and equipment monitoring, suiting up will then (~2:50pm) culminate in ingress in the Orlans through their "backdoors" and sealing off of the backpacks (~3:20pm).

Next in line are functionality checkouts of the suits and their BSS controls (e.g., temperature control handling, water cooling system ops), preliminary dimensional fit checks at reduced suit pressure (0.4 at, 5.9 psi), and half an hour of testing/training of suited mobility and translation inside the DC1, beginning at ~4:00pm *[These exercises include translation to all DC1 work stations with mated fluid umbilical, verification of Orlan fit, checkout of onboard cooling system operation, assessment of how the interior DC1 config impacts operations with various gear and accessories such as the POV (EVA support panel) and BSS (Orlan interface unit), evaluation of stowage of hardware to be taken out during the spacewalk, plus some typical EVA-17 tasks, such as SKK-9 container retrieval/stowage, WAL2 antenna adapter bracket accessing, and working with OTAs (Orlan Tether Assemblies).]*

Egress from the Orland is timed for around 4:45pm, to be followed by restoration of communications settings to nominal operation, one hour lunch break, and a two-hour period of post-training cleanup activities (changing clothes, drying out LCG, biomed harness belt, thermal undergarment, socks, comfort gloves, hygienic trunks and comm caps, remove LiOH canister and moisture collector, etc.), and air duct assembly.

Subsequently, after the Orland is confirmed to be dry, they are to be re-equipped with fresh consumables/replaceable elements for the spacewalk on Friday.

Before the dry-run, FE-2 Reiter completed yesterday's work on the ESA/RSC-Energia experiments ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS) and LAZIO (Low Altitude Zone/Ionization Observatory), downlinking the experiments' data files from PCMCIA memory cards to the ground via OCA.

Afterwards, the FE-2 performed the periodic (currently daily) checkout/verification of IP-1 airflow sensors in the various Russian segment (RS) hatch openings in the SM, FGB and DC1.

Thomas also disconnected the ITCS MTL (Internal Thermal Control System/Moderate Temperature Loop) coolant jumper connection for EXPRESS Rack 1 (ER1) which he had set up on 11/14 to support subsequent ground commanding of configuring the RFCA (Rack Flow Control Assembly), closing the RPC (Remote Power Controller), and configuring the rack to support ER1 activation.

Reiter next completed the periodic sampling of cabin air, started earlier with the GSC grab sampling, by using the AK-1M adsorber to sample the air in the SM and FGB and to check for leaked-out Freon.

In another test run, the FE-2 later will collect cabin air readings in the ISS with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system of the SM SOGS (Pressure Control & Atmospheric Monitoring System). *[GANK tests for Methane (CH₄), Ammonia (NH₃), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO₂), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN). Today's use of GANK included a resetting after an off-nominal deactivation on 10/5 that caused erroneous higher-than-normal CO readings.]*

After completion of the suited dry run, Reiter will perform the daily atmospheric status checks for ppO₂ (Partial Pressure Oxygen) and ppCO₂ (pp Carbon Dioxide), using the CSA-O₂ (Compound Specific Analyzer-Oxygen sensor) and CDMK (CO₂ Monitoring Kit). *[CSA-CP measurements were gathered with units #1053 & #1055]*

in Progress 23P, CSA-O2 (#1042, #1063) in the Lab, and CDMK (#1009) in SM and Lab. The instruments were turned off afterwards and returned to their regular locations.]

At the HRF1 (Human Research Facility 1) rack, Reiter is to conduct the periodic checkout of the MedOps cardiac defibrillator. (Last time done: 9/16). *[This periodic routine task is scheduled as soon as possible from Expedition start and every 60 days thereafter. For the checkout, the defib is connected to the 120V outlet, equipped with its battery (currently #1018) and then allowed to charge, for about five seconds, to a preset energy level (e.g., 100 joules). After the button-triggered discharge, a console indicator signals success or failure of the test. The pacing signal is downlinked via S-band for 2 min. The HRF was afterwards powered down.]*

At ~6:20pm, Thomas Reiter is scheduled for the fourth photo/video session of the ERB (Erasmus Recording Binocular) experiment, spending 2h10m taking mapping imagery of the interior of the SM with three cameras for high accuracy, as prescribed by ESA's "Prolyot" (Fly-through) scenario. *[ERB uses a three-dimensional (3-D) video camera, the Sony DSR PD150P camcorder and a Nikon SSM-3DC-101 3D photo camera for taking imagery of the environment onboard the ISS for an accurate map of the station's interior. The images will be transferred by a computer application into a 3D model to be viewed in the Virtual Reality Theater of ESA's Erasmus Center.]*

The crew will perform their daily physical exercise program on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2) and RED resistive exerciser (FE-2), with L-A and Misha today at a reduced 1.5 hrs due to their subsequent strenuous physical activity in the DC1.

Afterwards, Thomas will copy his, Misha's and L-A's exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Reiter is to complete the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

The FE-2 also performs the daily update/edit of the standard IMS (Inventory Management System) "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

At ~10:45am EST, the crew held the regular (nominally weekly) tagup with the

Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~11:25am, L-A, Misha and Thomas conducted their standard weekly teleconference with the JSC Astronaut Office (Kent Rominger), via S-band S/G (space-to-ground).

By ground commanding, with no crew action required, the Primary and Backup EXT MDM (Exterior Multiplexer/Demultiplexer) computers are to be loaded today with 12A.1 files and a software patch. *[The patch requires the EXT MDMs to be taken to diagnostics in order to load, so the EXT MDMs will be swapped. The EXT MDMs will be swapped one more time after the loads are complete to leave them in the configuration desired for 12A.1.]*

TsUP/Moscow is conducting a two-day test of the ASN-M satellite navigation system onboard the ISS.

Sleep time again will be at 12:00midnight EST.

Today's CEO photo targets, from the Lab nadir/science window, were **Niwot Ridge Tundra, Colorado** (*this Long Term Ecological Research [LTER] site is centered in northern Colorado near 40.0N 105.6W. This gently sloping, mile-high plateau is situated east of the Front Range of the Rockies between Cheyenne and Colorado Springs. The region has been intensely developed with cities and agricultural activities. On this pass look left of track and try for a mapping pass from just north of Denver to Colorado Springs*), **Red River Basin, TX** (*ISS has a near-nadir pass over the western portion of this target in fair weather and lighting. As the station approaches from the NW, the crew was to look for this agriculturally active river valley that forms part of the border between Texas and Oklahoma. Using the long lens settings and map the course of the river in detail*), and **Santa Barbara Coast, California** (*this LTER site is situated along the coast and near shore waters of southern California between Los Angeles and Lompoc, centered near 34.5N 119.9W. Looking left of track and concentrate on the Channel Islands National Park area south of Santa Barbara itself*).

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 10:43am EST [= epoch]*):

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Apogee height -- 343.3 km

Perigee height -- 328.0 km

Period -- 91.24 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0011515

Solar Beta Angle -- -61.8 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 105 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45737

Significant Events Ahead (all dates Eastern and subject to change):

11/22/06 -- Russian EVA-17 (3-9pm)

11/30/06 -- ISS Reboost

12/07/06 -- STS-116/12A.1 launch

12/09-16/06 -- STS-116/12A.1 docked mission w/ISS -- P5 truss

12/18/06 -- STS-116/12A.1 landing @ KSC

01/10/07 -- Progress M-57/22P undocking (DC1) & reentry

02/02/07 -- US EVA-6

02/06/07 -- US EVA-7

02/07/07 -- Progress M-59/24P launch

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02/10/07 -- US EVA-8

03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

03/16/07 -- STS-117/13A launch -- S3/S4 trusses

03/18/07 -- STS-117/13A docking

03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

04/06/07 -- Progress M-59/24P undocking (DC1) & reentry

04/09/07 -- Progress M-60/25P launch

04/11/07 -- Progress M-60/25P docking (DC1)

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3

09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/16/06
Date: Thursday, November 16, 2006 3:10:00 PM
Attachments:

ISS On-Orbit Status 11/16/06

All ISS systems continue to function nominally, except those noted previously or below.

After wakeup (8:30am EST), FE-2 Reiter again conducted post-sleep operations for CASPER (Cardiac Adapted Sleep Parameter Electrocardiogram Recorder), the new ESA experiment that had recorded his data overnight. Later in the day he performed pre-sleep ops and activation before sleeptime for a third overnight data take. *[CASPER monitors the heart rates of the ISS crewmembers while they sleep in order to determine if there is any physiological reason for sleep disturbances. To supplement this data, the crewmembers complete questionnaires before and after their sleep period. The data collected from this investigation may help develop countermeasures for future long duration missions and patients on Earth who suffer from sleep disturbances. For this purpose, CASPER combines objective physiological data and subjective inputs. Physiological data is obtained through a specially adapted vest, worn by the astronaut, with embedded sensors and cabling that connects ECG (Electrocardiogram) electrodes, for measuring heart rate, to a PDA for storing the heart rate data. Subjective inputs are obtained via a questionnaire, which runs on the same PDA. A questionnaire is completed both prior to and after each sleep period that the heart rate is measured.]*

CDR Lopez-Alegria continued his second 7-day SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) log and questionnaire entries from the Actiwatch in the experiment's HRF1 laptop application. *[The experiment is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the CDR's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the CDR as well as his patterns of sleep and activity throughout the Expedition.]*

The FE-2 continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of*

SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]

CDR Lopez-Alegria and FE-1 Tyurin reviewed EVA-from-DC1 procedures. Orlan activities for the EVA-17 on 11/22 today also are focusing on

1. filling the DIDBs (disposable in-suit drink bags) and installing them in the suits;
2. installing the Fresnel lens viewing aid in the helmets; and
3. check out & installation of U.S. add-on hardware on the Orlan-M suits, with documentary photography. *[Add-ons include the OTA consumables, right swing arm, a small trash bag, wire ties and safety tethers.]*

Later today (~7:05pm EST) the crew will also activate Progress M-57/22P, deinstall the air duct from 22P to DC1, remove the quick-release screw clamps, close hatches (~8:30pm) and start leak checks on the DC1-to-22P transfer vestibule.

Reiter set up for his tenth (of 13 planned) biweekly NOA/Nitric Oxide Analyzer session and undertook the procedure, later downlinking the measurements from the RSE1 laptop to the ground via OCA comm. *[Purpose of the ESA experiment ESANO1, consisting of the "Platon" analyzer and its power supply, is to monitor expired nitric oxide (NO) in the subject's exhaled air to detect signs of airway inflammation and indications of venous gas emboli (bubbles) that may be caused by inhalation of pollutants in the closed environment of the ISS cabin and increased risk of decompression sickness.]*

The FE-2 completed the periodic hardware health check on the ESA/RSC-Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS), essentially ascertaining the size of the recorded data on the ACT spectrometer's PCMCIA memory card by temporarily removing it and inserting it into the RSE1 laptop for "reading". The card was then changed out and the ALC shielding tile #2 repositioned. *[ALTCRISS uses the ACT spectrometer employed originally by VC8 guest cosmonaut Roberto Vittori last year in the DC1 for the Italian LAZIO (Low Altitude Zone/Ionization Observatory) experiment. Spacers (to correct the spectrometer's tilt) and new shielding tiles (LDM-ALC-101) were installed later by the CDR.]*

L-A retrieved and stowed the two FMKs (Formaldehyde Monitoring Kits) deployed by Thomas on 11/14 in the Lab (below CEVIS cycle) and SM (most forward handrail).

In the Lab, FE-2 Reiter set up the batteries of the ERB (Erasmus Recording

Binocular) experiment in the Cannon dual lithium ion battery charger for the 4-hr. charging process for another “Prolyot” (Fly through) session. *[ERB is a three-dimensional (3-D) video camera being employed for taking imagery of the environment onboard the ISS. The images will be used to create an accurate map of the station’s interior. For deriving an accurate model of the interior, specialists will use the images from the ERB, the Sony PD-150P video camera and the Nikon 3-D still camera.]*

Thomas also performed the monthly recharging of the Motorola-9505 Iridium satellite phone. *[After retrieving it from its location in the Soyuz TMA-9/13S descent module (BO), Reiter initiated the recharging of its lithium-ion battery, a 30-min. process, monitoring the process every 10-15 minutes as it took place. Upon completion Thomas returned the phone inside its SSSP Iridium kit and stowed it back in the BO’s operational data files (ODF) container. The satphone accompanies returning ISS crews on Soyuz reentry and landing for contingency communications with SAR (Search-and-Rescue) personnel after touchdown. The Russian-developed procedure for the monthly recharging has been approved jointly by safety officials. During the procedure, the phone is left in its fluoroplastic bag with open flap.]*

L-A conducted the weekly audit/inventory of the available CWCs (collapsible water containers) and their contents, to keep track of onboard water supplies. *[Updated “cue cards” based on the crew’s water calldowns are sent up every other week.]*

As part of the standard pre-EVA fitness evaluation, Mike L-A and Mikhail Tyurin are scheduled for the Russian MO-5 MedOps protocol of cardiovascular evaluation during graded exercises on the VELO cycle ergometer, assisting each other in turn as CMO (Crew Medical Officer). *[The assessment, supported by ground specialist tagup (VHF) and telemetry monitoring, uses the Gamma-1 ECG equipment with biomed harness, skin electrodes and a blood pressure and rheoplethysmograph cuff wired to the cycle ergometer’s instrumentation panels. For the graded exercise, the subject works the pedals after a prescribed program at load settings of 125, 150, and 175 watts for three minutes each. Data output involves a kinetocardiogram, rheoplethysmogram, rheoencephalogram and a temporal pulsogram.]*

The FE-2 will take the monthly sensor readings of the Russian “Pille-MKS” radiation dosimetry experiment, which has ten sensors placed at various locations in the Russian segment (port cabin window, starboard cabin window, ASU toilet facility, control panel, etc.), powering down the reader and replacing the flash card, afterwards stowing the removed memory card for return to Earth.

Mike L-A is to complete the routine daily maintenance of the SOZh (Environment

Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

Thomas Reiter performs the daily update/edit of the standard IMS (Inventory Management System) "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The crewmembers will work out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR) TVIS treadmill (FE-2), RED resistive exerciser (FE-2) and VELO bike with bungee cord load trainer (CDR, FE-1, accounted for by today's MO-5 tests, see above).

Afterwards, Thomas will copy his, Misha's and L-A's exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Sleep time again will be at 12:00midnight EST.

Today's CEO photo targets, from the Lab nadir/science window, were **Konza Prairie, Kansas** (*this Long Term Ecological Research (LTR) site is centered near 39.1 N 96.6W and extends from N to S over much of eastern Kansas in an area also know as the Flint Hills. Because of its poorer, stony soils it is much less developed agriculturally than the rest of the state and has retained more of the grassland character of the U.S. Great Plains prior to the arrival of settlers. Trying for contextual mapping of the area between Oklahoma City and Kansas City*), **Florida Coastal Everglades** (*this LTR site is located in extreme south Florida centered near 25.5N 80.0W. The crew had acquired some imagery of this target area already. This time they were to concentrate on mapping the coastal margins only. As they crossed the Florida peninsula from the NW, they were to shoot right of track*), and **Barringer Impact Crater** (*ISS approach was from the NW. As ISS crossed the Grand Canyon, the crew was to begin looking left of track for this small impact site located just south of Interstate 40 between Winslow and Flagstaff, Arizona, using the long lens for detail. Center point is near 35.0N 111.0W.*)

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From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/15/06
Date: Wednesday, November 15, 2006 11:59:44 AM
Attachments:

ISS On-Orbit Status 11/15/06

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After wakeup (8:30am EST), FE-2 Reiter again conducted post-sleep operations for CASPER (Cardiac Adapted Sleep Parameter Electrocardiogram Recorder), the new ESA experiment that had recorded his data overnight. Later in the day he performed pre-sleep ops and activation before sleeptime for a third overnight data take. *[CASPER monitors the heart rates of the ISS crewmembers while they sleep in order to determine if there is any physiological reason for sleep disturbances. To supplement this data, the crewmembers complete questionnaires before and after their sleep period. The data collected from this investigation may help develop countermeasures for future long duration missions and patients on Earth who suffer from sleep disturbances. For this purpose, CASPER combines objective physiological data and subjective inputs. Physiological data is obtained through a specially adapted vest, worn by the astronaut, with embedded sensors and cabling that connects ECG (Electrocardiogram) electrodes, for measuring heart rate, to a PDA for storing the heart rate data. Subjective inputs are obtained via a questionnaire, which runs on the same PDA. A questionnaire is completed both prior to and after each sleep period that the heart rate is measured.]*

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The FE-2 continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. Today, he

also conducted skin measurements, to evaluate the past treatment, and filled out the experiment questionnaire. (Last time done: 10/18). *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit. The noninvasive medical equipment used by the experiment are the Tewameter (from TEWL = transepidermal water loss, one of the most important biophysical parameters for evaluating the efficiency of the human skin water barrier), the Corneometer (to accurately determine the hydration level of the skin surface) and the VisioScan which takes direct measurements of the skin topography (structure & level of dryness) with a special UV-A (Ultraviolet A) light video camera with high resolution.]*

Thomas Reiter also serviced the Russian BMP Harmful Impurities Removal System, starting the "bake-out" cycle to vacuum on absorbent bed #2 of the regenerable dual-channel filtration system. The bake-out will be terminated tonight before sleep time (~4:15pm EDT). *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

Orlan activities by the CDR and FE-1 Mikhail Tyurin for the EVA-17 on 11/22 today are focusing on

1. suit fit adjustment for height on both Orlans (to be repeated as necessary during the dry-run and under reduced airlock pressure);
2. leak checks and valve functionality tests on the suits, their BSS interface units and the hatch KVDs (pressure equalization valves, U.S.: PEVs) in the "Pirs" Docking Compartment (DC1) and Service Module Transfer Compartment (SM PkhO) from their EVA support panels (POV);
3. leak checking on the oxygen repressurization tanks (BK-3, primary & backup);
4. operations with Orlan replaceables;
5. after setting up communications links via the suits' BRTA radio telemetry units, the crew performs voice, telemetry and biomedical parameter transmission tests, and functional testing of the Russian BETA-08 ECG (electrocardiogram) lead cable belts, worn under the Orlan-M suits, using the Gamma-1M medical complex from the PKO medical exam panel; and
6. installing the usual additional portable air repress bottle (BNP) in the "Pirs" module (to support a DC1 repress in the event of a failure of the DC1/PkhO hatch's pressure equalization valve), and a second BNP supplementary portable air repress bottle in the repress line of the SM's work compartment (RO).

Mike LA and Thomas Reiter powered up the new SVG (Space Video Gateway), configured the HDTV (High Definition TV) camera, and conducted the first live

downlink of HDTV image & sound, via Ku- and S-band, on an interior video “tour”, first for the Japanese NHK (Nippon Hoso Kyokai) television network at 10:00am EST, later for the Discovery Channel at 11:40am. SVG was deactivated at ~12:00pm. *[SVG is a specialized computer designed to capture, encode, packetize and downlink HDTV live via Ku-band assets or to record it on the hard drive. HDTV uses the Sony HDW-750 camcorder with Sony F115 microphone and V10 VTR (Video Tape Recorder). The flight-certified SVG hardware was provided by NASA and JAXA (Japanese Aerospace Exploration Agency) for temporary installation in the ISS Lab under an agreement between NASA, the Japan Broadcasting Corporation NHK and Discovery Communications, Inc. (DCI). The system was successfully tested for the first time on 10/18.]*

The FE-2 is scheduled for his third periodic on-orbit hearing assessment (O-OHA) test, a 30-min. NASA environmental health systems examination to assess the efficacy of acoustic countermeasures, using a special MEC (Medical Equipment Computer) application. *[The O-OHA audiography test involves minimum audibility measurements for each ear over a wide range of frequencies (0.25-10 kHz) and sound pressure levels, with the crewmembers using individual-specific Prophonics earphones, Bose ANC headsets and the SLM (sound level meter). To conduct the testing, the experimenter is supported by special EarQ software on the MEC (Medical Equipment Computer), featuring an up/down-arrow-operated slider for each test frequency that the crewmember moves to the lowest sound pressure level at which the tone can still be heard. The baseline test is required not later than about Flight Day 14 for each new Expedition and is then generally performed once per month.]*

Mike L-A is to complete the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables and today also the weekly BRPK air/liquid condensate separator apparatus inspection.

The CDR also performs the daily update/edit of the standard IMS (Inventory Management System) “delta file”, including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

L-A is scheduled to continue his support of the ALTEA (Anomalous Long-Term Effects on Astronauts) payload by checking its dosimeter instruments. *[Purpose of ALTEA is to define and measure descriptors for the electrophysiological brain functioning and to follow their dynamics, correlating it with space environments, and long-term unmanned real-time particle flux dosimetry (DOSI mode) inside the ISS using six particle detectors (originally introduced on Mir).]*

Lopez-Alegria also performs the weekly maintenance on the TVIS treadmill, primarily checking the condition of the SPDs (subject positioning devices) and recording time & date values.

Reiter will replace the "Sputnik-01" (Satellite-01) unit in the BR-9TsU-8system in the FGB with a new unit, delivered on 23P.

The crewmembers will work out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Thomas will copy his, Misha's and L-A's exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Sleep time again will be at 12:00midnight EST.

No CEO (Crew Earth Observation) photo targets uplinked for today. *[Projected daylight orbit tracks are primarily in the northern hemisphere and roughly paralleling the terminator. This combination, in conjunction with low light and poor weather of the northern hemisphere winter, is resulting in no CEO targets which meet the minimum illumination criterion of 25 degrees of sun elevation. This condition may persist for as long as three days.]*

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

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Significant Events Ahead (all dates Eastern and subject to change):

11/22/06 -- Russian EVA-17 (3-9pm)

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12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss

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06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/14/06
Date: Tuesday, November 14, 2006 11:42:58 AM
Attachments:

ISS On-Orbit Status 11/14/06

All ISS systems continue to function nominally, except those noted previously or below.

Immediately after wakeup (8:30am EST), FE-2 Reiter conducted post-sleep operations for CASPER (Cardiac Adapted Sleep Parameter Electrocardiogram Recorder), the new ESA experiment that had recorded his data overnight. Later in the day he performed pre-sleep ops and activation before sleeptime for a second run. *[CASPER monitors the heart rates of the ISS crewmembers while they sleep in order to determine if there is any physiological reason for sleep disturbances. To supplement this data, the crewmembers complete questionnaires before and after their sleep period. The data collected from this investigation may help develop countermeasures for future long duration missions and patients on Earth who suffer from sleep disturbances. For this purpose, CASPER combines objective physiological data and subjective inputs. Physiological data is obtained through a specially adapted vest, worn by the astronaut, with embedded sensors and cabling that connects ECG (Electrocardiogram) electrodes, for measuring heart rate, to a PDA for storing the heart rate data. Subjective inputs are obtained via a questionnaire, which runs on the same PDA. A questionnaire is completed both prior to and after each sleep period that the heart rate is measured.]*

The FE-2 also completed the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

FE-1 Tyurin serviced the Russian BMP Harmful Impurities Removal System, starting the "bake-out" cycle to vacuum on absorbent bed #1 of the regenerable dual-channel filtration system. Before sleep time today (10:20pm EST) the bake-out will be terminated. Regeneration of bed #2 follows tomorrow. *[Regeneration of*

each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]

Orlan activities by the CDR and FE-1 today focus on equipping the suits with their consumable ORU (orbit replaceable unit) elements, setting up communications, performing leak checks and valve functionality tests on the suits and their BSS interface units in the SM PkhO (Service Module Transfer Compartment) and the DC1 (Docking Compartment).

EVA preps by Misha and L-A also deal with liquid/gas separation (degassing) of the Orlan and BSS suit interface cooling loops, as well as installation of a US EMU (Extravehicular Mobility Unit) helmet light on the Orlan-M suit #25 and checkout of the helmet light already mounted on suit #27. All activities were photo/video documented.

Later tonight, Lopez-Alegria will set up the video equipment, prepare his report on the EVA equipment preparations and downlink the video for ground inspection.

Thomas Reiter is to deploy two passive FMK (formaldehyde monitoring kit) sampling assemblies in the Lab (below CEVIS) and SM (most forward handrail), to catch any atmospheric formaldehyde on a collector substrate for subsequent analysis on the ground.

Reiter also conducts the periodic sampling of cabin air for subsequent analysis on the ground by collecting samples with a GSC (Grab Sample Container) at the center of the SM and Lab.

The FE-2 will set up an ITCS MTL (Internal Thermal Control System/Moderate Temperature Loop) coolant jumper connection for EXPRESS Rack 1 (ER1) to support subsequent ground commanding of configuring the RFCA (Rack Flow Control Assembly), closing the RPC (Remote Power Controller), and configuring the rack to support ER1 activation.

Thomas Reiter is scheduled for the third photo/video session of the ERB (Erasmus Recording Binocular) experiment, spending 3 hours to take mapping imagery of the interior of the Lab with three cameras for high accuracy, as prescribed by ESA's "Prolyot" (Fly-through) scenario. *[ERB uses a three-dimensional (3-D) video camera, the Sony DSR PD150P camcorder and a Nikon SSM-3DC-101 3D photo camera for taking imagery of the environment onboard the ISS for an accurate map of the station's interior. The images will be transferred by a computer application into a 3D model to be viewed in the Virtual Reality Theater of ESA's Erasmus Center.]*

Thomas is to complete the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables and today also the weekly BRPK air/liquid condensate separator apparatus inspection.

Reiter also performs the daily update/edit of the standard IMS (Inventory Management System) "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The crewmembers will work out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Thomas will copy his, Misha's and L-A's exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At~9:20am EST, the crew participated in a PAO/educational event, fielding questions from the U.S. Department of Education. *[In attendance were U.S. Deputy Secretary of Education Ray Simon; 20 school children from the Washington, D.C. area; STS-118 Mission Specialist and Educator Astronaut Barbara Morgan].*

No CEO (Crew Earth Observation) photo targets uplinked for today. *[Projected daylight orbit tracks are primarily in the northern hemisphere and roughly paralleling the terminator. This combination, in conjunction with low light and poor weather of the northern hemisphere winter, is resulting in no CEO targets which meet the minimum illumination criterion of 25 degrees of sun elevation. This condition may persist for as long as three days.]*

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06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/13/06
Date: Monday, November 13, 2006 11:53:13 AM
Attachments:

ISS On-Orbit Status 11/13/06

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 8 of Increment 14.*

Sleep cycle for the crew is currently holding at wakeup = 8:30am EST, sleeptime = 12:00midnight.

FE-2 Reiter performed the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

CDR Lopez-Alegria, FE-1 Tyurin and Thomas Reiter, before breakfast, performed their fourth periodic Russian biomedical assessments PZEh-MO-7 (Calf Volume Measurement) and PZEh-MO-8 (Body Mass Measurement), using the IM mass measurement device, later breaking it down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference points, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G, where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

Mike L-A started his second seven-day SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) sleep log and questionnaire entries in the experiment's laptop application, later downloading data and initializing the device for another run. Afterwards, L-A will power down the HRF1 laptop. *[The*

experiment is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the CDR's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the CDR as well as his patterns of sleep and activity throughout the Expedition.]

Reiter is scheduled to set up the new ESA experiment CASPER (Cardiac Adapted Sleep Parameter Electrocardiogram Recorder) and, later in the day, to conduct pre-sleep ops and activation before sleeptime. *[CASPER monitors the heart rates of the ISS crewmembers while they sleep in order to determine if there is any physiological reason for sleep disturbances. To supplement this data, the crewmembers complete questionnaires before and after their sleep period. The data collected from this investigation may help develop countermeasures for future long duration missions and patients on Earth who suffer from sleep disturbances. For this purpose, CASPER combines objective physiological data and subjective inputs. Physiological data is obtained through a specially adapted vest, worn by the astronaut, with embedded sensors and cabling that connects ECG (Electrocardiogram) electrodes, for measuring heart rate, to a PDA for storing the heart rate data. Subjective inputs are obtained via a questionnaire, which runs on the same PDA. A questionnaire is completed both prior to and after each sleep period that the heart rate is measured.]*

Preparations continued for next week's EVA-17 (11/22) which will be preceded by the usual spacewalk dry run. The CDR and FE-1 gathered and began readying and inspecting the replaceable components (OTA) and auxiliary gear for their particular Orlan "skafandr" suits (#25 & #27), including portable O₂ tanks (BK-3), storage batteries, LiOH canisters, moisture collectors, KVO liquid cooling garments, ShL-10 headsets, GP-10K gloves, BK-10 undergarments, socks, filters for feedwater lines (FOR), IK Orlan measurement unit and BOS degassing pump, etc.

Tyurin will also prepare the Glisser video equipment for the spacewalk, supported by ground specialist tagup.

L-A and Misha will also spent ~30-min. on a joint review of the EVA timeline and discussed particulars with ground specialists.

In the Lab, Reiter set up the batteries of the ERB (Erasmus Recording Binocular) experiment in the Cannon dual lithium ion battery charger for the 4-hr. charging process for another "Prolyot" (Fly through) session tomorrow. *[ERB is a three-dimensional (3-D) video camera being employed for taking imagery of the environment onboard the ISS. The images will be used to create an accurate map of the station's interior. For deriving an accurate model of the interior, specialists will use the images from the ERB, the Sony PD-150P video camera and the Nikon*

3-D still camera.]

Thomas is also scheduled to complete his 7th session of the regular monthly ETD (Eye Tracking Device) experiment, which studies the coordination of eye and head movements in zero-G, i.e. the adaptation of the human vestibular (balance) system, and takes place in the Docking Compartment (DC-1)'s central sphere. *[After a calibration with the calibrating unit, the experiment investigates horizontal eye and head movement coordination, measures Listing's plane, and determines the orientation of the vestibulo-ocular coordinate system, using five target marks on a visual target board on the EV-2 hatch on the horizontal plane. For the experiment, Thomas first had to check the setup of the left and right video cameras, then established his most comfortable and stable body position relative to the visual target (60 cm for the first part of the experiment, 100 to 150 cm in parts two & three). Each step required another prior calibration run, using visual target cues or the calibration unit.]*

The CDR has 2h10m timelined for unpacking and stowing US cargo items unloaded from Progress M-58/23P, keeping track of items and locations in the IMS (Inventory Management System).

Over RGS (Russian Ground Site) at ~7:50pm, Thomas will run another VHF-1 (Russian: UKV-1) voice communications test with the ground to check the external telephone link with the Columbus Control Center (COL-CC) at Oberpfaffenhofen near Munich/Germany.

Thomas is to perform the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

Reiter will also conduct the daily update/edit of the standard IMS (Inventory Management System) "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The crewmembers are to work out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, the FE-2 copies his, Misha's and L-A's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

No CEO (Crew Earth Observations) targets uplinked for today.

CEO photography can be viewed and studied at the websites:

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<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

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ISS Orbit (*as of this morning, 7:42am EST [= epoch]*):

Mean altitude -- 336.0 km

Apogee height -- 343.9 km

Perigee height -- 328.1 km

Period -- 91.25 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0011734

Solar Beta Angle -- -69.5 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 75 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45672

Significant Events Ahead (all dates Eastern and subject to change):

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02/06/07 -- US EVA-7

02/07/07 -- Progress M-59/24P launch

02/09/07 -- Progress M-59/24P docking (DC1)

02/10/07 -- US EVA-8

03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

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06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3

09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/12/06
Date: Sunday, November 12, 2006 9:43:02 AM
Attachments:

ISS On-Orbit Status 11/12/06

All ISS systems continue to function nominally, except those noted previously or below. *Sunday -- off-duty day for CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Thomas Reiter, except for regular maintenance and voluntary work. Ahead: Week 8 of Increment 14.*

Sleep cycle shifting for the crew continued with today's wakeup time delayed by another 3.5 hours (from 5:00am to 8:30am EST). Sleep time tonight has moved from 8:30pm to 12:00midnight. *[Day/night cycle will continue to be shifted in one more step to 8:20am EST wakeup on 11/22, sleep time to 5:40am on 11/23. The EVA, estimated at 5h 45m duration, will begin on 11/22 with EV hatch opening at 6:00pm, ending with hatch closing at 11:45pm.]*

CDR Lopez-Alegria's first job was to support the deactivation of the CDRA (Carbon Dioxide Removal Assembly) by disconnecting its LTL (Low Temperature Loop) cooling supply line at the Lab AR (Atmosphere Revitalization) Rack.

FE-2 Reiter performed the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

FE-1 Tyurin completed the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the Service Module (SM), including the ASU toilet facilities systems/replaceables.

Working off his discretionary "free time" task list, in the DC1 docking compartment Mikhail collected the periodic readings on the MOSFET (metal oxide semiconductor field-effect transistor) radiation sensor reader/display of the Matryoshka-R anthropomorphic (human torso) "phantoms" located inside the ISS. *[The complex*

Matryoshka payload suite is designed for sophisticated radiation studies. Besides the Phantom Sphere containers in the SM, the human torso in the DC1 is equipped with individual horizontal slice-like layers with 356 thermoluminescent detectors (TLDs) and five nuclear radiation tracking detectors (NTDPs). The mannequin is covered with a "poncho" and "hood" and used for studies of on-orbit radiation and long-term dose accumulation. The payload collects radiation measurements every 15 minutes of each hour around the clock. Note: Matryoshka is the name for the traditional Russian set of nested dolls.]

Reiter and Lopez-Alegria will have their weekly PFCs (private family conferences) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop, currently SSC-8 in the Lab at portside), Thomas at 10:15am EST, L-A at 12:10pm.

The crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR) and VELO bike with bungee cord load trainer (FE-1).

SPHERES ground team uplink to Mike L-A re yesterday's task: *"Thanks for your great work on SPHERES – the Payload community really enjoyed working with you on it"*.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

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From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/11/06
Date: Saturday, November 11, 2006 11:17:11 AM
Attachments:

ISS On-Orbit Status 11/11/06

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 14 crew CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Thomas Reiter.*

In preparation for the Orlan EVA on 11/22, the phased sleep cycle shifting for the crew began today with a wakeup time delayed by 4 hours (from 1:00 to 5:00am EST). Sleep time tonight has moved from 4:30pm to 8:30pm (to last until 8:30am tomorrow morning). *[Day/night cycle will continue to be shifted in two more steps to 8:20am EST wakeup on 11/22, sleep time to 5:40am on 11/23. The EVA, estimated at 5h 45m duration, will begin on 11/22 with EV hatch opening at 6:00pm, ending with hatch closing at 11:45pm.]*

After the late wakeup, Reiter performed the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

The crew conducted the regular weekly three-hour task of thorough station cleaning, wearing protective garment. *["Uborka", normally done every Saturday, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with "Fungistat" disinfectant wipes; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

As part of today's *uborka*, the crew replaced the four dust filters (PF1-4) in the SM, two dust filters (PS1, PS2) in the *Funktsionalnyi-Grusovoi Blok* (FGB) and cleaned the mesh screens of the FGB's central ventilation fans (TsV1 & TsV2), with the fans

running (in earlier years they were first turned off by the ground).

FE-1 Tyurin completed the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables and today also the weekly BRPK air/liquid condensate separator apparatus inspection.

At ~8:00am EST, the crew engaged in their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

On the MEC (Medical Equipment Computer), the CDR filled out the regular weekly FFQ (Food Frequency Questionnaire), his sixth, which keeps a personalized log of his nutritional intake over time on special MEC software. *[The FFQ records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

Mike L-A also handled the regular maintenance reboots on the SSC (Station Support Computer) File Server and OCA Comm Router laptops as well as the weekly PCS (Portable Computer System) A31p laptops.

The FE-1 performed the periodic (about twice a month) replenishing of the Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water from an EDV containing water from the BKO multifiltration/purification column unit. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh-8 Liquid Unit where they could cause Elektron shutdown. Procedure: the BKO water is carefully transferred with a pump (BP), located behind SM panel 420, from the EDV-1 through the air/liquid separator unit (GZhS) into the empty EDV-2 while the crewmember checks for any air bubbles accumulating in the GZhS (and, if visible, estimates their number, with no more than two 1 cm diameter bubbles permitted in EDV-2). Elektron water is also supplied from U.S. technical water in a CWC (contingency water container) that is checked for its contents of air bubbles and is rejected if the estimated total air bubble volume is more than 30 cubic centimeters (1 cm air bubble is about 0.5 ccm). CWCs can hold condensate, technical or potable water. Raw condensate is either processed through the SRV-K condensate water processor system into potable water or is used directly for flush water in the ASU toilet system.]*

As his first voluntary "Saturday Science" session, CDR Lopez-Alegria conducted another 2.5-hr. SPHERES experiment run. *[SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellites) is designed to demonstrate the*

basics of formation flight and autonomous docking, using a beacon as reference for the first satellite, to fly formation with or dock to the beacon. Incremental tests include basic attitude control (performing a series of rotations), attitude-only tracking, attitude and range tracking, and docking with handheld beacon. The payload consists of up to three self-contained 8-inch dia. free-floating satellites which perform the various algorithms (control sequences), commanded and observed by the crew members which provide feedback to shape algorithm development. Each satellite has 12 thrusters and a tank with CO₂ for propellant.

The first tests have used only one satellite (plus two beacons – one mounted and one hand-held); the second satellite arrived on ULF1.1, the third will be delivered on 12A.1. Formation flight and autonomous docking are important enabling technologies for distributed architectures. For today, L-A set up Work Area, dimmed GLA (General Luminaire Assemblies), programmed and deployed satellites, and used the SSC to command execution of tests. SPHERES operations require the CDRA operating in dual-bed or single-bed mode. If the CDRA is not working properly, the Environmental Control and Life Support System (ECLSS) group will conduct an assessment to verify the ppCO₂ flight rule requirement. Time Critical: S-band AOS was required for crew to check CDRA status with MCC-H. Ku-band AOS was required for real-time video downlink during portions of the session.]

The crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Thomas Reiter copied his, Misha's and L-A's exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~9:50am, Misha Tyurin had his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop, currently SSC-8 in the Lab at portside).

Weekly Science Update (*Expedition Fourteen -- 7th*):

ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS): Off-nominal encountered during ALTEINO activities on 10/26-27 smaller files than expected on last memory card. Check of the ALTEINO device by the crew is being planned.

ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System): CNSM troubleshooting (new pc card and fiber optics) successfully completed. DOSI running in Normal 10 configuration

BASE: Complete.

BCAT-3 (Binary Colloidal Alloy Test-3): Planned.

CARD (Investigating Mechanisms of Heart Disease in Micro-G, ESA): CARD activities on 10/31 were confirmed to be completed very successfully. CARD experiment session 2 on-going on 11/09 and 11/10. The CARD experiment is not affected by the RC failure to cool

CBOSS (Cellular Biotechnology Support Systems): Complete.

CFE (Capillary Flow Experiment): Complete.

CULT (Cultural Factors Questionnaire): Fifth session for Thomas Reiter was performed nominally on 11/1.

DAFT (Dust & Aerosol Measurement Feasibility Test): Complete.

Earth Knowledge Acquired by Middle School Students (EarthKAM): 24th ISS session terminated today. 108 schools and 6585 students participated. Over 2000 images downlinked.

ETD (Eye Tracking Device): Seventh session for Reiter currently planned on 11/13.

GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology): Planned

IMMUNO (Saliva Sampling): First session with Thomas Reiter performed nominally on 10/30. IMMUNO samples have been inserted in MELFI.

LEUKIN: Complete.

MISSE (Materials ISS Experiment): Ongoing.

MTR-2 (Russian radiation measurements): Passive dosimeters measurements in DC1 "PIRS".

NOA (Nitric Oxide Analyzer): During session performed by Thomas Reiter on

11/03, the PLATON device showed an error message E2120. Upon investigation on-ground between DAMEC and PD, the conclusion is that the E2120 is not an error message, but rather normal behavior under specific circumstances (calculated concentration of exhaled sample below 5ppb, i.e. stated detection limit of device). Next (tenth) session is currently planned on 11/16.

Nutrition: Thanks to Mike L-A for completing another run.

PK-3 (Plasma Crystal 3): Second set of experiments with Thomas Reiter was completed nominally last week between 10/16 and 10/20.

POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G): Planned.

RC (Refrigerated Centrifuge): Planned.

RS (Renal Stone): Planned.

SAMPLE: Complete.

SEM (Space Experiment Module): Successfully completed off task list. The SEM pictures have been downlinked and are in DIMS.

SLEEP: Thanks to Mike L-A for his support.

SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite): Today on "Saturday Science".

Swab (Characterization of Microorganisms & Allergens in Spacecraft): Planned.

TROPI (Study of Novel Sensory Mechanism in Root Phototropism): The second Tropi science run was completed successfully.

YING (Yeast in No Gravity): Complete.

CEO (Crew Earth Observations): Task list.

No CEO (Crew Earth Observation) targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

Significant Events Ahead (all dates Eastern and subject to change):

11/22/06 -- Russian EVA-17 (3-9pm)
11/30/06 -- ISS Reboost (~4.2 m/s)
12/07/06 -- STS-116/12A.1 launch (9:35pm EST)
12/09/06 -- STS-116/12A.1 docking (7:35pm)
12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss
12/16/06 -- STS-116/12A.1 undocking (4:19pm)
12/18/06 -- STS-116/12A.1 landing @ KSC
01/10/07 -- Progress M-57/22P undocking (DC1) & reentry
02/02/07 -- US EVA-6
02/06/07 -- US EVA-7
02/07/07 -- Progress M-59/24P launch
02/09/07 -- Progress M-59/24P docking (DC1)
02/10/07 -- US EVA-8
03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses
03/18/07 -- STS-117/13A docking
03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/?/?/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/10/06
Date: Friday, November 10, 2006 11:47:23 AM
Attachments:

ISS On-Orbit Status 11/10/06

All ISS systems continue to function nominally, except those noted previously or below.

After wakeup (1:00am EST), FE-2 Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

Preparations for the Orlan EVA-17 on 11/22 continue. Today CDR Lopez-Alegria (EV2) and FE-1 Tyurin (EV1) performed the mandatory Russian pre-EVA MedOps procedure MO-6 (hand-cycle ergometry) in the Service Module (SM), assisting each other in turn and supported by tagup with ground specialists who are to clear them for spacewalking. *[Because cosmonauts in previous Russian programs have shown noticeable decrease in arm muscle tone, TsUP/IBMP (MCC-Moscow/Institute of Biomedical Problems) physical fitness experts have groundruled the handgrip/arm tolerance test analysis (hand ergometry) a standard pre-Orlan EVA requirement. For MO-6, the subject dons the ECG (electrocardiogram) biomed harness, attaches three skin electrodes and plugs the harness into the PKO medical exam panel on the cycle ergometer. The other crewmember assists. The 30-min exercise itself starts after 10 seconds of complete rest, by manually rotating the cycle's pedals, set at 150 W, backwards until "complete exhaustion".]*

Also for the spacewalk, Tyurin conducted a teleconference at ~3:15am EST with ground specialists to discuss specifics of his scheduled GOLF demo outside the DC1 Docking Compartment. *[Purpose of the event was to "inform the public at large about the upcoming 'Golf shot around the World' event dedicated to the 200th Anniversary of establishing diplomatic ties between Russia and the United States; and to commemorate the golf shot of Alan Shepard, Jr. on the Moon"]*

Later, Misha took situational photographs and video of his BTN-M1 “Neutron” control box installation and the configuration of the SKK removable cassette containers #9 for materials samples exposure, to be swapped with the currently exposed SKK. *[The photo/video documentation was downlinked for ground inspection.]*

In addition, the two Orlan spacewalkers prepared the EVA bundle of hardware and tools, dimensionally fitted to be taken outside through the EV hatch. Photo/video was recorded of the resulting configuration for TsUP/Moscow.

Meanwhile, Reiter conducted the second day of the ESA cardiological experiment CARD (Long Term Microgravity: A Model for Investigating Mechanisms of Heart Disease), his second run, powering up the PFM/PAM (Pulse Frequency Modulated/Payload Accommodation Manager) used previously for PFS (Pulmonary Function System), and then started the cardiac experiment by donning the Russian CDL Holter Arterial Blood Pressure (BP) instrument, performing the CARD breathing protocol and collecting blood samples for subsequent insertion in the MELFI (Minus-Eighty Laboratory Freezer for ISS) for freezing. Afterwards, Thomas closed out Holter ops, cleaned the RC (Refrigerator Centrifuge) and powered down the CARD laptop. *[Astronauts experience lowered blood volume and pressure during space missions due to relaxation of the cardiovascular system in microgravity which may be a result from decreased fluid and sodium in the body. CARD examines the relationship between salt intake and the cardiovascular system when exposed to the microgravity environment and explores whether blood pressure & volume can be restored to the same levels that were measured during groundbased measurements by adding additional salt to the crew’s food. Results from this may lead to new health safety measures for astronauts to protect them on long duration missions.]*

CDR Lopez-Alegria concluded his 3rd session with the new NASA/JSC experiment NUTRITION (of 8 planned), finishing the required 24-hour data collection by securing the last urine specimen for immediate placement in the MELFI (Minus-Eighty Laboratory Freezer for ISS) freezer. The equipment was then disassembled and stowed. *[The Clinical Nutritional Assessment profile, currently required on all U.S. Astronauts, collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing in-flight samples and an additional postflight sample. Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional*

status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]

The FE-2 worked on the ESA/RSC-Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS), conducting the regular periodic health check. *[ALTCRISS uses the ACT spectrometer employed by VC8 guest cosmonaut Roberto Vittori last year in the DC1 for the Italian LAZIO (Low Altitude Zone/Ionization Observatory) experiment.]*

On the prime BITS2-12 onboard telemetry measurement system's central processor subsystem (PTsB, TA968MA), the FE-1 replaced the PZUB-1S data storage unit with the newer PZUB-1M version delivered on 23P.

L-A completed the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

Working off his voluntary "free time" task list, Tyurin performed the daily update/edit of the standard IMS (Inventory Management System) "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

Misha also collected post-docking cabin air readings in the ISS with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system of the SM SOGS (Pressure Control & Atmospheric Monitoring System). *[GANK tests for Methane (CH₄), Ammonia (NH₃), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO₂), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

In the Node, Reiter removed and replaced the failed SD2 smoke detector BBA (Baseplate Ballast Assembly) with a new spare.

The FE-2 also performed troubleshooting on the PCS (Portable Computer System) and replaced a failed A31p laptop currently located in the Airlock. *[This PCS failed to boot up during the monthly PCS reboot activity on 11/3. The applicable Flight Rule requires a minimum of four working PCS machines in preparation for 12A.1.]*

The CDR modified the onboard NH₃ (ammonia) vent tool to prevent seal damage

and allow proper connection.

L-A completed the periodic (~weekly) atmospheric status check for ppO₂ (Partial Pressure Oxygen) and ppCO₂ (pp Carbon Dioxide), taking CSA-CP (Compound Specific Analyzer-Combustion Products) readings and also using the CSA-O₂ (Compound Specific Analyzer-Oxygen Sensor) and CDMK (CO₂ Monitoring Kit).

[CSA-CP measurements were gathered with units #1053 & #1055 in Progress 23P, CSA-O2 (#1042, #1063) in the Lab, and CDMK (#1009) in SM and Lab. The instruments were turned off afterwards and returned to their regular locations.]

In support of ground commanded CDRA (Carbon Dioxide Removal Assembly) activation for the upcoming CO₂-propelled SPHERES experiment (as “Saturday Science”) and to control increased CO₂ levels, Mike L-A connected the LTL (low temperature loop) of the Lab ITCS (Internal Thermal Control System).

At ~3:00am EST, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~2:00pm, the crew conducted their regular weekly tagup with the Lead Flight Director at MCC-H/JSC.

At ~2:55pm, L-A and Thomas tagged up with the ground to discuss the elements of the HDTV downlinks on 11/15.

The crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR) and VELO bike with bungee cord load trainer (FE-1). Reiter’s exercise today was part of his CARD assessment session on the TVIS (see above).

Afterwards, L-A transferred his, Reiter’s and Misha’s exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Today’s CEO photo targets, from the Lab nadir/science window, were **Tunis, Tunisia** (*ISS had a nadir pass in good light over the Tunisian capital centered near 36.48N 10.11E. Using the long lens settings to map the urban margins*), **Mississippi Delta Region** (*trying for a nadir mapping pass for contextual views of*

*this target area centered near 30.0N 90.0W. Mapping for land use along the river from just west of New Orleans then up river as far as Baton Rouge), and **Sevilleta Wildlife Area, New Mexico** (this Long Term Ecological Research [LTER] Site is centered right of track near 34.5N 106.8W. Using the long lens setting to map in detail along the Rio Grande River from just south of Albuquerque then northward to near Taos).*

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 6:51am EST [= epoch]*):

Mean altitude -- 336.4 km

Apogee height -- 344.5 km

Perigee height -- 328.3 km

Period -- 91.26 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0012035

Solar Beta Angle -- -62.6 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 75 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45624

Significant Events Ahead (all dates Eastern and subject to change):

11/22/06 -- Russian EVA-17 (3-9pm)

11/30/06 -- ISS Reboost

12/07/06 -- STS-116/12A.1 launch

12/09-16/06 -- STS-116/12A.1 docked mission w/ISS -- P5 truss

12/18/06 -- STS-116/12A.1 landing @ KSC

01/10/07 -- Progress M-57/22P undocking (DC1) & reentry

02/02/07 -- US EVA-6

02/06/07 -- US EVA-7

02/07/07 -- Progress M-59/24P launch

02/09/07 -- Progress M-59/24P docking (DC1)

02/10/07 -- US EVA-8

03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

03/16/07 -- STS-117/13A launch -- S3/S4 trusses

03/18/07 – STS-117/13A docking
03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/09/06
Date: Thursday, November 09, 2006 5:38:51 PM
Attachments:

ISS On-Orbit Status 11/09/06

All ISS systems continue to function nominally, except those noted previously or below.

After wakeup (1:00am EST), before breakfast & first exercise, CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Thomas Reiter completed the regular monthly session with the Russian crew health-monitoring program's medical assessment MO-9/Biochemical Urinalysis. Afterwards, Reiter stowed the Urolux hardware. *[MO-9 is conducted every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

Also before breakfast, Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

Thomas set up the new portable equipment for the ESA science payload CARD (Long Term Microgravity: A Model for Investigating Mechanisms of Heart Disease) and then started his second session of the cardiac experiment by donning the Russian CDL Holter Arterial Blood Pressure (BP) instrument and taking the first BP measurements, to be continued through tomorrow. He is also required by the CARD protocol to perform several double rebreathing sessions using special rubber breathing bags. The CARD laptop will be powered down before sleep time tonight. *[Astronauts experience lowered blood volume and pressure during space missions due to relaxation of the cardiovascular system in microgravity which may*

be a result from decreased fluid and sodium in the body. CARD examines the relationship between salt intake and the cardiovascular system when exposed to the microgravity environment and explores whether blood pressure & volume can be restored to the same levels that were measured during groundbased measurements by adding additional salt to the crew's food. Results from this may lead to new health safety measures for astronauts to protect them on long duration missions.]

Lopez-Alegria completed the third day of the new NASA/JSC experiment NUTRITION, for which he had to forego exercising and food intake for eight hours. During the session, he collected urine samples for immediate insertion into the MELFI (Minus-Eighty Laboratory Freezer for ISS) freezer. The RC was later powered off after a temperature reset to limit wear on the compressor, and cleaned. *[Background: The Clinical Nutritional Assessment profile, currently required on all U.S. Astronauts, collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing inflight samples and an additional postflight sample. Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

The CDR and FE-1 took the CHeCS emergency medical operations OBT (on-board training) drill, a 30-min. exercise to refresh their Crew Medical Officer (CMO)'s acuity in applying ACLS (advanced cardio life support) in an emergency and other procedures. Today's computer-based proficiency drill focused on a review of nosebleed treatment and laceration closure.

In the extensive preparations for the Orlan EVA on 11/22, Mike L-A and Misha Tyurin today had 3 hrs set aside to search for and gather all Russian hardware and tools required for the spacewalk. The activity was supported by ground specialist tagup.

Also in prepping for EVA-17, the FE-1 took the assembled Russian "Glisser" video equipment through a thorough test/checkout. After close-out, the "Glisser" batteries

were set up for recharging and later stowed away with the torn-down gear. *["Glisser" will play a special role during the spacewalk since the system will have to record Tyurin's attempts to demonstrate hitting a golf ball in space.]*

Thomas Reiter meanwhile performed the periodic (monthly) functional closure test of a spare emergency vacuum valve (AVK) for the Vozdukh CO₂ removal system, in the spare parts kit. *[The AVKs are critical because they close the Vozdukh's vacuum access lines in the event of a malfunction in the regular vacuum valves (BVK) or a depressurization in the Vozdukh valve panel (BOA). Access to vacuum is required to vent carbon dioxide (CO₂) during the regeneration of the absorbent cartridges (PP). During nominal operation, the AVK valves remain open.]*

The CDR completed the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

Working from his discretionary task list, the FE-1 performed the daily update/edit of the standard IMS (Inventory Management System) "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

A second task from the "time available" list for the FE-1 was the replacement of lighting units in the SD1-7 light fixtures of the DC1 Docking Compartment with spares.

L-A conducted the weekly audit/inventory of the available CWCs (collapsible water containers) and their contents, to keep track of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week. The current cue card lists 33 water containers (~1131 liters total) for the four types of water identified on board: technical water (for Elektron, flushing, hygiene; ~945 liters), potable water (~129 liters), condensate water (for processing, 28.03 liters) and other (TCS fluid, EMU waste water, 28.6 liters). Water was delivered by 12A and is re-supplied from processed condensate. There is no water on 23P.]*

The FE-2 continued another session of the extensive task of prepacking hardware for return to Earth on 12A.1, with about 3h50m hours scheduled for today.

The crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR) and VELO bike with bungee cord load trainer (FE-1). Reiter's exercise today was part of his CARD assessment session on the TVIS (see above).

Afterwards, Tyurin transferred his, Reiter's and L-A's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~3:15am EST, Mikhail conducted a PAO TV interview with the Russian "Rossia" channel on the 30th Anniversary of the Russian Pop group "Zemlyane".

At ~12:40pm, Thomas had his weekly PFC (Private Family Conference) via S-band/ audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop, currently SSC-8 in the Lab at portside).

Significant Events Ahead (all dates Eastern and subject to change):

11/22/06 -- Russian EVA-17 (3-9pm)

11/30/06 -- ISS Reboost

12/07/06 -- STS-116/12A.1 launch

12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss

12/18/06 -- STS-116/12A.1 landing @ KSC

01/10/07 -- Progress M-57/22P undocking (DC1) & reentry

02/02/07 -- US EVA-6

02/06/07 -- US EVA-7

02/07/07 -- Progress M-59/24P launch

02/09/07 -- Progress M-59/24P docking (DC1)

02/10/07 -- US EVA-8

03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

03/16/07 -- STS-117/13A launch -- S3/S4 trusses

03/18/07 -- STS-117/13A docking

03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

????/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

04/06/07 -- Progress M-59/24P undocking (DC1) & reentry

04/09/07 -- Progress M-60/25P launch

04/11/07 -- Progress M-60/25P docking (DC1)

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3

09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/08/06
Date: Wednesday, November 08, 2006 1:12:16 PM
Attachments:

ISS On-Orbit Status 11/08/06

All ISS systems continue to function nominally, except those noted previously or below.

Before breakfast, FE-2 Thomas Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

The German Flight Engineer also underwent his first Russian blood chemistry analysis test PZE MO-11, assisted by FE-1 Mikhail Tyurin as CMO (Crew Medical Officer) as required. The exam was performed with the kits and accessories of the Reflotron-4 blood analyzer and supported by tagup with ground specialists. *[Earlier Reflotron versions have operated already on space station Mir. For the test, Reiter imbibed 250 ml of warm water or plain (unsweetened) tea, after which fresh blood was drawn from his finger with an Autoclix mini-lancet and a Reflotron pipette. Clinical data were then determined from the collected sample. Using various reagent tabs, the blood is tested with strips (KPI) for such parameters as hemoglobin, glucose, bilirubin, amylase, uric acid, triglycerides, urea, creatinin, cholesterol, etc. The tubes with blood samples were temporarily kept cool for the subsequent (post-breakfast) analysis. Reflotron-4 uses 40 W of power, supplied by the Service Module (SM)'s electrical system.]*

Thomas also broke out and set up the equipment for tomorrow's (11/9) planned "Urolux" biochemical urine test (PZE MO-9) for the two FEs. *[MO-9 is conducted regularly every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for US crewmembers for IMG (Integrated Medical Group) PHS evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. The data are then entered in the Medical Equipment*

Computer (MEC)'s special IFEP software (In-Flight Examination Program).]

CDR Lopez-Alegria completed the second day of the new NASA/JSC experiment NUTRITION, for which he had to forego exercising and food intake for eight hours. During the session, he collected blood samples (assisted by FE-2 Reiter), which were first spun in the RC (Refrigerated Centrifuge) and then placed in MELFI (Minus-Eighty Laboratory Freezer for ISS). The RC was later powered off after a temperature reset to limit wear on the compressor, and cleaned. The equipment for tomorrow's urine collections was then set up. *[Background: The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing inflight samples and an additional postflight sample. Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

Repeating his first MedOps WinSCAT (Spaceflight Cognitive Assessment Tool) session, Mike L-A logged in on the MEC (Medical Equipment Computer) and performed the psychological evaluation exercise on the laptop-based WinSCAT experiment. *[WinSCAT is a time-constrained questionnaire test of cognitive abilities, routinely performed by astronauts aboard the ISS every 30 days before or after the PHS (periodic health status) test or on special CDR's, crewmembers or flight surgeons request.]*

L-A conducted the periodic status check on the ALTEA (Anomalous Long-Term Effects on Astronauts) payload, using the ELC4 (EXPRESS Rack 4) laptop with the revised software, inspecting the dosimetry LEDs (light emitting diodes) and checking whether the hardware is securely mounted. *[Purpose of ALTEA is to define and measure descriptors for the electrophysiological brain functioning and to follow their dynamics, correlating it with space environments. The originally planned CNSM (Central Nervous System Monitoring) sessions by a crewmember wearing a helmet for a 32-channel EEG system has not yet been performed due to a data transfer problem. ALTEA has to date operated only in its long-term unmanned mode of real-time particle flux dosimetry (DOSI mode) inside the ISS using six*

particle detectors (originally introduced on Mir).]

The FE-2 conducted the second 2-hr. photo/video session of the ERB (Erasmus Recording Binocular) experiment, taking mapping imagery of the interior of the "Pirs" Docking Compartment (DC1) with three cameras for high accuracy, as prescribed by ESA's "Prolyot" (Fly-through) scenario. *[ERB uses a three-dimensional (3-D) video camera, the Sony DSR PD150P camcorder and a Nikon SSM-3DC-101 3D photo camera for taking imagery of the environment onboard the ISS for an accurate map of the station's interior. The images will be transferred by a computer application into a 3D model to be viewed in the Virtual Reality Theater of ESA's Erasmus Center.]*

In the Russian segment (RS), FE-1 Tyurin gathered and set up the Russian "Glisser" video equipment for test activities scheduled tomorrow, configuring the system, then charging the camcorder batteries and later tearing the gear down.

Thomas Reiter performed outfitting in the SM by installing a new IP-1 airflow sensor in the hatchway between the PrK (transfer tunnel) and the Progress M-58/23P cargo ship docked at the aft port.

Mike L-A and Misha Tyurin had 2h20m to review and study flight procedures and a preliminary timeline for the Orlan EVA-17 on 11/22, including viewing an illustrative DVD video clip. *[Between tomorrow (11/09) and then, the crewmembers will have their hands full with gathering Russian EVA hardware and tools, conducting testing on the "Glisser" video system (important for recording the contractual GOLF activity), conducting the MO-6 medical assessment on two comm passes, preparing BTN-M1 and the SKK-9 exposure cassette, putting together the EVA equipment "cluster", preparing the Orlan ORUs, auxiliary equipment and personal gear, configuring the Orlans, including changing arms on Orlan #25, check out the suits and equipment, and do final preparations for the spacewalk. Crew sleep cycle will be shifted gradually to 8:20am EST wakeup (from currently 1:00am), sleep time 5:40am (from currently 4:30pm). The EVA, estimated at 5h 45m duration, will begin on 11/22 with EV hatch opening at 6:00pm, ending with hatch closing at 11:45pm. Objectives of the spacewalk are: (1) GOLF demo, (2) BTN-M1 installation on SM (small diameter section), (3) installation of WAL2 antenna adapter bracket, (4) inspection of the Strela-2 crane retention mechanisms and bolt assemblies, and (5) "Panorama" photography as time permits.]*

Thomas completed the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables and today also the weekly BRPK air/liquid condensate separator apparatus inspection.

Mikhail performed the daily update/edit of the standard IMS (Inventory Management System) "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

After yesterday's first training activity by the two FEs for the RPM photo/video observations at STS-116/12A.1 arrival, the crew today conducted a 15-min teleconference with ground specialists to discuss the images downlinked yesterday. *[During the RPM at ~600 ft from the station, Misha and Thomas will have ~90 seconds for taking high-resolution digital photographs of all tile areas and door seals on the Orbiter, to be downlinked for launch debris assessment. The crew will be wearing headsets on extension cables for communicating during the maneuver. Positioned at SM windows 6 & 8 and facing toward the FGB hatch, the crewmembers today practiced with the DCS 760 digital cameras, switching lenses (400mm & 800mm) and using manual focusing (in case there is a problem with autofocus). The ground will evaluate the downlinked images obtained today and provide feedback. More OBTs will then be scheduled.]*

The FE-2 continued another session of the extensive task of prepacking hardware for return to Earth on 12A.1, with about 1h55m hours scheduled for today.

The CDR did the periodic (once per month) routine inspection of the RED (Resistive Exercise Device) with canister cords, squat harness components, and accessory straps, and the canister bolts for re-tightening if required.

Mike L-A also performed the weekly maintenance on the TVIS treadmill, primarily checking the condition of the SPDs (subject positioning devices) and recording time & date values.

The crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (FE-2), TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (CDR) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A transferred his, Reiter's and Tyurin's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

The crew yesterday reported a water leak in the BRPK-1 air/liquid condensate separator apparatus inspection. They also crew received error messages when they tried to switch over to BRPK-2 and it would not start. TsUP/Moscow has deactivated the SM SKV air conditioner system and the SRVK condensate water processor, which generate and process condensate, and are developing

troubleshooting plans.

Today's CEO photo targets, from the Lab nadir/science window, were **Tunis, Tunisia** (*ISS had a near nadir pass in good light and weather over the Tunisian capital city. It is situated on a large bay on the north coast near 36.5N 9.9E. As the station approached the Mediterranean coast from the SW, the crew was to shoot just right of track and use the long lens to map the urban area in detail*), and **Barringer Impact Crater** (*the crew had a nadir pass in good light and fair weather over this small impact site located just south of Interstate 40 between Winslow and Flagstaff, Arizona. Center point is near 35.0N 111.0W.*)

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 7:13am EST [= epoch]*):

Mean altitude -- 336.6 km

Apogee height -- 344.7 km

Perigee height -- 328.4 km

Period -- 91.26 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0012196

Solar Beta Angle -- -54.5 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 78 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45592

Significant Events Ahead (all dates Eastern and subject to change):

11/22/06 -- Russian EVA-17 (3-9pm)

11/30/06 -- ISS Reboost

12/07/06 -- STS-116/12A.1 launch

12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss

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02/06/07 -- US EVA-7

02/07/07 -- Progress M-59/24P launch

02/09/07 -- Progress M-59/24P docking (DC1)

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??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
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04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/07/06
Date: Tuesday, November 07, 2006 12:42:18 PM
Attachments:

ISS On-Orbit Status 11/07/06

All ISS systems continue to function nominally, except those noted previously or below.

Before breakfast, FE-2 Thomas Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

The crew began preparations for the Orlan EVA on 11/22, today removing cargo items from the Service Module Transfer Compartment (SM PkhO) and the "Pirs" Docking Compartment (DC1) while tracking transfers in the IMS (Inventory Management System) and then configuring the DC1. *[Payload hardware disassembled and relocated from the DC1 particularly involved the LAZIO (Low Altitude Zone/Ionization Observatory) experiment.]*

After starting up the DOUG (Dynamic Onboard Ubiquitous Graphics) application, CDR Lopez-Alegria conducted the pre-12A.1 L-30 day checkout of the MSS (Mobile Service System), supplementing yesterday's checkout by the ground. The ground subsequently used the SSRMS (Space Station Remote Manipulator System) for a survey of the P6 truss 4B array blanket box. Later, the CDR disconnected the UOP DCP (utility outlet panel/display & control panel) bypass power cable at the Lab RWS (Robotics Work Station). *[DOUG is a software program on the MSS RWS laptops that provides a graphical birdseye-view image of the external station configuration and the SSRMS arm, showing its real-time location and configuration on a laptop during its operation.]*

FE-1 Tyurin conducted the third 1.5-hr part of outfitting the Russian BKS Onboard Cable Network in the Service Module (SM) with newly installed and connected cabling for the future BTN-M1 "NEUTRON" science equipment. Afterwards, Mikhail

also installed the BTN-ME control box for the experiment. *[BTN-M1 will be mounted on the outside of the SM during the upcoming Russian EVA-17. Extensive new cabling was necessary to connect the experiment with an external antenna and to the onboard control system. NEUTRON, along with the "Vsplesk" experiment (to be launched later), will create a physical model of charged and neutral particles generated during solar bursts and of the neutron albedo of the Earth atmosphere considering solar and geophysical aspects.]*

In the Lab, Reiter set up the batteries of the ERB (Erasmus Recording Binocular) experiment in the Cannon dual lithium ion battery charger for the 4-hr. charging process for another "Prolyot" (Fly through) session tomorrow. *[ERB is a three-dimensional (3-D) video camera being employed for taking imagery of the environment onboard the ISS. The images will be used to create an accurate map of the station's interior. For deriving an accurate model of the interior, specialists will use the images from the ERB, the Sony PD-150P video camera and the Nikon 3-D still camera.]*

CDR Lopez-Alegria assembled his equipment for another session (the second) with the NASA/JSC-sponsored NUTRITION experiment. For tomorrow its protocol requires him to forego exercising and eating 8 hours before drawing his blood samples. *[Background: The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing inflight samples and an additional postflight sample. Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection, normative markers of nutritional assessment, and a return session plus 30-day (R +30) session to allow evaluation of post-flight nutrition and implications for rehabilitation. (Note: To date, it has not been possible to assess nutritional status during flight because blood and urine could not be collected, stowed frozen, and returned during ISS missions. MELFI (Minus-Eighty Laboratory Freezer for ISS) now makes it possible.]*

Later in the afternoon, Thomas Reiter set up the equipment for the Russian MedOps biochemical blood test MO-11, consisting of the Reflotron IV analyzer, with accessories, power supply and Reflotron IV kit. He also prepared equipment for

blood collection and dosing as well as test strips (KPI) for investigating blood components such as hemoglobin, glucose, bilirubin, aspartate aminotransferase, alanine aminotransferase, pancreatic amylase, and glutamyltranspeptidase. After connecting it to the power supply and performing a calibration run using test strips, he deactivated the instrument and left it fully configured at the work site until tomorrow morning. *[Thomas will undergo the 2.5-hr. tests tomorrow (11/8), preceded by imbibing 250 ml of warm water or plain (unsugared) tea 20 minutes before taking the blood samples, assisted by Tyurin.]*

The CDR completed the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

Mike L-A also performed the daily update/edit of the standard IMS "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

After setting up the video camcorder to cover their activities, the two Flight Engineers had 30 minutes scheduled for some OBT (onboard training) to hone their skill in photographing the Orbiter RPM (Rendezvous Pitch Maneuver) at STS-116/12A.1 arrival. *[During the RPM at ~600 ft from the station, the two ISS crewmembers will have ~90 seconds for taking high-resolution digital photographs of all tile areas and door seals, to be downlinked for launch debris assessment. The crew will be wearing headsets on extension cables for communicating during the maneuver. Positioned at SM windows 6 & 8 and facing toward the FGB hatch, the crewmembers today practiced with the DCS 760 digital cameras, switching lenses (400mm & 800mm) and using manual focusing (in case there is a problem with autofocus). The ground will evaluate the downlinked CEO images obtained today and provide feedback. More OBTs will then be scheduled.]*

FE-2 Reiter continued the extensive task, begun yesterday, of prepacking hardware for return to Earth on 12A.1, with about four hours scheduled for today.

The crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A transferred his, Reiter's and Tyurin's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~4:20am EST, Thomas supported another LDM (Long-Duration Mission)/PAO video downlink event, a press conference with representatives from industry and interested media assembled at ESTEC (European Space & Technology Centre) in Noordwijk/Netherlands. *[The audio/video connection was made by the SM's automated onboard program sequencer (SPP) over RGS (Russian Ground Site), and the VHF-1/TV signal was routed from there through TsUP/Moscow and Oostankino TV satellite to ESTEC via IGS network.]*

A suggestion for a new "Saturday Science" program for CDR Lopez-Alegria was uplinked for his perusal and response, dealing with another SPHERES experiment run. *[SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellites) is designed to demonstrate the basics of formation flight and autonomous docking, using a beacon as reference for the first satellite, to fly formation with or dock to the beacon. Incremental tests include basic attitude control (performing a series of rotations), attitude-only tracking, attitude and range tracking, and docking with handheld beacon. The payload consists of up to three self-contained 8-inch dia. free-floating satellites which perform the various algorithms (control sequences), commanded and observed by the crew members which provide feedback to shape algorithm development. Each satellite has 12 thrusters and a tank with CO₂ for propellant. The first tests have used only one satellite (plus two beacons – one mounted and one hand-held); the second satellite arrived on ULF1.1, the third will be delivered on 12A.1. Formation flight and autonomous docking are important enabling technologies for distributed architectures.]*

Update on S-band String 1: Troubleshooting on the intermittent S-Band String 1 forward link anomaly continues in both HDR (High Data Rate Mode) and LDR (Low Data Rate Mode). A FIT (Flight Investigation Team) meeting is planned for tomorrow.

Heads-up on ZPM (Zero Propellant Maneuver): The ZPM on Sunday was successfully performed, after a last-minute correction of mass properties data to account for the relocation of the MT (Mobile Transporter). A series of attitude maneuver command /rate command pairs transitioned the ISS to the desired attitude in approximately 2 hours. The station was maneuvered 102 degrees in yaw, to Torque Equilibrium Attitude (TEA). The highest CMG momentum observed was 69% of CMG capacity. An estimated 8 kg of propellant were conserved.

Today's CEO photo targets, from the Lab nadir/science window, were **Red River Basin, TX** *(researchers are collaborating with the University of Texas, Dallas on collecting data on the water sheds around Lake Texoma and the Red River. Changes are occurring here because of major alterations in water resources from dam construction, sediment transfer due to soil erosion, and the diversion of increasing amounts of water for urban and agricultural uses. The crew was to pay*

*particular attention to the water levels in the Lake Texoma as North Texas experienced a very dry summer this year. Center point for the target box that has been defined for the Red River Basin is 34.25N, 119.91W), and **Santa Barbara Coast, California** (the Santa Barbara Coastal LTER [Long Term Ecological Research] site is located in the coastal zone of southern California near Santa Barbara. It is bounded by the steep east-west trending Santa Ynez Mountains and coastal plain to the north and the unique Northern Channel Islands archipelago to the south. Point Conception, where the coast of California returns to a N to S orientation, lies at the western boundary, and the Santa Clara River marks its eastern edge. The site lies on the active boundary of the Pacific Oceanic Plate and the North American Continental Plate. High levels of tectonic activity have created dramatic elevation gradients in both the terrestrial and the underwater landscapes of the site. Mapping strip documenting land use change. The center point for the target box that we have defined for the Santa Barbara Coast is 34.5N, 119.91W).*

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 3:59am EST [= epoch]*):

Mean altitude -- 336.6 km

Apogee height -- 344.9 km

Perigee height -- 328.4 km

Period -- 91.27 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0012341

Solar Beta Angle -- -49.9 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 100 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45574

Significant Events Ahead (all dates Eastern and subject to change):

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11/30/06 -- ISS Reboost

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01/10/07 -- Progress M-57/22P undocking (DC1) & reentry

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02/09/07 -- Progress M-59/24P docking (DC1)
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03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
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??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
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06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/06/06
Date: Monday, November 06, 2006 1:43:06 PM
Attachments:

ISS On-Orbit Status 11/06/06

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 7 of Increment 14.*

After wakeup, FE-2 Thomas Reiter performed the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

Supplementing his first 7-day participation in the SLEEP experiment (Sleep-Wake Actigraphy & Light Exposure during Spaceflight), CDR Michael Lopez-Alegria set up photo/video equipment to take pictures and video of his sleep bunk area. *[The documentation was requested by the SLEEP ground team to help correlate L-A's sleep environment with information from the Actiwatch and Sleep Logs. SLEEP has monitored his sleep/wake patterns and light exposure, using a special Actiwatch device worn by the CDR which measures the light levels encountered by him as well as his patterns of sleep and activity throughout the Expedition.]*

FE-1 Tyurin conducted the second part (~4.5-hr) of outfitting the Russian BKS Onboard Cable Network in the Service Module (SM) with newly routed, installed & connected cabling for the future BTN-M1 "NEUTRON" science equipment. FE-2 Reiter provided assistance for the installation. The activities, which also included making connections with the BITS2-12 onboard telemetry measurement system, were supported by ground specialist tagup. *[BTN-M1 will be mounted on the outside of the SM during the upcoming Russian EVA-17. Extensive new cabling is necessary to connect the experiment with an external antenna and to the onboard control system. NEUTRON, along with the "Vsplesk" experiment (to be launched later), will create a physical model of charged and neutral particles generated during solar bursts and of the neutron albedo of the Earth atmosphere considering solar and geophysical aspects.]*

Reiter worked on the Service Module (SM)'s IK0501 gas analyzer (GA) of the SOGS Pressure Control & Atmospheric Monitoring System, deactivating the unit and replacing its BF carbon dioxide (CO₂) filter assembly with a new unit from FGB stowage (replaced last: 9/25). *[After ensuring good seals on the instrument's base and no leaks around the installed filter, Thomas reactivated the GA and stowed the spent BF for disposal. IK0501 is an automated system for measuring CO₂, O₂, and H₂O in the air as well as the flow rate of the gas being analyzed.]*

At ~3:25am EST, Lopez-Alegria and Reiter discussed with ground specialists the upcoming job of prepacking cargo for return on STS-116/12A.1. They then began the activity, which today had about 4 hrs set aside between the two.

In preparation of the MSS (Mobile Service System) pre-12A.1 (L-30d) checkout tomorrow, Mike L-A connected the UOP DCP (utility outlet panel/display & control panel) bypass power cable at the Lab RWS (Robotics Work Station) and then reviewed the applicable DOUG (Dynamic Onboard Ubiquitous Graphics) software. *[DOUG is a special application running on the MSS RWS (Robotics Work Station) laptops that provides a graphical birdseye-view image of the external station configuration and the SSRMS arm, showing its real-time location and configuration on a laptop during its operation.]*

The CDR also spent two hours unpacking and stowing US cargo items unloaded from Progress M-58/23P.

Over RGS (Russian Ground Site) at ~4:10am, Thomas ran another VHF-1 (Russian: UKV-1) voice communications test with the ground to check the external telephone link with the Columbus Control Center (COL-CC) at Oberpfaffenhofen near Munich/Germany.

With the Elektron oxygen generator running nominally, Mikhail Tyurin performed the periodic (about twice a month) replenishing of the (still inoperable) Elektron's water supply for electrolysis, filling the KOV thermal loops' EDV container with water from an EDV containing water from the BKO multifiltration/purification column unit. *[The 40-minute procedure is specially designed to prevent air bubbles larger than ~10 mm from getting into the BZh-8 Liquid Unit where they could cause Elektron shutdown. Procedure: the BKO water is carefully transferred with a pump (BP), located behind SM panel 420, from the EDV-1 through the air/liquid separator unit (GZhS) into the empty EDV-2 while the crewmember checks for any air bubbles accumulating in the GZhS (and, if visible, estimates their number, with no more than two 1 cm diameter bubbles permitted in EDV-2). Elektron water is also supplied from U.S. technical water in a CWC (contingency water container) that is checked*

for its contents of air bubbles and is rejected if the estimated total air bubble volume is more than 30 cubic centimeters (1 cm air bubble is about 0.5 ccm). CWCs can hold condensate, technical or potable water. Raw condensate is either processed through the SRV-K condensate water processor system into potable water or is used directly for flush water in the ASU toilet system.]

Afterwards, the FE-1 conducted the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the Service Module (SM), including the ASU toilet facilities systems/replaceables.

Misha also did the daily update/edit of the standard IMS “delta file”, including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

To prepare themselves for the Orbiter RPM (R-Bar Pitch Maneuver) photography at arrival of STS-116/12A.1, Tyurin and Reiter undertook their first 30-min skill training, positioned at SM windows #6 & #8 as during the actual RPM. *[The two FEs, equipped with comm headsets, used DCS760 digital still cameras with 400 and 800mm lenses for shooting CEO (Crew Earth Observation) targets overlapping 40% to 50% with a frame rate of 1.5-2 seconds and using manual focus only. Halfway through, they were to switch cameras, and later downlink the images to the ground for evaluation by specialists.]*

The crew worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1, FE-2).

Afterwards, L-A transferred his, Reiter’s and Tyurin’s exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Update on S-band String 1: No determination/resolution yet. Troubleshooting of String 1, which has an intermittent/failed forward link, was conducted over the weekend. Results and next steps will be discussed by JSC engineers on Wednesday (11/8) morning.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are

downloaded by the public each month from this "Gateway" site);
<http://earthobservatory.nasa.gov/>
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 5:14am EST [= epoch]*):

Mean altitude -- 336.7 km
Apogee height -- 345.1 km
Perigee height -- 328.4 km
Period -- 91.27 min.
Inclination (to Equator) -- 51.63 deg
Eccentricity -- 0.0012388
Solar Beta Angle -- -45.2 deg (magnitude increasing)
Orbits per 24-hr. day -- 15.78
Mean altitude loss in last 24 hours -- 158 m
Revolutions since FGB/Zarya launch (Nov. 98) -- 45560

Significant Events Ahead (all dates Eastern and subject to change):

11/22/06 -- Russian EVA-17 (3-9pm)
11/30/06 -- ISS Reboost
12/07/06 -- STS-116/12A.1 launch
12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss
12/18/06 -- STS-116/12A.1 landing @ KSC
01/10/07 -- Progress M-57/22P undocking (DC1) & reentry
02/02/07 -- US EVA-6
02/06/07 -- US EVA-7
02/07/07 -- Progress M-59/24P launch
02/09/07 -- Progress M-59/24P docking (DC1)
02/10/07 -- US EVA-8
03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses
03/18/07 -- STS-117/13A docking
03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/05/06
Date: Sunday, November 05, 2006 11:30:43 AM
Attachments: [image002.gif](#)

ISS On-Orbit Status 11/05/06

All ISS systems continue to function nominally, except those noted previously or below. *Sunday -- off-duty day for CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Thomas Reiter, except for regular maintenance and voluntary work. Ahead: Week 7 of Increment 14.*

After wakeup, FE-2 Reiter performed the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

Tyurin conducted the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the Service Module (SM), including the ASU toilet facilities systems/replaceables, the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/Moscow, and today the weekly BRPK air/liquid condensate separator apparatus inspection.

The FE-1 also performed the periodic channel calibration/adjustment on the SM's IK0501 gas analyzer. *[IK0501 is an automated system for measuring CO₂, O₂, and H₂O in the air as well as the flow rate of the gas being analyzed.]*

Afterwards, Misha deactivated the gas analyzer in the Soyuz TMA-9/13S crew return vehicle's Descent Module (SA), docked at the FGB nadir port, which he had turned on on 11/2 as a periodic monitoring task.

The CDR completed the microbial (bacterial and fungal) T+5 Day analysis of air samples collected on 10/31 with the MAS (Microbial Air Sampler) kit in Lab, Node and SM. *[The sampling analysis is performed once per month for the first three months, and once every three months thereafter. Bacterial and fungal air samples are taken at two locations in each module. The colony growth on the sampling slides is analyzed after five days of incubation in 4 Petri dishes. For onboard visual analysis of media slides from SSK, MCDs (microbial capture devices) from WMK, coliform detection bags from MWAK, and Petri dishes from MAS, the crew has a procedure for visual inspection of samples for bacterial and fungal colony growths after appropriate incubation periods.]*

The crew worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR) and VELO bike with bungee cord load trainer (FE-1).

At ~9:10am EST, Reiter had his weekly PFC (private family conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop, currently SSC-8 in the Lab at portside).

At ~10:57am, the ISS began the Zero Propellant Maneuver (ZPM). Lasting until 12:57pm (i.e. two hours), it takes the vehicle at a snail's pace through a yaw angle of 90 deg from +XVV (+x-axis in velocity vector, flying nose forward) to +YVV (+y-axis in VV, flying sideways) using only CMGs (Control Moment Gyroscopes). *[The ZPM is a new technique developed by JSC Engineering/Draper personnel. With sufficient CMG momentum (and time!), attitude maneuvers can be performed without the use of thrusters, thus conserving precious props. In ZPM, a series of attitude & turning rate command pairs transition the ISS from an initial attitude/rate/momentum state to a desired final state under the constraints of bounded CMG momentum and gimbal rates. If there are issues with the execution of ZPM, a propulsive attitude control command will be issued to maintain attitude control. The station will remain in +YVV +ZLV TEA (+z-axis in local vertical/Torque Equilibrium Attitude) momentum management until the Progress thruster test scheduled for 11/8.]*

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from

this "Gateway" site);

<http://earthobservatory.nasa.gov/>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (as of this morning, 4:55am EST [= epoch]):

Mean altitude -- 336.9 km

Apogee height -- 345.3 km

Perigee height -- 328.5 km

Period -- 91.27 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0012506

Solar Beta Angle -- -40.4 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.78

Mean altitude loss in last 24 hours -- 100 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45544

Significant Events Ahead (all dates Eastern and subject to change):

11/22/06 -- Russian EVA-17 (3-9pm)

11/30/06 -- ISS Reboost

12/07/06 -- STS-116/12A.1 launch

12/09-16/06 -- STS-116/12A.1 docked mission w/ISS -- P5 truss

12/18/06 -- STS-116/12A.1 landing @ KSC

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02/02/07 -- US EVA-6

02/06/07 -- US EVA-7

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??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

04/06/07 -- Progress M-59/24P undocking (DC1) & reentry

04/09/07 -- Progress M-60/25P launch

04/11/07 -- Progress M-60/25P docking (DC1)

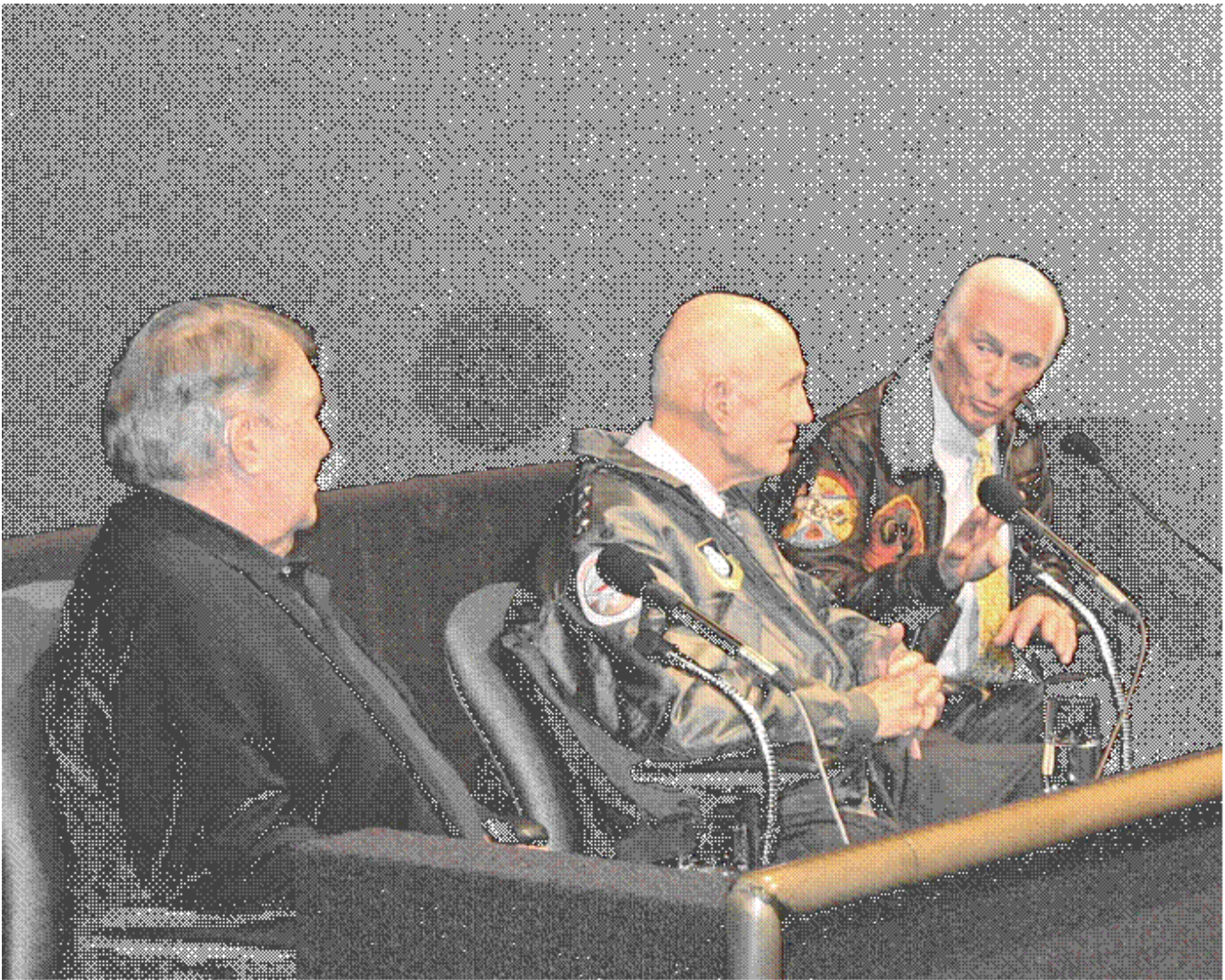
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3

09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

Today's bonus:

The pleasure of their company: Great NASA Astronauts at the NASM on 11/3 -

Wally Schirra (Apollo 7, etc.), Thomas Stafford (Apollo 10, etc.), Gene Cernan (Apollo 17, etc.):



From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/04/06
Date: Saturday, November 04, 2006 1:34:46 PM
Attachments:

ISS On-Orbit Status 11/04/06

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 14 crew CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Thomas Reiter.*

After wakeup (1:00am EST), Reiter performed the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

The crew conducted the regular weekly three-hour task of thorough station cleaning, wearing protective garment. *["Uborka", normally done every Saturday, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with "Fungistat" disinfectant wipes; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

Tyurin completed the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

At ~8:50am, the crew engaged in their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

Lopez-Alegria concluded the first session for Inc14 of the EarthKAM (Earth Knowledge Acquired by Middle School Students) experiment from the University of

California in San Diego, by shutting down, disassembling and stowing the hardware. School kids sent up a great special message of thanks to the crew. *[EarthKAM was activated on 10/30 to continue getting students interested in math and science and to inspire this next generation of explorers. The session was another smashing success: A total of 108 education groups participated, downlinking 1351+ images, from across the United States (95), Canada (2), United Kingdom (1), Columbia (1), Germany (2), France (1), Spain (1), Argentina (1), Japan (2) and South Korea (1), with a total of 6585 students participating. The payload ran without crew intervention, using a Kodak ESC 460C electronic still camera with 50mm or 180 mm lens, powered by 16Vdc from a 28 Vdc adapter, taking pictures by remote operation from the ground. It was available for students who submitted image requests and conduct geographic research. The requests were uplinked in a camera control file to the IBM A31p SSC laptop which then activated the camera at specified times and received the digital images from the camera's storage card on its hard drive, for subsequent downlink via OpsLAN.]*

The crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Mike L-A copied his, Mikhail's and Thomas's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~5:30am, Misha had his weekly PFC (private family conference) via S-band/ audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop, currently SSC-8 in the Lab at portside).

Zero Propellant Maneuver (ZPM) look-ahead: Tomorrow (11/5), an attitude maneuver from +XVV (+x-axis in velocity vector) to +YVV (i.e., 90 deg rotation) using only three CMGs (Control Moment Gyroscopes) will be executed in order to test/verify a potential new future prop-saving capability. [The procedure uses a sequence of attitude and turning rate commands uplinked in a file and then converted to a script of time-tagged commands for automated execution. If ZPM is aborted for any reason (e.g., higher-than-expected momentum values on the CMGs or undesirable CMG signatures), the regular USTO (US Thruster Only) controller would take over, which commands the Russian thrusters without requiring handover between MCSs (motion control systems).]

Weekly Science Update (Expedition Fourteen -- 6th):

ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS): Activities with ALTEINO have been performed on 10/26 (ALTEINO rotation) and 10/27 (memory card exchange/file downlink). Two off-nominal events have been encountered: smaller files than expected on last memory card (possible memory card formatting issue), and a pouch was wrongly positioned during the ALTEINO rotation. Although this pouch orientation does not impact science, it shall be rotated too.

ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System): Thanks was uplinked to the crew for troubleshooting ALTEA. PDs (Payload Developers) are evaluating the data.

BASE: Complete.

BCAT-3 (Binary Colloidal Alloy Test-3): Planned.

CARD (Investigating Mechanisms of Heart Disease in Micro-G, ESA): Six completed Rebreather sessions.

CBOSS (Cellular Biotechnology Support Systems): Complete.

CFE (Capillary Flow Experiment): Complete.

CULT (Cultural Factors Questionnaire): Fifth session for Thomas Reiter was performed nominally on 11/1.

DAFT (Dust & Aerosol Measurement Feasibility Test): Complete.

Earth Knowledge Acquired by Middle School Students (EarthKAM): 24th ISS session terminated today. 108 schools and 6585 students participated. Over 2000 images downlinked.

ETD (Eye Tracking Device): Sixth session for Thomas Reiter reported nominal on 10/25.

GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology): Planned

IMMUNO (Saliva Sampling): First session with Thomas Reiter performed nominally on 10/30. IMMUNO samples have been inserted in MELFI.

LEUKIN: Complete.

MISSE (Materials ISS Experiment): Ongoing.

MTR-2 (Russian radiation measurements): Passive dosimeters measurements in DC1 "PIRS".

NOA (Nitric Oxide Analyzer): The ninth session for Thomas Reiter was conducted on 11/03.

Nutrition: Planned.

PK-3 (Plasma Crystal 3): Second set of experiments with Thomas Reiter was completed nominally last week between 10/16 and 10/20.

POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G): Planned.

RC (Refrigerated Centrifuge): Planned.

RS (Renal Stone): Planned.

SAMPLE: Complete.

SEM (Space Experiment Module): Successfully completed off task list. The SEM pictures have been downlinked and are in DIMS.

SLEEP: In progress (from task list).

SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite): Planned.

Swab (Characterization of Microorganisms & Allergens in Spacecraft): Planned.

TROPI (Study of Novel Sensory Mechanism in Root Phototropism): The second Tropi science run was completed successfully.

YING (Yeast in No Gravity): Complete.

CEO (Crew Earth Observations): Through 10/29, the ground has received a total of 1009 of Inc14 CEO images for review and cataloging. *"The overall quality and composition of your photography is high. We've noted your recent long lens (800mm) sessions of San Diego. This is a good choice for a practice target. Good focus becomes easier in off-nadir views. Keep working on the nadir views. Your 400mm views have become consistently good now. You took some very nice shots*

of Mount Etna and its plume. We are continuing to try different types of visuals in our target lists to help you locate our sites. Feel free to let us know if these are helping and what works best.”

Today's CEO photo targets, from the Lab nadir/science window, were **Urumqui, China** (*ISS had a near-nadir pass in afternoon light and fair weather over this extremely remote city of 2 million people in western China. It is situated in a mountain pass of the Tien Shan Mountains near 43.48N 87.35E*), **Khartoum, Sudan** (*The crew had a nadir pass in high sun and good weather over the Sudanese capital. It is located at the confluence of the White Nile and Blue Nile Rivers near 15.36N 32.32E*), and **Barringer Impact Crater** (*ISS had a nadir pass in good light and fair weather over this small impact site located just south of Interstate 40 between Winslow and Flagstaff, Arizona. Center point is near 35.0N 111.0W*).

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<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

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ISS Orbit (*as of this morning, 6:06pm EST [= epoch]*):

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06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
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From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/03/06
Date: Friday, November 03, 2006 3:21:46 PM
Attachments:

ISS On-Orbit Status 11/03/06

All ISS systems continue to function nominally, except those noted previously or below.

Before breakfast, FE-2 Thomas Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

Afterwards, Reiter set up for his ninth (of 13 planned) biweekly NOA/Nitric Oxide Analyzer session and undertook the procedure, later downlinking the measurements from the RSE1 laptop to the ground via the BSR-TM telemetry channel. *[Purpose of the ESA experiment ESANO1, consisting of the "Platon" analyzer and its power supply, is to monitor expired nitric oxide (NO) in the subject's exhaled air to detect signs of airway inflammation and indications of venous gas emboli (bubbles) that may be caused by inhalation of pollutants in the closed environment of the ISS cabin and increased risk of decompression sickness.]*

As part of his regular monthly fitness evaluation, Mikhail Tyurin undertook his first session of the Russian MO-5 MedOps protocol of cardiovascular evaluation during graded exercises on the VELO cycle ergometer, assisted by the FE-2 as CMO (Crew Medical Officer). *[The assessment, supported by ground specialist tagup (VHF) and telemetry monitoring (today on Daily Orbit 1, 4:33am EST), uses the Gamma-1 ECG equipment with biomed harness, skin electrodes and a blood pressure and rheoplethysmograph cuff wired to the cycle ergometer's instrumentation panels. For the graded exercise, the subject works the pedals after a prescribed program at load settings of 125, 150, and 175 watts for three minutes each. Data output involves a kinetocardiogram, rheoplethysmogram, rheoencephalogram and a temporal pulsogram.]*

For Thomas Reiter, it was time for his first orthostatic hemodynamic endurance test session with the Russian Chibis suit, conducting the MedOps MO-4 exercise protocol in the below-the-waist reduced-pressure device (ODNT, US: LBNP). Mikhail assisted his crewmate as CMO (Crew Medical Officer), and the one-hour session was supported by tagup with a ground specialist via VHF at ~6:01am EST on DO2. *[The Chibis provides gravity-simulating stress to the body's cardiovascular/circulatory system for evaluation of Reiter's orthostatic tolerance (e. g., the Gauer-Henry reflex) after 17 weeks in zero-G. Data output include blood pressure readings.]*

CDR Lopez-Alegria had three hours scheduled to do the periodic thorough inspection of the Emergency Lighting Power Supply (ELPS) units in the U.S. segment (USOS). *[There are three ELPS units in the Node, two in the Lab, and one ELPS in the US Airlock. This activity had been on the unscheduled "job jar" task list before.]*

Also shown previously on the discretionary task list and scheduled today for Mike was the periodic inspection of station bacterial filters and smoke detectors in the Airlock (A/L) and the Node. *[There is one bacterial filter and smoke detector (SD) in the A/L, plus two SDs and one filter in the Node.]*

Thomas collected post-docking cabin air readings in the ISS with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system of the SM SOGS (Pressure Control & Atmospheric Monitoring System). *[GANK tests for Methane (CH₄), Ammonia (NH₃), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO₂), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN). Today's use of GANK included a resetting after an off-nominal deactivation on 10/5 that caused erroneous higher-than-normal CO readings.]*

After replacing CSA-CP (Compound Specific Analyzer-Combustion Products) batteries and pump with new spares resupplied by 23P, L-A performed the periodic (~weekly) atmospheric status check for ppO₂ (Partial Pressure Oxygen) and ppCO₂ (pp Carbon Dioxide), taking CSA-CP readings and also using the CSA-O₂ (Compound Specific Analyzer-Oxygen Sensor) and CDMK (CO₂ Monitoring Kit). *[CSA-CP measurements were gathered with unit #1043 (prime) at the SM Central Post and with #1045 (backup unit) in the Node, CSA-O2 (#1042, #1063) in the Lab, and CDMK (#1009) in SM and Lab. The instruments were turned off afterwards, except for the prime CSA-CP which continues to run.]*

FE-1 Tyurin conducted the first 3-hr part of outfitting the Russian BKS Onboard

Cable Network in the Service Module (SM) with newly installed and connected cabling for the future BTN-M1 "NEUTRON" science equipment. Additional cable installations are scheduled for Monday (11/6) and Tuesday (11/7). *[BTN-M1 will be mounted on the outside of the SM during the upcoming Russian EVA-17. Extensive new cabling is necessary to connect the experiment with an external antenna and to the onboard control system. NEUTRON, along with the "Vsplesk" experiment (to be launched later), will create a physical model of charged and neutral particles generated during solar bursts and of the neutron albedo of the Earth atmosphere considering solar and geophysical aspects.]*

Lopez-Alegria disconnected the ER1 (EXPRESS Rack 1) from the Lab ITCS (Internal Thermal Control System) at the RIP (Rack Interface Panel) of the overhead LABO2 rack. *[The disconnection was motivated by the persistent indication of a continuing small leak at the ER-1 thermal connection QD (quick disconnect). The MAMS (Microgravity Acceleration Measurement System) in the rack was therefore deactivated and ER1 powered off, followed by disconnection of the TCS loop. A forward plan for repairing the leak will be developed.]*

At ~8:20am EST, with thrusters inhibited due to MT (Mobile Transporter) loads constraints, the MT railcar was moved by ground commanding from WS3 (Worksite 3) to WS8 on truss segment P3 in preparation for the Flight 12A.1 pre-launch checkout on 11/8.

Afterwards, the CDR configured the SSRMS (Space Station Remote Manipulator System) Wrist Yaw Joint (WYJ) for the checkout and subsequently disconnected the UOP DCP (Utility Outlet Panel/Display & Control Panel) bypass power cable from the Lab Robotics Work Station (RWS). *[The WYJ was repositioned to point the LEE (Latching End Effector)-B away from the ISS velocity vector to protect against potential MMOD (Micrometeoroid/Orbital Debris) strikes. Pictures taken earlier of the LEE-A snare cable show that one of the cables is in a "mini S-curve" configuration; however, that does not affect operation of the unit, which is currently latched to the MBS (Mobile Base System) and is acceptable for the 12A.1 mission. MSS (Mobile Service System) was powered down by ground command at ~1:15pm.]*

L-A also completed the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables and today the weekly BRPK air/liquid condensate separator apparatus inspection.

Thomas performed the daily update/edit of the standard IMS (Inventory Management System) "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

At ~5:15am EST, Misha Tyurin linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing transfer details, stowage locations and bar code identifications for the IMS databases, as well as hardware slated for unpacking from 23P.

On the CEVIS (Cycle Ergometer with Vibration Isolation), the CDR performed the regular monthly maintenance, which deals mostly with an examination of the wire rope isolators for damage. One of the ropes was reported to be severed. *[This is a known and expected condition with adequate redundancy. The crew has been asked to provide pictures to ensure sufficient attached isolators are available for isolation of the RED from ISS structure. Spares are available onboard if needed.]*

The crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1). Tyurin's VELO exercise was part of his MO-5 cardiovascular assessment (see above).

Afterwards, L-A transferred his, Reiter's and Tyurin's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Also on the MEC, the CDR filled out the regular weekly FFQ (Food Frequency Questionnaire), his sixth, which keeps a personalized log of his nutritional intake over time on special MEC software. *[The FFQ records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

Mike L-A also handled the regular maintenance reboots on the SSC (Station Support Computer) File Server and OCA Comm Router laptops as well as the weekly PCS (Portable Computer System) A31p laptops.

The FE-1 unstowed and transferred, from the 23P cargo ship, the hardware for the new installment of the long-term BIO-5 Rasteniya-2 ("Plants-2") experiment which uses the Lada-10 greenhouse module to research growth & development of plants under spaceflight conditions. *[Misha set up the new root module, filled the water container, activated the system, configured the floppy disk and PCMCIA in the experiment's control computer (BU) for cultivation, conducted a hardware checkout and later powered down the system.]*

At ~5:00am, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~1:10pm, the crew conducted their regular weekly tagup with the Lead Flight Director at MCC-H/JSC.

At ~2:25pm, L-A is scheduled for his weekly PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop, currently SSC-8 in the Lab at portside).

At ~11:20am, the ground conducted a swap between two onboard computers, viz., transitioning INT-1 MDM (Interior Systems 1 Multiplexer/Demultiplexer) to Prime and INT-2 to Backup. *[INT 2 will lose power for a while during the cabling reconfiguration on 12A.1.]*

Update on PLD1 (Payload 1) MDM: After PLD1 lost health and status on Wednesday night, the MDM was power cycled yesterday and came back up to nominal state. Last night, it was returned to Prime status, as required for the STS-116/12A.1 mission.

Update on Control Moment Gyroscope 3 testing: Results of this week's CMG-3 testing are still being analyzed. A change in bearing dynamics was noted from drag torque data, but it is not well understood yet what changed. CMG-3's bearings are thought to be adequately lubricated, but it is not known whether the lube is good or degraded oil. Presently, there are no plans to return CMG-3 to operational status (i. e., spinning up to 6600 RPM and incorporating into the steering function) since more tests in micro-G are desired prior to returning the gyro into the gravity environment (potentially on Flight 1E).

Zero Propellant Maneuver (ZPM) look-ahead: On Sunday (11/5), an attitude maneuver from +XVV (+x-axis in velocity vector) to +YVV (i.e., 90 deg rotation) using only three CMGs (Control Moment Gyroscopes) will be executed in order to test/verify a potential new future prop-saving capability. *[The procedure uses a sequence of attitude and turning rate commands uplinked in a file and then converted to a script of time-tagged commands for automated execution. If ZPM is aborted for any reason (e.g., higher-than-expected momentum values on the CMGs or undesirable CMG signatures), the regular USTO (US Thruster Only) controller would take over, which commands the Russian thrusters without requiring handover between MCSs (motion control systems).]*

Update on EarthKAM (EK): In the currently running EarthKAM (Earth Knowledge Acquired by Middle School Students) session, EK is "going gangbusters": 108

schools with over 6000 students are directly involved. Scheduled are 1900+ images, with 814 already on the ground. *[EarthKAM was activated on 10/30, and the current session is the 24th aboard the ISS and the first on Increment 14. The payload runs without crew intervention through Saturday (11/4). EK is using a Kodak ESC 460C electronic still camera with 50mm and 180mm lenses, powered by 16Vdc from a 28 Vdc adapter, taking pictures by remote operation from the ground, without crew interaction. It is available for students who submit image requests and conduct geographic research (107 schools are currently signed up for participation). The requests are uplinked in a camera control file to the IBM 760XD SSC laptop which then activates the camera at specified times and receives the digital images from the camera's storage card on its hard drive, for subsequent downlink via OpsLAN.]*

Update on S-Band String 1: During the latest troubleshooting of S-Band String 1, whose forward link has suffered intermittent dropouts since 10/19, tests focusing on the XPDR-1 (Transponder 1) showed "mixed results". String 1 will be reactivated to run for ~36 hours over the weekend, followed by String 2 for the ZPM on 11/5 (see above), and then return to String 1 for the remainder of the week.

Today's CEO photo targets, from the Lab nadir/science window, were **Afar Rift Zone, Ethiopia** (*rifting of the African and Arabian plates in the past 30 million years has created a seismically unstable area where magma from below thins and causes stretching of the crust above. This also manifests itself as earthquakes in the local region. Nadir mapping swaths through this region is needed for baseline imagery. Center point of the box that has been defined for the Afar Rift zone is 10.5N, 42.5E*), **Gweni-Fada Impact Crater** (*ISS had a nadir pass over this landmark feature in northern Chad. Distinguished by its crescent shape, Gweni Fada is an eroded crater about 14 km in diameter [slightly larger than Aorounga] and has been dated as less than 345 million years. This crater is located within the Ennedi Plateau, southeast of the larger and darker Tibesti Plateau. Crew was to use the long lens settings for details of the impact structure. Center point is 17.4N, 21.75E*), and **Konza Prairie, Kansas** (*this Long Term Ecological Research [LTR] site is situated extends from N to S over much of eastern Kansas in an area also know as the Flint Hills. Because of its poorer, stony soils it is much less developed agriculturally than the rest of the state and has retained more of the grassland character of the U.S. Great Plains prior to the arrival of settlers. Shooting well left of track this pass between Oklahoma City and Kansas City for contextual views of this area centered near 39.1N 96.6W*).

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are

downloaded by the public each month from this "Gateway" site);
<http://earthobservatory.nasa.gov/>
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this noon, 12:06pm EST [= epoch]*):

Mean altitude -- 337.2 km
Apogee height -- 345.6 km
Perigee height -- 328.8 km
Period -- 91.28 min.
Inclination (to Equator) -- 51.63 deg
Eccentricity -- 0.0012524
Solar Beta Angle -- -30.5 deg (magnitude increasing)
Orbits per 24-hr. day -- 15.78
Mean altitude loss in last 24 hours -- 100 m
Revolutions since FGB/Zarya launch (Nov. 98) -- 45517

Significant Events Ahead (all dates Eastern and subject to change):

11/22/06 -- Russian EVA-17 (3-9pm)
11/30/06 -- ISS Reboost
12/07/06 -- STS-116/12A.1 launch
12/09-16/06 -- STS-116/12A.1 docked mission w/ISS -- P5 truss
12/18/06 -- STS-116/12A.1 landing @ KSC
01/10/07 -- Progress M-57/22P undocking (DC1) & reentry
02/02/07 -- US EVA-6
02/06/07 -- US EVA-7
02/07/07 -- Progress M-59/24P launch
02/09/07 -- Progress M-59/24P docking (DC1)
02/10/07 -- US EVA-8
03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses
03/18/07 -- STS-117/13A docking
03/20/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/02/06
Date: Thursday, November 02, 2006 3:41:03 PM
Attachments:

ISS On-Orbit Status 11/02/06

All ISS systems continue to function nominally, except those noted previously or below.

Before breakfast, FE-2 Thomas Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

Afterwards, Reiter conducted the second day of the ESA cardiological experiment CARD (Long Term Microgravity: A Model for Investigating Mechanisms of Heart Disease), powering up the PFM/PAM (Pulse Frequency Modulated/Payload Accommodation Manager) used previously for PFS (Pulmonary Function System), and then started the cardiac experiment by donning the Russian CDL Holter Arterial Blood Pressure (BP) instrument, performing the CARD breathing protocol and collecting blood samples for subsequent insertion in the MELFI (Minus-Eighty Laboratory Freezer for ISS) for freezing. Afterwards, Thomas closed out Holter ops, cleaned the RC (Refrigerator Centrifuge) and powered down the CARD laptop. *[Astronauts experience lowered blood volume and pressure during space missions due to relaxation of the cardiovascular system in microgravity which may be a result from decreased fluid and sodium in the body. CARD examines the relationship between salt intake and the cardiovascular system when exposed to the microgravity environment and explores whether blood pressure & volume can be restored to the same levels that were measured during groundbased measurements by adding additional salt to the crew's food. Results from this may lead to new health safety measures for astronauts to protect them on long duration missions.]*

FE-1 Mikhail Tyurin had 1.5 hrs to familiarize himself with procedures/instructions and set up the work site for a major outfitting activity on the Russian BKS Onboard

Cable Network for the future BTN-M1 "NEUTRON" science equipment. The new cable installations are scheduled for tomorrow (11/3) plus Monday and Tuesday of next week. *[BTN-M1 will be mounted on the outside of the SM during the upcoming Russian EVA-17. Extensive new cabling is necessary to connect the experiment with an external antenna and to the onboard control system. NEUTRON, along with the "Vsplesk" experiment (to be launched later), will create a physical model of charged and neutral particles generated during solar bursts and of the neutron albedo of the Earth atmosphere considering solar and geophysical aspects.]*

Working afterwards on the ASN-M satellite navigation system in the Service Module (SM), the FE-1 replaced the previously removed NVM-1 navigation computer behind panel 228 and NPM-3 navigation receiver module behind panel 338 with new units delivered on Progress M-58/23P and connected them to the BKS. *[The ASN-M satellite navigation system, Russia's equivalent of the U.S. GPS, will be required for the arrival of the European ATV (Automated Transfer Vehicle) "Jules Verne" next year.]*

Also in the SM, Tyurin later removed and replaced the electric current converter (PTAB-1M) on the #1 800A storage battery block (of eight) with a new PTAB brought up by 23P. The old unit was pre-packed for disposal. *[Each of the 800A batteries has its own charge/discharge unit (ZRU) which tracks 49 battery parameters and is designed to increase the operating life of the battery by setting up charging and discharging modes. Each ZRU is comprised of one battery current converter (PTAB), one PTAB control unit (BUPT), and three charge/discharge current integrators (MIRT-3).]*

Doing regular maintenance on the ASU toilet facilities in the SM, CDR Michael Lopez-Alegria completed the periodic replacement of the toilet's urine receptacle (MP) and filter insert (F-V), stowing the old units for disposal.

Lopez-Alegria worked with the MSS/SSRMS (Mobile Service System/Space Station Remote Manipulator System), completing the scheduled second-day maneuvers, assisted by the DOUG (Dynamic Onboard Ubiquitous Graphics) laptop application which today worked well, unlike yesterday. *[L-A today "walked off" the SSRMS inchworm-like for the second time, grappling PDGF-3 (Power & Data Grapple Fixture 3) at MT WS3 (Mobile Transporter/Worksite 3). After the ground had completed the base change, L-A released PDGF-4 and maneuvered the SSRMS to the MT translation configuration. Actual translation of the railcar by ground commanding is scheduled for tomorrow. The pre-12A.1 checkout of the MSS by the crew will then follow on 11/8.]*

FE-2 Thomas Reiter performed the routine task of shooting two photos of the SM

aft port's docking cone, used for the recent Progress M-58 link-up, a standard practice after Russian dockings. These images are used to refine current understanding of docking conditions. The pictures were later downlinked via OCA assets. *[The objective is to take photo imagery of the scratch or scuff mark left by the head of the docking probe on the internal surface of the drogue (docking cone) ring, now rotated out of the passageway. As other crewmembers before him, the FE-2 used the Nikon D1X digital still camera to take two pictures each with the hatch closed down]*

Mike L-A had two hours for gathering and configuring U.S. EVA tools to be used by him and Misha Tyurin during the EVA-17 on 11/22.

On the EMCS (European Modular Cultivation System), used from 10/20 till yesterday for TROPI (Analysis of a Novel Sensory Mechanism in Root Phototropism) experiment, the FE-2 replaced the empty AMSM (Air Mix Supply Module) supply tank with a fresh bottle. *[EMCS, delivered on ULF1.1, is a combination centrifuge/growth chamber that allows plant growth experiments to be carried out in controlled partial and microgravity conditions. Main research focus is on multi-generation (seed-to-seed) experiments, studies on gravity effects on early development and growth, and on signal perception and transduction in plant tropisms. Experiments with insects, amphibian and invertebrates as well as studies with cell and tissue cultures are also foreseen for EMCS.]*

Mike L-A conducted the periodic quick status check on the ALTEA (Anomalous Long-Term Effects on Astronauts) payload, using the ELC4 (EXPRESS Rack 4) laptop with the revised software, inspecting the dosimetry LEDs (light emitting diodes) and checking whether the hardware is securely mounted. Also working on ALTEA, Thomas continued hardware troubleshooting by replacing the system's optical data cable and its ELC4 PC card, afterwards running a test to verify proper functioning. *[Purpose of ALTEA is to define and measure descriptors for the electrophysiological brain functioning and to follow their dynamics, correlating it with space environments. The originally planned CNSM (Central Nervous System Monitoring) sessions by a crewmember wearing a helmet for a 32-channel EEG system has not yet been performed due to a data transfer problem. ALTEA has to date operated only in its long-term unmanned mode of real-time particle flux dosimetry (DOSI mode) inside the ISS using six particle detectors (originally introduced on Mir).]*

At ~10:20am EST, the crew conducted a science/research conference with Acting ISS Program Scientist Julie Robinson and colleagues. *[Points of discussion pertained to key data collection for major ongoing medical experiments (NUTRITION, SLEEP, etc.), sample collection/stow/return for biological experiments (SWAB, TROPI, GRAVI), education payloads, and ongoing rescheduling*

(SPHERES, Ultrasound Lite, ALTEA).]

L-A conducted the weekly audit/inventory of the available CWCs (collapsible water containers) and their contents, to keep track of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week. The current cue card lists 33 water containers (~1185 liters total) for the four types of water identified on board: technical water (for Elektron, flushing, hygiene; ~999.1 liters), potable water (~129 liters), condensate water (for processing, 28.03 liters) and other (TCS fluid, EMU waste water, 28.6 liters). Water was delivered by 12A and is re-supplied from processed condensate. There is no water on 23P.]*

Misha worked briefly in the Soyuz TMA-9/13S crew return vehicle, activating its gas analyzer (GA), a periodic monitoring event.

The CDR completed the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables and today the weekly BRPK air/liquid condensate separator apparatus inspection.

L-A also performed the daily update/edit of the standard IMS "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1). Thomas' treadmill exercise was incorporated in his CARD heart function assessment (see above).

Afterwards, L-A transferred his, Reiter's and Tyurin's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Zero Propellant Maneuver (ZPM): To test a potential new future prop-saving capability, an attitude maneuver from +XVV (+x-axis in velocity vector) to +YVV (i. e., 90 deg yaw rotation) using only three CMGs (Control Moment Gyroscopes) instead of thrusters will be executed on 11/5. *[The procedure uses a sequence of attitude and turning rate commands uplinked in a file and then converted to a script of time-tagged commands for automated execution. If ZPM is aborted for any reason (e.g., higher-than-expected momentum values on the CMGs or undesirable CMG signatures), the regular USTO (US Thruster Only) controller would take over, which commands the Russian thrusters without requiring handover between MCSs*

(motion control systems).]

Update on EarthKAM (EK): In the currently running EK (Earth Knowledge Acquired by Middle School Students) session, about 800 images have already been downlinked as of yesterday. [EarthKAM was activated on 10/30, and the current session is the 24th aboard the ISS and the first on Increment 14. The payload runs without crew intervention through Saturday (11/4). EK is using a Kodak ESC 460C electronic still camera with 50mm and 180mm lenses, powered by 16Vdc from a 28 Vdc adapter, taking pictures by remote operation from the ground, without crew interaction. It is available for students who submit image requests and conduct geographic research (107 schools are currently signed up for participation). The requests are uplinked in a camera control file to the IBM 760XD SSC laptop which then activates the camera at specified times and receives the digital images from the camera's storage card on its hard drive, for subsequent downlink via OpsLAN.]

Update on S-Band String 1: During the latest troubleshooting of S-Band String 1, whose forward link has suffered intermittent dropouts since 10/19, the problem disappeared yesterday after a power cycle of XPDR-1 (Transponder 1), and the system "was solid", functioning nominally. To see if the problem continues to be present, plans are to reactivate String 1 to run for ~36 hours over the weekend, then go to String 2 for the ZPM on 11/5 (see above), and afterwards switch back to String 1 for the remainder of the week.

Today's CEO photo targets, from the Lab nadir/science window, were **Somalia Coast** (*this target area is subject to dramatic vegetation green up during El Niño cycles, especially along the coast. Above normal rainfall has occurred over eastern equatorial Africa in recent months, possibly in response to the ongoing El Niño. This pass should have been early enough in the day to beat the diurnal sea breeze cloud formations. As ISS tracked NE-ward just inland from the coast, the crew was to shoot right of track and acquire a context mapping swath*), **Pinacates Biosphere Site, Northern Mexico** (*this extensive area of volcanic activity [cones and lava flows] is situated just inland from the Sea of Cortez in the Sonoran Desert of NW Mexico. It provides a unique habitat for fauna in flora in the region and has been designated as an ecological preserve by the government. Observers monitor this area for subtle seasonal changes in its appearance. Looking right of track to document the area in detail using the long lens settings*), **Upheaval Dome Impact Crater** (*this impact site is situated in the arid Canyon Lands area of eastern Utah, west of the San Juan Mountains, between the southward flowing Green River and the southwestward flowing Colorado River. It is about 10km in diameter and roughly 174 million years old. Looking left of track, east of the Green River and trying to get detailed views with the long lens*), and **Palmyra Atoll, Central Pacific** (*ISS had a near nadir pass in good light and fair weather over this oddly shaped atoll. Crew was to document with the long lens, the details of the coral reef*

structures of this island for use in an international database effort to map and monitor the Earth's coral reef environments).

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 6:58am EST [= epoch]*):

Mean altitude -- 337.3 km

Apogee height -- 345.7 km

Perigee height -- 328.9 km

Period -- 91.28 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0012515

Solar Beta Angle -- -25.5 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 94 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45497

Significant Events Ahead (all dates Eastern and subject to change):

11/22/06 -- Russian EVA-17 (3-9pm)

11/30/06 -- ISS Reboost

12/07/06 -- STS-116/12A.1 launch

12/09-16/06 -- STS-116/12A.1 docked mission w/ISS -- P5 truss

12/18/06 -- STS-116/12A.1 landing @ KSC

01/15/07 -- Progress M-57/22P undocking (DC1) & reentry

01/16/07 -- Progress M-59/24P launch

01/18/07 -- Progress M-59/24P docking (DC1)

02/02/07 -- US EVA-6

02/06/07 -- US EVA-7

02/10/07 -- US EVA-8

03/09/07 -- Progress M-58/23P undocking (SM aft port) & reentry

03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

04/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

03/18/07 -- STS-117/13A launch -- S3/S4 trusses

03/25/07 -- STS-117/13A undocking

04/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

04/06/07 -- Progress M-59/24P undocking (DC1) & reentry

04/09/07 -- Progress M-60/25P launch

04/11/07 -- Progress M-60/25P docking (DC1)

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3

09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 11/01/06
Date: Wednesday, November 01, 2006 3:56:43 PM
Attachments:

ISS On-Orbit Status 11/01/06

All ISS systems continue to function nominally, except those noted previously or below.

FE-1 Mikhail Tyurin began the day with the routine checkup of Docking Compartment (DC1) circuit breakers and fuses. *[The monthly checkup in the "Pirs" DC1 looks at AZS circuit breakers on the BVP Amp Switch Panel (they should all be On) and the LEDs (light-emitting diodes) of 14 fuses in Fuse Panels BPP-30 & BPP-36.]*

Before breakfast, FE-2 Thomas Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. Later, he also conducted the periodic skin measurements, to evaluate the past treatment, and filled out the experiment questionnaire. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit. The noninvasive medical equipment used by the experiment are the Tewameter (from TEWL = transepidermal water loss, one of the most important biophysical parameters for evaluating the efficiency of the human skin water barrier), the Corneometer (to accurately determine the hydration level of the skin surface) and the VisioScan which takes direct measurements of the skin topography (structure & level of dryness) with a special UV-A (Ultraviolet A) light video camera with high resolution.]*

In support of the ongoing TROPI (Analysis of a Novel Sensory Mechanism in Root Phototropism) experiment, started on 10/20, the FE-2 once more replaced the tape in the EMCS (European Modular Cultivation System) camcorder with a blank cassette, terminating TROPI Run 2. Reiter then installed new TROPI ECs (Experiment Containers, #FM019-026) with fresh samples in the EMCS centrifuge for Run 3. The Run 2 ECs were placed in EMCS Cold Stowage Bags at the MWA (Maintenance Work Area) and inserted in MELFI (Minus-Eighty Laboratory Freezer

for ISS) for freezing. Afterwards, Thomas powered down the EMCS and turned off the ELC3 (EXPRESS Rack 3 laptop). *[The tapes record the growth of the plants in the ECs. EMCS, delivered on ULF1.1, is a combination centrifuge/growth chamber that allows plant growth experiments to be carried out in controlled partial and microgravity conditions. Main research focus is on multi-generation (seed-to-seed) experiments, studies on gravity effects on early development and growth, and on signal perception and transduction in plant tropisms. Experiments with insects, amphibian and invertebrates as well as studies with cell and tissue cultures are also foreseen for EMCS. By sprouting seeds under different levels of partial gravity and different frequencies of light, this experiment should help to better understand the different systems used by plants to determine in what direction their roots and shoots should grow. In this NASA-sponsored study, Arabidopsis thaliana plants (or thale cress, with a small-sized genome which makes it useful for genetic mapping and sequencing) sprouted from seeds are video taped and mature plants are harvested. The ESA-sponsored adjunct experiment GRAVI (Threshold Acceleration for Gravisensing) experiment grows lentil seedling roots under various gravity conditions. Later, the mature plants will be analyzed at the molecular level to determine what genes are responsible for successful plant growth in microgravity. Insights gained from TROPI can lead to sustainable onboard agriculture for future long duration space missions.]*

In addition, Reiter set up the new portable equipment for the ESA science payload CARD (Long Term Microgravity: A Model for Investigating Mechanisms of Heart Disease) and then started the cardiac experiment by donning the Russian CDL Holter Arterial Blood Pressure (BP) instrument and taking the first BP measurements, to be continued through tomorrow. He is also required by the CARD protocol to perform several double rebreathing sessions using special rubber breathing bags. The CARD laptop will be powered down before sleep time tonight. *[Astronauts experience lowered blood volume and pressure during space missions due to relaxation of the cardiovascular system in microgravity which may be a result from decreased fluid and sodium in the body. CARD examines the relationship between salt intake and the cardiovascular system when exposed to the microgravity environment and explores whether blood pressure & volume can be restored to the same levels that were measured during groundbased measurements by adding additional salt to the crew's food. Results from this may lead to new health safety measures for astronauts to protect them on long duration missions.]*

Thomas brought the ESA experiment CULT up to date by filling out its "cultural" questionnaire on the RSE1 laptop, his fifth time. *[CULT is a study conducted currently by Russia for ESA. The multi-Increment investigation, which eventually will involve 12 subjects, including Thomas Reiter, is dedicated to the study of cultural aspects and different leadership styles of on-board crews as a function of*

mission duration, including interactions within multinational crews. Results from this experiment may provide valuable recommendations on how to interact with future multinational crews. The questionnaire is contained on a PCMCIA memory card, to be used for all subjects and sessions. Compressed data files are downlinked via OCA.]

For the MSS/SSRMS (Mobile Service System/Space Station Remote Manipulator System) maneuver activities today and tomorrow, CDR Michael Lopez-Alegria closed the Lab window shutter for protection, and then successfully performed the robotic operations, including snare cable troubleshooting, in conjunction with the ground. *[Today's activity was for L-A to "walk off" the SSRMS inchworm-like from the Lab PDGF (Power & Data Grapple Fixture) onto the MRS MBS (Mobile Remote Servicer/Mobile Base System) PDGF-4 at MT (Mobile Transporter) WS3 (Worksite 3), followed by detailed photography of the arm's LEE (Latching End Effector) "A" in an ongoing investigation of configuration issues with that LEE's snare cables. Tomorrow (11/2), the MT will be translated by remote control with the SSRMS out to WS8 on truss segment P3 in anticipation of the Flight 12A.1 pre-launch checkout. The activities were conducted without the (Dynamic Onboard Ubiquitous Graphics) application.]*

In addition, the CDR performed the scheduled lens change on the EarthKAM system at the Lab science window, going from 50mm to the 180mm-lens configuration. The lens change had to be performed while EarthKAM was not taking pictures. *[EarthKAM was activated on 10/30, and the current session is the 24th aboard the ISS and the first on Increment 14. The payload runs without crew intervention through Saturday (11/4). EK is using a Kodak ESC 460C electronic still camera with 50mm and 180mm lenses, powered by 16Vdc from a 28 Vdc adapter, taking pictures by remote operation from the ground, without crew interaction. It is available for students who submit image requests and conduct geographic research (107 schools are currently signed up for participation). The requests are uplinked in a camera control file to the IBM 760XD SSC laptop which then activates the camera at specified times and receives the digital images from the camera's storage card on its hard drive, for subsequent downlink via OpsLAN.]*

Mikhail set up and performed his second session with the Russian "Diatomeya" ocean observations program. *[Using the Nikon F5 digital still camera with 400mm-lens from window #8 and the Sony DSR PD-150P camcorder from window #7, Misha was to obtain characteristic data of the autumn bioproduction development process and current conditions for oceanologic observations, specifically algae blooms in the ocean, highly pronounced cloud cover anomalies, surface manifestations of the bottom activity (the "boiling" water effect), water dynamics (swirls, wakes of subsurface waves, water level drop, smoothing swaths in wave fields). Uplinked targets were the Eastern region of the tropical area of the Pacific*

Ocean, and the Caribbean and Sargasso Seas in the North Atlantic.]

The two Flight Engineers worked together on the second session of the LDM Astrolab educational experiment DVD-4 Demo, deferred from 10/27, with Thomas acting as demonstrator of the robotic program (ROBoT) and Misha as cameraman filming footage that will be used to produce a DVD lesson for use by teachers and their students aged 12-18 years across ESA member states. *[Four schools in Austria, Switzerland, Sweden and the UK are participating in filming accompanying on-ground demonstrations. DVD-4 continues a pedagogical series of lessons initiated on previous ESA missions.]*

The FE-1 conducted a hardware search for the GOLF experiment scheduled for the next Russian EVA (EVA-17, on 11/22). Supported by tagup with ground specialists, Tyurin then set up the video equipment in the Service Module (SM) and performed a simulated demo for the camera, with Lopez-Alegria assisting with the photo/video ops. The video was downlinked via RGS (Russian Ground Site), and the digital images will be transmitted to the ground via OCA in the near future. *[EVA-17 will be conducted by Misha (EV1) and L-A (EV2). The GOLF demo will be performed by Tyurin on the EVA ladder outside the "Pirs" DC1 by tapping the golf ball in its spring "tee" restraint mechanism with the golf club, while being videoed by the "Glisser" camcorder mounted on a special bracket on a DC1 handrail.]*

The two Flight Engineers had another 5h45m timelined between them for Progress unloading, cargo transfers and IMS (Inventory Management System) logging.

Thomas Reiter conducted the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables and today also the periodic (currently daily) checkout/verification of IP-1 airflow sensors in the various RS (Russian segment) hatchways in the SM, FGB and DC1.

Working off his discretionary "time permitting" task list, Misha did the daily update/edit of the standard IMS "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR) and VELO bike with bungee cord load trainer (FE-1). Thomas' treadmill exercise was incorporated in his CARD heart function assessment (see above).

Afterwards, L-A transferred his, Reiter's and Tyurin's exercise data files to the MEC

(Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

The unpacking and stowing of IMAK #1039 (ISS Medical Accessory Kit) delivered on Mission 12A scheduled yesterday was deferred to a later date. *[This activity had recently been on the discretionary "job jar" task list.]*

Today's CEO photo targets, from the Lab nadir/science window, were **Mozambique** (*regional development far from cities is what is occurring presently in Mozambique because of natural gas drilling. Observers are anticipating the development of infrastructure that will change the appearance of this area. Their goal is to acquire baseline imagery before the major development of this infrastructure occurs. The gas fields are located northeast of the capital city of Maputo. Center Point for this target is 24S, 34E*), **Delhi, India** (*Delhi is a little difficult to see as ISS approached because of haze. However, the closer the crew was to nadir the lower the opacity of the haze. Ground team members realized that by using the 400 mm lens the crew was probably not able to get the entire city in one frame. Because of the weather conditions this would not be a good day to try for anything other than detailed views of the infrastructure of the city. Center point is 28.4N, 77.14E*), **Afar Rift Zone, Ethiopia** (*the high jet stream clouds should clear out of this area at the time ISS passes over. Rifting of Africa and Arabia in the past 30 million years has created this rift zone, an area where magma from below thins the crust above and causes stretching of the crust above. This also manifests itself as earthquakes in the local region. Mapping pass through this region is needed for baseline imagery. Center point of the box that has been defined for the Afar Rift zone is 10.5N, 42.5E*), **Gweni-Fada Impact Crater** (*Gweni Fada is an eroded crater about 14 km in diameter [slightly larger than Aorounga] and has been dated as less than 345 million years. This crater is located within the Ennedi Plateau in the northeastern part of Chad. The Ennedi Plateau is located in the SE of the Tibesti Plateau. Center point is 17.4N, 21.75E*), and **Georgia Coastal Ecosystems** (*the GCE study area is a barrier island and marsh complex located on the central Georgia coast in the vicinity of Sapelo Island and the Altamaha River, one of the largest and least developed rivers on the east coast of the United States. Looking right of track for coastal areas and barrier islands. Documenting land use. Center point is 31.43N, 81.37W*).

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 4:17am EST [= epoch]*):

Mean altitude -- 337.4 km

Apogee height -- 345.9 km

Perigee height -- 328.9 km

Period -- 91.28 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0012666

Solar Beta Angle -- -20.5 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 123 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45480

Significant Events Ahead (all dates Eastern and subject to change):

11/03/06 -- ISS Reboost

11/22/06 -- Russian EVA-17 (3-9pm)

11/30/06 -- ISS Reboost

12/07/06 -- STS-116/12A.1 launch

12/09-16/06 -- STS-116/12A.1 docked mission w/ISS -- P5 truss

12/18/06 -- STS-116/12A.1 landing @ KSC

01/10/07 -- Progress M-57/22P undocking (DC1) & reentry

01/19/07 -- US EVA-6

01/23/07 -- US EVA-7

01/27/07 -- US EVA-8

02/07/07 -- Progress M-59/24P launch (may move to 01/18/07)

02/09/07 -- Progress M-59/24P docking (DC1)

03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

03/16/07 -- STS-117/13A launch -- S3/S4 trusses (NET; requires 14Slip)

03/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

????/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

04/06/07 -- Progress M-59/24P undocking (DC1) & reentry

04/09/07 -- Progress M-60/25P launch

04/11/07 -- Progress M-60/25P docking (DC1)

06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3

09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);
CC:
Subject: ISS On-Orbit Status 10/31/06
Date: Tuesday, October 31, 2006 4:04:48 PM
Attachments:

ISS On-Orbit Status 10/31/06

All ISS systems continue to function nominally, except those noted previously or below.

Before breakfast, CDR Lopez-Alegria performed the 24-hr. data registration of the acoustic dosimeters (body-worn and one static) deployed yesterday. Readings will again be taken tonight before sleep time, after which L-A will deactivate and stow the dosimeters at ~ 2:10pm EST. *[Before turning the dosimeters back on again, their batteries were changed out. The dosimeters were then statically deployed for approximately 12 hrs in specified locations.]*

Mike L-A, FE-1 Tyurin and FE-2 Reiter, before breakfast, performed their third periodic Russian biomedical assessments PZEh-MO-7 (Calf Volume Measurement) and PZEh-MO-8 (Body Mass Measurement), using the IM mass measurement device, later breaking it down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference points, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G, where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

Also before breakfast, Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

In addition, Reiter and Tyurin underwent the standard Russian PFE (Physical Fitness Evaluation) test MO-3, Thomas' second, Mikhail's first time, using the TVIS treadmill for workout (in unmotorized mode) and wearing the Cardiocassette KK-2000 belt with three chest electrodes. *[The test, controlled from the RSE-Med laptop, yielded ECG (electrocardiogram) readings to the Cardiocassette-2000, later downlinked via U.S. OCA. For the ECG, the FEs worked out on the TVIS, first walking 3 min. up to 3.5 km/h, then running at a medium pace of 6.5 km/h, followed by the maximum pace not exceeding 10 km/h, then walking again at gradually decreasing pace.]*

Mikhail Tyurin's repair work on the Elektron oxygen generator was successful. After an initial air-bubble-caused shutdown of the micropumps and a nitrogen purge of the gas analyzer, the electrolysis machine came up on the second try and is currently running on the backup pump at 32 amps, producing O₂.

The CDR unpacked and stowed the IMAK #1039 (ISS Medical Accessory Kit) delivered on Mission 12A, preparatory for its eventual return on 12A.1. *[This activity had recently been on the discretionary "job jar" task list.]*

In preparation of the ESA experiment CARD (Long Term Microgravity: A Model for Investigating Mechanisms of Heart Disease with New Portable Equipment) scheduled for tomorrow (11/1) and Thursday, Thomas Reiter reviewed the experiment protocol and loaded fresh batteries in the Russian CDL Holter Arterial Blood Pressure (BP) instrument, used for the 24-hour BP monitoring. CARD also requires several double rebreathing sessions using special rubber breathing bags. *[Astronauts experience lowered blood volume and pressure during space missions due to relaxation of the cardiovascular system in microgravity which may be a result from decreased fluid and sodium in the body. CARD examines the relationship between salt intake and the cardiovascular system when exposed to the microgravity environment and explores whether blood pressure & volume can be restored to the same levels that were measured during groundbased measurements by adding additional salt to the crew's food. Results from this may lead to new health safety measures for astronauts to protect them on long duration missions.]*

On the Russian "Gamma-1M" medical complex in the Service Module (SM), Tyurin removed and replaced the blood pressure (BP) control panel with a new spare delivered on Progress M-58/23P. The installation was then tested with the use of the PKO biomed harness for measuring ECG & BP data.

The CDR used the EHS SSK (Environmental Health Systems/Surface Sample Kit)

to collect surface sample swabs in Lab and Node for cultivation/incubation. *[SSK sampling is done once per month for the first three months that a module is on orbit and once every three months thereafter. Bacterial and fungal samples are taken at two locations in each module, with the prime site in the Lab being the air supply diffuser at the LAB1P5 rack. The colony growth on the 10 sampling slides will be analyzed after five days of incubation (next Sunday, 11/5).]*

L-A also employed the MAS (Microbial Air Sampler) kit to collect air samples in Lab, Node and SM for bacterial and fungal analysis. *[As done for the SSK, the sampling analysis is performed once per month for the first three months, and once every three months thereafter. Bacterial and fungal air samples are taken at two locations in each module. The colony growth on the sampling slides will be analyzed after five days of incubation in 4 Petri dishes (i.e., on 11/5). For onboard visual analysis of media slides from SSK, MCDs (microbial capture devices) from WMK, coliform detection bags from MWAK, and Petri dishes from MAS, the crew has a procedure for visual inspection of samples for bacterial and fungal colony growths after appropriate incubation periods.]*

In support of the ongoing TROPI (Analysis of a Novel Sensory Mechanism in Root Phototropism) experiment's Run 2, started on 10/25, the FE-2 twice replaced the tape in the video recorder of the EMCS (European Modular Cultivation System) with a blank cassette, one at the beginning and one at the end of the day. *[The tapes are being used to record the growth of the plants in the ECs (Experiment Containers). After looking at the downlinked images from the experiment, researchers performed the automated photostimulation on schedule.]*

Preparatory to tomorrow's and Thursday's scheduled SSRMS (Space Station Remote Manipulator System) "walkoff" maneuver and the subsequent translation on the MT (Mobile Transporter), Mike L-A reviewed the applicable DOUG (Dynamic Onboard Ubiquitous Graphics) software. *[DOUG is a software program on the MSS (Mobile Service System) RWS laptops that provides a graphical birdseye-view image of the external station configuration and the SSRMS arm, showing its real-time location and configuration on a laptop during its operation. The plan for tomorrow is for the SSRMS to "walk off" inchworm-like onto the MRS MBS (Mobile Remote Servicer/Mobile Base System); also, to take detailed photography of the arm's LEE (Latching End Effector) "A" in an ongoing investigation of configuration issues with that LEE's snare cables. On Thursday (11/2), the MT will translate with the SSRMS out to Worksite 8 (WS8) on truss segment P3 in anticipation of the Flight 12A.1 pre-launch checkout.]*

The CDR powered down the IWIS (Internal Wireless Instrumentation System) which he had set up for data taking during the CMG-3 (Control Moment Gyroscope 3) testing yesterday (see below).

FE-2 Reiter reconfigured the power feed of the “Makita” battery charger (SMPA), plugging it into PS (Power Strip)-28 junction box on UOP-4 (Utility Outlet Panel 4). *[This change allows for simultaneous operation of the HRF (Human Research Facility) laptop, the SVG (Space Video Gateway) computer and SMPA from PS-28 and prevents a possible overload of the two Ku-band power converters with that combination.]*

Thomas completed the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

Misha did the daily update/edit of the standard IMS “delta file”, including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The two Flight Engineers had another 5h10m timelined between them for Progress unloading, cargo transfers and IMS (Inventory Management System) logging.

The crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1). Misha’s and Thomas’ treadmill exercise was incorporated in their MO-3 fitness assessment (see above).

Afterwards, L-A transferred his, Reiter’s and Tyurin’s exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~8:00am EST, Thomas supported two LDM (Long-Duration Mission)/PAO video downlink events: (1) a short address (i.e., the Laudatio) for the “Pride of Britain Award”, this year’s top stage event in London where Prime Minister Tony Blair will present space-related awards to UK born astronaut Piers Sellers (STS-121) and science teacher Linda Davies; (2) a live interview by CNN from its London studio for broadcast in Europe, USA and Asia in different time slots. *[The audio/video connection was made by the SM’s automated onboard program sequencer (SPP) over RGS (Russian Ground Site), and the VHF-1/TV signal, tested yesterday by Tyurin, was routed from there through TsUP/Moscow and Ostankino TV satellite to EAC (European Astronaut Center) via IGS network.]*

At ~10:20am, the crew downlinked messages of greetings to be used by PAO for

the U.S. holidays ahead.

The EarthKAM (EK) ground team sent up words of appreciation to L-A for setting up and videoing the EK equipment yesterday. *[In its new session (the 24th aboard the ISS and the first time on Increment 14), EK will operate all week, with a lens change on Wednesday (after a brief interruption for SSRMS-LEE photography), and will be shut down this weekend. There are currently about 107 schools signed up to participate. Student requests for targets are uplinked in a camera control file to an A31p SSC (Station Support Computer) laptop which then activates the DCS 760 electronic still camera at specified times and receives the digital images from the camera's storage card on its hard drive, for subsequent downlink via OPS LAN.]*

Progress M-58 Propulsion Test Anomaly: Specialists in Moscow have assessed the configuration of the Progress 23P Thruster Test and have concluded that the failure to fire on manifold 2 was caused by human error. The manifold interconnect valves for fuel were incorrectly configured.

Update on CMG-3: The CMG gimbals were yesterday repositioned at various angles between two spin-ups to 500 rpm and subsequent no-brake coast-downs to zero rpm. There were no high vibration events during the test. Data from the test are being analyzed to determine forward work.

Today's CEO photo targets, from the Lab nadir/science window, were **Karakoram** *(the Karakoram Range is one of the main mountain systems of south central Asia in northern Kashmir and northwestern Tibet. It is also the westernmost system of the Himalaya complex connecting with the Pamirs. This is an extensively glaciated area with some of the world's longest mountain valley glaciers and elevations in the 20,000 to 29,000 ft range. Context views of the Karakoram were requested. There was the possibility of popcorn cumulus for this pass. The center point for the box that has been defined for the Karakoram is 36.5N, 75.65E), Niwot Ridge Tundra, Colorado* *(Niwot Ridge [40deg.3'N. 105deg.36'W.] is located approximately 35 km west of Boulder, Colorado, with the entire study site lying above 3000 m elevation. There is the Arikaree Glacier, extensive alpine tundra, a variety of glacial landforms, glacial lakes, patterned ground, and permafrost. The research area is bounded on the west by the Continental Divide, with runoff on the two sides being destined for the Colorado and Mississippi Rivers. Mapping pass over this diverse site with particular note to land use changes is desirable), and Shortgrass Steppe (SGS), Colorado* *(the SGS site encompasses a large portion of the Colorado Piedmont Section of the western Great Plains. The extent is defined as the boundaries of the Central Plains Experimental Range [CPER], which is managed by the Agricultural Research Service [ARS], and the Pawnee National Grassland [PNG], which is managed by the US Forest Service. The PNG is characterized by a mosaic of ownership and land use. Ownership includes federal, state or private and land use*

consists of livestock grazing or row-crops. There are conservation groups that exert influence over the area, particularly on federal lands. This varied land use and diversity associated with land users and managers substantiates the importance of the SGS-LTER to the area. Mapping pass of the varied land use in this area. Center point for this site is 40.81N, 104.14W.)

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 3:57am EST [= epoch]*):

Mean altitude -- 337.5 km

Apogee height -- 345.9 km

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Solar Beta Angle -- -15.5 deg (magnitude increasing)

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Revolutions since FGB/Zarya launch (Nov. 98) -- 45464

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??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
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09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);
CC:
Subject: ISS On-Orbit Status 10/30/06
Date: Monday, October 30, 2006 4:05:48 PM
Attachments:

ISS On-Orbit Status 10/30/06

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 6 of Increment 14.*

Before breakfast, CDR Lopez-Alegria began Part 1 (of 5) of the periodic acoustic measurement protocol by deploying crew-worn acoustic dosimeters, to be carried for 24 hours (with a microphone on the shirt collar). (Last time done: 5/11/06). *[Tonight, after about 15 hours of measurements, dosimeter data will be recorded and the hardware power-cycled, for another data take tomorrow morning after 8.5-hr. sleep. At that point, the crew will deploy the dosimeters statically in the station for the duration of the day, record measurements tomorrow night and stow the instruments. Acoustic data must be taken twice per Increment, each time for the duration of the 16-hour crew workday.]*

FE-2 Reiter performed the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

Thomas Reiter also conducted his first stress test plus saliva and blood sampling of the ESA/Russian biomed experiment "IMMUNO", assisted by FE-1 Tyurin where required for venous blood collection and blood sample processing (smear and in the Plasma-03 centrifuge). Samples were then secured in the MELFI (Minus Eighty Degree Celsius Laboratory Freezer for ISS) in cold packs in their KB-03 container. *[IMMUNO is a 24-hr. test of human immune system changes, with the objective to investigate immune neuro-endocrine reactions in the space environment by studying samples of saliva, blood and urine using collection kits and the biomedical (MBI) protection kit. Also included are entries in a fluid/medications intact log, and a stress-test questionnaire to be filled out by the subject at begin and end.]*

Mikhail Tyurin worked the long-awaited IFM (inflight maintenance) of the Elektron oxygen generator, installing a new valve (KP), delivered on Progress M-58/23P, to bypass the faulty KE-1 condensate replenishment valve (which has a failed solenoid) on the BZh-9 Liquid Unit. *[The failed valve will be manually switched to the open position for Elektron operations. In a checkout of the installation, the FE-1 was able to manually command the valve via a laptop after installing a new fuse. The Elektron should be ready for reactivation, to be attempted tomorrow (10/31).]*

In preparation for Elektron activation, Tyurin also disconnected the BKO multifiltration/purification column unit from the KP valve and A-R supply hose adapter to flush the BKO twice with deionized water from KOV containers, pumping the water through the column unit and catching it in an empty EDV container. *[Purpose of the activity is to assess the quantity of air bubbles in and remove them from the BKO to prevent tripping a safety shutdown of the micropumps of Elektron's BZh Liquid Unit by cavitation. The BKO was afterwards reconnected to the Elektron.]*

Mikhail worked on the primary string of the BITS2-12 onboard telemetry system's Central Processor system (PTsB), removing and replacing its ROM data storage unit (read-only memory, PZUB) with a new spare. *[On 10/23/06, a new PZUB was also installed in the backup PTsB.]*

Meanwhile, Mike L-A and Thomas had six hours reserved between them for Progress unloading, cargo transfers and IMS (Inventory Management System) logging.

In preparation for SSRMS (Space Station Remote Manipulator System) operations beginning on Wednesday (11/1), Mike L-A hooked up the UOP-DCP (utility outlet panel-to-display & control panel) bypass power cable at the Lab RWS (Robotics Work Station).

Also in support of the SSRMS activities, the MT (Mobile Transporter) on the S0 truss was successfully moved from WS3 (Worksite 3) to WS4 by ground command from MCC-H. *[During the time of translation, when the MT wasn't latched and mated, thrusters and crew exercising were inhibited to observe MT load limits. The translation was necessary to check out WS3 in preparation for the 12A.1 assembly flight. The MT will be translated to WS8 on Friday (11/3), also in prep for 12A.1.]*

The FE-2 worked on the SM EPS (Service Module/Electrical Power System), removing the failed #4 storage battery and replacing it with a spare 800A. The ZRU charge/discharge unit #4 was deactivated by TsUP-Moscow beforehand and later reactivated. *[Battery #4 is currently being conditioned in Cycle mode. This*

restores the full set of eight SM batteries to operation. The removed unit was stowed for eventual disposal in 23P.]

Tyurin performed the periodic channel calibration/adjustment on the IK0501 gas analyzer. *[IK0501 is an automated system for measuring CO₂, O₂, and H₂O in the air as well as the flow rate of the gas being analyzed.]*

Misha also worked briefly in the Soyuz TMA-9/13S crew return vehicle, activating its gas analyzer (GA) for its periodic run.

The two Flight Engineers performed the periodic (monthly) functional closure test of a spare emergency vacuum valve (AVK) for the Vozdukh CO₂ removal system, in the spare parts kit. *[The AVKs are critical because they close the Vozdukh's vacuum access lines in the event of a malfunction in the regular vacuum valves (BVK) or a depressurization in the Vozdukh valve panel (BOA). Access to vacuum is required to vent carbon dioxide (CO₂) during the regeneration of the absorbent cartridges (PP). During nominal operation, the AVK valves remain open.]*

L-A set up and activated the U.S. EarthKAM (EK) hardware for a new session (the 24th time aboard the ISS and the first time on Increment 14). EK will operate all week, with a lens change on Wednesday (after a brief interruption for SSRMS-LEE photography), and will be shut down this weekend. *[EK is using a DCS 760 electronic still camera with 50mm (f/1.4) lens, powered by 16Vdc from a 28 Vdc adapter, taking pictures by remote operation from the ground, without crew interaction. The student requests are uplinked in a camera control file to an A31p SSC (Station Support Computer) laptop which then activates the camera at specified times and receives the digital images from the camera's storage card on its hard drive, for subsequent downlink via OPS LAN.]*

Tyurin set up and performed his first session with the Russian "Diatomeya" ocean observations program. Using the Nikon F5 digital still camera with 400mm-lens from window #8 and the Sony DSR PD-150P camcorder from window #7, Misha was to record high production zones and associated oceanic phenomena in specific Pacific and Atlantic ocean areas (algae blooms in the ocean, water areas with blue-color background, highly pronounced cloud cover anomalies, and surface manifestations of water dynamics such as swirls, wakes of subsurface waves, water level drop, smoothing patterns in wave fields). *[Uplinked targets were the Eastern region of the tropical area of the Pacific Ocean, and the Caribbean and Sargasso Seas in the North Atlantic.]*

The FE-1 also completed the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet

facilities systems/replaceables and today the weekly BRPK air/liquid condensate separator apparatus inspection.

The CDR did the daily update/edit of the standard IMS "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Thomas transferred his, L-A's and Misha's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Over RGS (Russian Ground Site) at ~9:25am EST, Tyurin ran another VHF-1 (Russian: UKV-1) voice communications test with the ground to check the external telephone link with the Columbus Control Center (Col-CC) at Oberpfaffenhofen outside Munich/Germany.

At ~3:10pm EST the crew has the periodic communications checkout pass scheduled over NASA VHF (very high frequency) sites at Dryden (3:14pm), White Sands (3:17pm) and Wallops Island (3:22pm) for the periodic VHF1 emergency comm check, talking with Houston/Capcom, MSFC/PAYCOM (Payload Operation & Integration Center Communicator) and Moscow/Glavni (TsUP Capcom) in the normal fashion via VHF radio from a handheld microphone and any of the U.S. segment ATUs (audio terminal units). *[The test is to verify signal reception and link integrity, and to ensure minimum required link margin during emergency and special events (such as a Soyuz relocation). Last time done: 9/6/06.]*

Progress M-58 Propulsion Test Anomaly: Yesterday's (10/29) standard dynamic (hot) testing of Progress thruster systems failed in part. Of the two test firings of the DPO (approach & attitude control) thrusters, only the firing on manifold #1 at 4:24am was nominal; the test on manifold #2, at 5:51am, failed due to a misconfigured valve that left the manifold cut off from the propellant supply. The incident is under investigation, and the test has been rescheduled for next week. Meanwhile, SM thrusters are being used for maneuvers. In an emergency, manifold #1 could still be used.

Update on CMG-3: MCC-H engineers are continuing troubleshooting on Control

Moment Gyroscope 3, to gather additional data on the state of the accelerometer, lubricant, and lubrication of the spin bearings. *[Today's tests consist of repeated low speed torque runs to 500 rpm with subsequent no-brake spin down to zero, separated by a "milk shake" test involving commanded gimbal movements, the idea being to check on possible resulting changes of drag characteristics.]*

Update on S-Band String 1 Anomaly: More troubleshooting was performed last Friday (10/27) on the malfunctioning S-band String 1 forward link. Specialists will meet later this week to discuss future plans. *[S-band comm continues to function nominally on String 2 on both forward and return links. While two good comm systems are desired (in particular for EVAs), no impacts on present flight operations are expected from the current one-string connection.]*

Update on Progress Docking Anomaly: The failure of the KURS 2AO antenna to retract on 10/26 prior to docking at the SM aft end is under investigation in Moscow by a special commission established for this purpose.

No CEO (Crew Earth Observation) photo targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 5:55am EST [= epoch]*):

Mean altitude -- 337.6 km

Apogee height -- 345.8 km

Perigee height -- 329.5 km

Period -- 91.29 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0012159

Solar Beta Angle -- -10.6 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 90 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45449

Significant Events Ahead (all dates Eastern and subject to change):

11/03/06 -- ISS Reboost

11/22/06 -- Russian EVA-17 (3-9pm)

11/30/06 -- ISS Reboost

12/07/06 -- STS-116/12A.1 launch
12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss
12/18/06 -- STS-116/12A.1 landing @ KSC
01/10/07 -- Progress M-57/22P undocking (DC1) & reentry
01/19/07 -- US EVA-6
01/23/07 -- US EVA-7
01/27/07 -- US EVA-8
02/07/07 -- Progress M-59/24P launch (may move to 01/18/07)
02/09/07 -- Progress M-59/24P docking (DC1)
03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses (NET; requires 14Slip)
03/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);
CC:
Subject: ISS On-Orbit Status 10/29/06
Date: Sunday, October 29, 2006 2:23:35 PM
Attachments:

ISS On-Orbit Status 10/29/06

All ISS systems continue to function nominally, except those noted previously or below. *Sunday -- off-duty day for CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Thomas Reiter, except for regular maintenance and voluntary work. Ahead: Week 6 of Increment 14.*

After wakeup (1:00am EST) CDR Lopez-Alegria continued his first 7-day SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) log and questionnaire entries from the Actiwatch in the experiment's HRF1 laptop application.

FE-2 Reiter performed the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

Tyurin conducted the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the Service Module (SM), including the ASU toilet facilities systems/replaceables, and the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/Moscow.

Preparatory to his upcoming first session with the IMMUNO experiment, Thomas Reiter unstowed and set up the necessary hardware, including the Cryogem-03M refrigerator, Plasma-03 accessories, CARDIOSCIENCE and SALIVA-IMMUNO kits and wipes. *[IMMUNO is a test of human immune system changes, with the objective to investigate immune neuro-endocrine reactions in the space environment by studying samples of saliva, blood and urine using collection kits and the biomedical (MBI) protection kit. Also included is a stress-test questionnaire to be filled out by the subject and based on the accompanying MO-3 stress test, performed during the subject's physical exercise regimen.]*

Working off his discretionary "time permitting " task list, in the DC1 docking compartment Mikhail Tyurin collected the periodic readings on the MOSFET (metal oxide semiconductor field-effect transistor) radiation sensor reader/display of the Matryoshka-R anthropomorphic (human torso) "phantoms" located inside the ISS. *[The complex Matryoshka payload suite is designed for sophisticated radiation studies. Besides the Phantom Sphere containers in the SM, the human torso in the DC1 is equipped with individual horizontal slice-like layers with 356 thermoluminescent detectors (TLDs) and five nuclear radiation tracking detectors (NTDPs). The mannequin is covered with a "poncho" and "hood" and used for studies of on-orbit radiation and long-term dose accumulation. The payload collects radiation measurements every 15 minutes of each hour around the clock. Note: Matryoshka is the name for the traditional Russian set of nested dolls.]*

The crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR) and VELO bike with bungee cord load trainer (FE-1).

Reiter and Lopez-Alegria had their weekly PFCs (private family conferences) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop, currently SSC-8 in the Lab at portside), Thomas at 9:50am EST, L-A at 2:35pm.

Early in the morning, TsUP-Moscow conducted the standard dynamic (hot) testing of Progress M-58 thruster systems. *[ISS attitude control was handed over to the Russian MCS (motion control system) at 3:35am EST. There were two test firings of Progress DPO (approach & attitude control) thrusters, each of 20 second duration: at 4:24am using Progress DPO manifold #1 and at 5:51am on manifold #2. Control authority was returned to the U.S. segment (USOS) at 6:45am.]*

TsUP also terminated the recharging of the Progress' main buffer battery (BB) and its backup (RB) from the SM.

This morning, the crew reported the failure of an LHA (Lamp Housing Assembly, 1OS2) in the Lab. *[There is no impact to ISS operations from this failure.]*

Update on Elektron: Repair of the Russian electrolysis machine for oxygen generation with the newly arrived spares is scheduled for Monday (10/30), activation for Tuesday.

Update on CMG-3: Tomorrow evening, MCC-H engineers will do more troubleshooting on Control Moment Gyroscope 3, to gather additional data on the

state of the accelerometer, lubricant, and lubrication of the spin bearings. *[The tests will consist of repeated low speed torque runs to 500 rpm with subsequent no-brake spin down to zero, separated by a "milk shake" test involving commanded gimbal movements, the idea being to check on possible resulting changes of drag characteristics.]*

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<http://earthobservatory.nasa.gov>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 7:12am EST [= epoch]*):

Mean altitude -- 337.7 km

Apogee height -- 346.0 km

Perigee height -- 329.4 km

Period -- 91.29 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0012316

Solar Beta Angle -- -5.6 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 129 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45435

Significant Events Ahead (all dates Eastern and subject to change):

11/03/06 -- ISS Reboost

11/22/06 -- Russian EVA-17 (3-9pm)

11/30/06 -- ISS Reboost

12/07/06 -- STS-116/12A.1 launch

12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss

12/18/06 -- STS-116/12A.1 landing @ KSC

01/10/07 -- Progress M-57/22P undocking (DC1) & reentry

01/19/07 -- US EVA-6

01/23/07 -- US EVA-7

01/27/07 -- US EVA-8

02/07/07 -- Progress M-59/24P launch (may move to 01/18/07)

02/09/07 -- Progress M-59/24P docking (DC1)

03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses (NET; requires 14Slip)
03/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 10/28/06
Date: Saturday, October 28, 2006 4:26:30 PM
Attachments:

ISS On-Orbit Status 10/28/06

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 14 crew CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Thomas Reiter.*

After wakeup (2:00am), CDR Lopez-Alegria continued his first 7-day SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) log and questionnaire entries from the Actiwatch in the experiment's HRF1 laptop application.

FE-2 Reiter performed the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

The crew completed the regular weekly three-hour task of thorough station cleaning, wearing protective garment. *["Uborka", normally done every Saturday, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with "Fungistat" disinfectant wipes; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

Working on the MEC (Medical Equipment Computer), the CDR filled out the regular weekly FFQ (Food Frequency Questionnaire), his fifth, which keeps a personalized log of his nutritional intake over time on special MEC software. *[The FFQ records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

FE-1 Tyurin conducted the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

At ~8:50am EDT, the crew engaged in their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

Mikhail Tyurin and Thomas Reiter had 1.5 hr dedicated to priority cargo transfers and commensurate IMS (Inventory Management System) updates. Highest priority Russian transfers were those items needed for the Elektron repair activities scheduled for Monday (10/30).

The crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Afterwards, L-A copied his, Misha's and Thomas's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Update on S-band String 1: In effort to isolate the problem experienced on S-Band String 1 MCC-Houston today is conducting a series of tests involving swaps between String 1 and String 2, self-tests on String 1, reconfiguration of String 1 to high data rate, transponder tests, etc . *[Recap: On 10/19, communications with ISS (voice, payload & systems commanding) on S-band String 1 began locking up and failing on the forward link (= the uplink from ground station to TDRS satellite plus the downlink from TDRS to ISS). Comm was switched to S-band String 2 and continues to perform nominally on both forward and return links. Specialists are continuing to troubleshoot String 1, suspecting a hardware problem. While two good comm systems are desired, no impacts on flight operations are expected from the current one-string connection.]*

Update on Elektron: Repair of the Russian oxygen generator with the newly arrived spares is scheduled for Monday (10/30), activation for Tuesday.

Update on 23P Docking: The EPS (electrical power system) load shed during the Progress 23P docking delay on 10/26 had some minor impacts to payload operations. ER3 (EXPRESS Rack 3), with the EMCS TROPI (European Modular Cultivation System/Analysis of a Novel Sensory Mechanism in Root Phototropism)

experiment was without power for approximately 10 hours. However, this power outage occurred during the “dark” cycle of the experiment and power was restored to the rack just in time to continue the “light” cycle of the experiment. MELFI (Minus Eighty Degree Celsius Laboratory Freezer for ISS)’s Brayton motor was powered off for the docking activities and was down for approximately 9 hours. The dewars experienced very little temperature gain during this time and it is believed there are minimal impacts to the science. ER1 was also powered down during the EPS load shed. The MAMS (Microgravity Acceleration Measurement System) data that were collected during the docking event was lost. Flight controllers at TsUP/Moscow believe that the KURS 2AO antenna on the Progress did not retract. Investigation into the exact state of the antenna is ongoing.

Weekly Science Update (*Expedition Fourteen -- 5th*):

ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS):

ALTCRISS memory cards from Inc13 have been analyzed by the science teams and are reported nominal. Next activities with ALTEINO were conducted on 10/26 and 10/27 – only rotation of the instrument was foreseen.

ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System): Planned.

BASE: Complete.

BCAT-3 (Binary Colloidal Alloy Test-3): Planned.

CARD (Latent Virus Shedding during Spaceflight, ESA): Planned.

CBOSS (Cellular Biotechnology Support Systems): Complete.

CFE (Capillary Flow Experiment): Complete.

CULT (Cultural Factors Questionnaire): Fifth session for Thomas Reiter is planned on 11/1.

DAFT (Dust & Aerosol Measurement Feasibility Test): Complete.

Earth Knowledge Acquired by Middle School Students (EarthKAM): Planned.

ETD (Eye Tracking Device): Sixth session for Thomas Reiter reported nominal on 10/25.

GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology): Planned

IMMUNO (Saliva Sampling): First session with Thomas Reiter planned on 10/30.

LEUKIN: Complete.

MISSE (Materials ISS Experiment): Ongoing.

MTR-2 (Russian radiation measurements): Passive dosimeters measurements in DC1 "PIRS".

NOA (Nitric Oxide Analyzer): The ninth session for Thomas Reiter is currently planned on 11/03.

Nutrition: Planned.

PK-3 (Plasma Crystal 3): Second set of experiments with Thomas Reiter was completed nominally last week between 10/16 and 10/20.

POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G): Planned.

RC (Refrigerated Centrifuge): Planned.

RS (Renal Stone): Planned.

SAMPLE: Complete.

SEM (Space Experiment Module): Planned.

SLEEP: In progress.

SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite): Planned.

Swab (Characterization of Microorganisms & Allergens in Spacecraft): Planned.

TROPI (Study of Novel Sensory Mechanism in Root Phototropism): The first Tropi science run was completed 10/25. The ECs were removed and replaced, and the samples taken out and inserted into the MELFI. The downlinked images from this run were excellent and there is clear evidence of tropism in the plants. The second TROPI science run was initiated on 10/26. Automated hydration of the seeds was

successfully completed and confirmed by downlinked images. The seeds will now start to germinate and the photostimulation portion of the experiment will follow in two days time. “The Tropi Team is very appreciative of Thomas’s efforts to make this experiment a success.”

YING (Yeast in No Gravity): Complete.

CEO (Crew Earth Observations): Through 10/23, the ground has received a total of 664 of Inc14 CEO images for review and cataloging. “Your practice 400mm imagery of Buenos Aires and the Chilean west coast canyons has excellent focus and composition. You also acquired imagery of our Lake Poopo site. The weather and visibility were not as good as we expected. We are having no issues with your camera times in terms of time-to-position and cataloging your views. “

Today's CEO photo targets, from the Lab nadir/science window, were **Patagonian Glaciers** (*this pass may have been the crew's last best view of Patagonia for a couple of weeks. Weather was forecast to be clearing from the W at the time of the pass. The crew was to continue to try for details of the glacial features on the Pacific side of the ice fields*), **Esperanza Fire near Palm Springs** (*DYNAMIC EVENT: This deadly, major fire in Southern California was started by arsonists yesterday morning. Fanned by strong Santa Ana Winds of up to 50mph, the area has expanded rapidly to over 24,000 acres and is only 5% contained. This was the crew's first pass in daylight this weekend to document this event from space. ISS track was well to the SE, over southern Baja California. However, if the crew used the long lens settings and looked toward the horizon to the NW, the large smoke plume should have been easily visible*), and **Jornada Basin, New Mexico** (*this is a Long Term Ecological Research [LTER] site situated in southern New Mexico along the Rio Grande River north of El Paso. Using the long lens setting and trying to map in detail the area near the river from El Paso northward*).

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Mean altitude loss in last 24 hours -- 83 m
Revolutions since FGB/Zarya launch (Nov. 98) -- 45418

Significant Events Ahead (all dates Eastern and subject to change):

11/03/06 -- ISS Reboost
11/22/06 -- Russian EVA-17 (3-9pm)
11/30/06 -- ISS Reboost
12/07/06 -- STS-116/12A.1 launch
12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss
12/18/06 -- STS-116/12A.1 landing @ KSC
01/10/07 -- Progress M-57/22P undocking (DC1) & reentry
01/19/07 -- US EVA-6
01/23/07 -- US EVA-7
01/27/07 -- US EVA-8
02/07/07 -- Progress M-59/24P launch (may move to 01/18/07)
02/09/07 -- Progress M-59/24P docking (DC1)
03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses (NET; requires 14Slip)
03/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);
CC:
Subject: ISS On-Orbit Status 10/27/06
Date: Friday, October 27, 2006 2:27:45 PM
Attachments:

ISS On-Orbit Status 10/27/06

All ISS systems continue to function nominally, except those noted previously or below.

Most of the crew's time today was dedicated to gaining access to and beginning unloading the Progress 23 cargo ship after yesterday's delayed hard dock. *[After soft dock was completed at ~10:29am EDT, the ship's docking probe retraction halted at 80 mm (full retraction: 400 mm). Telemetry indicators for the forward-facing KURS 2AO (orientation) antenna remained static, showing full deployment and no indication of full retraction. The ISS remained in free drift for two additional orbits (~3 hrs.) to give Russian specialists more time to assess this anomaly via the access-limited Russian Ground Sites (RGS) comm. At 1:43pm, TsUP commanded full probe retraction, which (after an apparent brief hesitation at 115 mm) was successful, as was the following hook drive. ISS went back to controlled attitude ~2:06pm, terminating power conservation measures. The actual status of the 2AO antenna is still unknown at this time.]*

This morning, after wakeup (2:00am) and before Progress ops, CDR Lopez-Alegria continued his first 7-day SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) log and questionnaire entries from the Actiwatch in the experiment's HRF1 laptop application.

FE-2 Reiter performed the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

The CDR took down the IWIS (Internal Wireless Instrumentation System), which had been set up for data taking during the docking, and configured it for upcoming

CMG-3 (Control Moment Gyroscope 3) testing.

Meanwhile, in the Service Module (SM) FE-1 Mikhail Tyurin conducted the standard one-hour leak checking of the SM aft docking vestibule & fuel/oxidizer transfer line interface between Progress 23P and Zvezda, starting at ~5:00am EDT.

After the leak check, hatches were opened, and Tyurin installed the QD (quick disconnect) screw clamps (BZV) of the docking & internal transfer mechanism (SSVP) to rigidize the coupling, followed by the standard air sampling inside the Progress with the Russian AK-1M air sampler and deactivation of the cargo ship.

Misha also collected post-docking cabin air readings in the ISS with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system of the SM SOGS (Pressure Control & Atmospheric Monitoring System). *[GANK tests for Methane (CH₄), Ammonia (NH₃), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO₂), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

Tyurin and Lopez-Alegria then removed the docking mechanism (StM, *Stykovochново mekhanizma*) between 23P and SM PkhO (Transfer Compartment) to free the passageway. *[The StM is the "classic" probe-and-cone type, consisting of an active docking assembly (ASA) with a probe (SSh), which fits into the cone (SK) on the passive docking assembly (PSA) for initial soft dock and subsequent retraction to hard dock. The ASA is mounted on the Progress' cargo module (GrO), while the PSA sits on the docking ports of the SM, FGB and DC1.]*

Continuing work in the cargo ship, Mikhail installed the standard US-21 matching unit, a 1-hr. task. *[The US-21 matching unit connects the SM with the Progress motion control and DPO thrusters systems, so that they can be commanded by the SM computer system (BVS). After bolting the box down, Misha hooked up its the telemetry (TM) connector to the BITS2-12 onboard TM system on Go from TsUP, after Moscow had inhibited data output to the VD-SU control system mode, powered off the BITS and deactivated the SKV-1 air conditioner. These systems were subsequently turned back on.]*

Afterwards, Misha and Mike L-A completed the electronic integration of 23P into the ISS by installing the LKT local temperature sensor commutator (TA251MB) of the BITS2-12, along with its ROM unit (read-only memory, TA765B). The LKT was subsequently switched on by the ground to complete the basic configuration. *[The BITS2-12, VD-SU control mode, and SKV-1 air conditioner were also temporarily powered off for the installation.]*

Subsequently, the two crewmembers began with cargo transfers and commensurate IMS (Inventory Management System) updates, starting off with the fresh ODF (Operations Data Files, *bortovaya dokumentatsia*) and fresh food stores. Highest priority Russian transfers are those items needed for the Elektron repair activities scheduled for Monday (10/30). *[Priority U.S. cargoes are ten items required to be unpacked prior to 12A.1, particularly a CSA-CP (Compound Specific Analyzer-Combustion Products) Resupply Kit and CSA-CP Accessories Kit. Other cargoes can remain onboard Progress for the present.]*

FE-2 Reiter unloaded the newly arrived Russian ODF crew procedures and updates, replaced them in the existing books as required and transferred them to their stowage locations. *[The new documents include two new books,- one for the Increment 14 EVAs, the other for Progress M-58 cargo transfer ops.]*

The CDR retrieved and stowed the two FMKs (Formaldehyde Monitoring Kits) deployed by him on 10/25 in the Lab (below CEVIS cycle) and SM (most forward handrail).

The FE-2 worked on the ESA/RSC-Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS), ascertaining the size of the recorded data file on the AST spectrometer's PCMCIA memory card and the AST's switching-on time. The file on the RSE1 laptop was then to be downlinked to TsUP via OCA. *[ALTCRISS uses the AST spectrometer employed by VC8 guest cosmonaut Roberto Vittori last year in the DC1 for the Italian LAZIO (Low Altitude Zone/ Ionization Observatory) experiment.]*

Reiter had more time reserved for continuing the current audit/inventory behind FGB panels of various Russian equipment items delivered over time for noise abatement, of which a major portion have been reported as missing. *[For the equipment audit, the restraints/bungees in the panel lockers needed to be reconfigured.]*

The CDR performed the regular maintenance reboots on the SSC (Station Support Computer) OCA Comm Router laptop. *[The also scheduled SSC File Server reboot was taken over by MCC-H as a validation demo of a new capability, called Admin PC, that enables specialists to perform limited OpsLAN administration tasks on ISS from the ground.]*

Thomas completed the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables and today also the weekly BRPK air/liquid condensate separator apparatus inspection.

Mike L-A supported the earlier CDRA (Carbon Dioxide Removal Assembly) deactivation via ground commanding by disconnecting CDRA's LAB1D6 ITCS LTL (Internal Thermal Control System/Low Temperature Loop) supply line.

L-A also performed the periodic (~weekly) atmospheric status check for ppO₂ (Partial Pressure Oxygen) and ppCO₂ (pp Carbon Dioxide), taking CSA-CP (Compound Specific Analyzer-Combustion Products) readings and also using the CSA-O₂ (Compound Specific Analyzer-Oxygen Sensor) and CDMK (CO₂ Monitoring Kit). *[CSA-CP measurements were gathered with unit #1043 (prime) at the SM Central Post and with #1045 (backup unit) in the Node, CSA-O2 (#1042, #1063) in the Lab, and CDMK (#1009) in SM and Lab. The instruments were turned off afterwards, except for the prime CSA-CP which continues to run.]*

Later tonight, Misha will update/edit the standard daily IMS (Inventory Management System) "delta file", including stowage locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

The crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1).

Later today, L-A will copy his, Misha's and Thomas's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~4:45am, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~6:30am, L-A set up the SM's amateur radio equipment (Kenwood VHF transceiver with manual frequency selection, headset, power supply) to conduct a 10-min. ham radio exchange with attendees at the Flanders Science Festival in Gent, Belgium.

At ~10:40am, FE-2 Thomas Reiter downlinked LDM (Long-Duration Mission)/PAO video, including a short presentation for a number of events in Germany and to some individual addressees, for recording at EAC (European Astronaut Center). He was also interviewed in a live program for German Phoenix TV (Michael Krons). *[The audio/video connection was made by the SM's automated onboard*

program sequencer (SPP) over RGS, and the VHF/TV signal was routed from there through TsUP/Moscow and Ostankino TV satellite to EAC via IGS network.]

At ~3:30pm, the crew is scheduled for their regular weekly tagup with the Lead Flight Director at MCC-H/JSC.

Because of the 23P docking delay, today's planned DVD-4 educational demo and SPHERES experiment sessions were deferred to a later date.

Update on TRRJ (Thermal Radiator Rotary Joint) Testing: Yesterday (Day 4 of 5 testing days, ending tonight at midnight EDT) both the S1 and P1 TRRJ's were parked and locked at 0 degrees for 23P docking. Loop A shut down nominally; Loop B shutdown experienced a "toothcrash" (temporarily misaligned gear teeth) but was locked properly after three tries. After the docking, the TRRJ's were moded back to Autotrack for the final operational checkout, again not without snags. [The various workarounds employed to execute the checkout are now being examined, to update TRRJ procedures with those that work best in the future.]

Today's CEO photo targets, from the Lab nadir/science window, were **Ganges Plain air pollution** (*Dynamic event. Looking left for a limb view of regional air pollution banking against the Himalaya front ranges. Denser zones, trajectory and altitude of the upper surface of the polluted layer are of interest. Center point: approximately 28N 81E*), **Caracas, Venezuela** (*this capital city lies near the coastline but on the inland side of a coastal range of mountains. It is seldom photographed but is one of the major cities in a comparative study of city growth based on remotely sensed data [one of the best measures of city growth in the developing world]. Shooting obliquely right for a context view. More detailed views will be requested later in the expedition. Center point: 9.5N 66.9E*), and **Florida Coastal Everglades** (*mapping swath requested parallel with and left of track, to document the many changes occurring in one of America's greatest wetlands and neighboring shallow bays. Center point: 26N 81W*).

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 6:39am EDT [= epoch]*):

Mean altitude -- 337.9 km

Apogee height -- 346.2 km

Perigee height -- 329.6 km
Period -- 91.29 min.
Inclination (to Equator) -- 51.63 deg
Eccentricity -- 0.0012397
Solar Beta Angle -- 4.0 deg (magnitude decreasing)
Orbits per 24-hr. day -- 15.77
Mean altitude loss in last 24 hours -- 194 m
Revolutions since FGB/Zarya launch (Nov. 98) -- 45402

Significant Events Ahead (all dates Eastern and subject to change):

11/03/06 -- ISS Reboost
11/22/06 -- Russian EVA-17 (3-9pm)
11/30/06 -- ISS Reboost
12/07/06 -- STS-116/12A.1 launch
12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss
12/18/06 -- STS-116/12A.1 landing @ KSC
01/10/07 -- Progress M-57/22P undocking (DC1) & reentry
01/19/07 -- US EVA-6
01/23/07 -- US EVA-7
01/27/07 -- US EVA-8
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03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
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03/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 10/26/06
Date: Thursday, October 26, 2006 2:45:44 PM
Attachments:

ISS On-Orbit Status 10/26/06

All ISS systems continue to function nominally, except those noted previously or below.

Progress M-58/23P docked smoothly at the Service Module (SM) aft port at 10:29am EDT and is latched and clamped after post-docking ops were delayed by more than three hours. Hatch opening has been deferred to tomorrow. *[Although the ship was securely captured with its docking probe, the seemingly incomplete retraction of one of its five KURS antennas delayed probe retraction and closing of Progress & SM hooks and latches until retraction of the "orientation" antenna at the front of the spacecraft was confirmed by imagery evaluation. With the station in free drift during the anomaly and solar arrays not optimally positioned, MCC-Houston immediately initiated "load shedding" measures (power conservation by turning off non-essential electrical loads). Also, during the extended free drift period and consequent antenna pointing offsets, communications with the ground were affected, reducing comm to an estimated 75% of attitude-controlled norm. The probe was fully retracted by ~2:00pm, i.e. after a delay of ~3h 30m.]*

After the delay, hooks and latches were finally closed, and the crew is now conducting the standard one-hour leak checking of the docking vestibule and fuel/oxidizer transfer line interface between Progress and SM. During leak checking and initial clamp installation, RS thrusters will again be inhibited.

Mikhail Tyurin shut off the TORU and reconfigured STTS communications, and Lopez-Alegria took down the TV Ku-band connection through the USOS via the FGB A31p, which was also shut down.

When hatches are opened tomorrow morning, Tyurin and LA will first install the QD (quick disconnect) screw clamps (BZV) of the docking & internal transfer mechanism (SSVP) to rigidize the coupling. Next, they will perform the standard air sampling inside the Progress with the Russian AK-1M air sampler, then deactivate

the cargo ship and install the ventilation air duct. *[Unpacking and transfers of delivered cargo will be guided by uplinked Russian and U.S. Unpack Lists. First priority will be on food rations: 23P delivered 38 Russian food containers (35 with main food rations, 3 with supplemental "bonus" food for Misha), and 22 U.S. food containers (14 for LA & Misha, 1 main plus 3 "bonus" for Thomas, and 4 "bonus" for LA.)]*

Earlier, after wakeup (2:00am) and before Progress ops, CDR Lopez-Alegria continued his first 7-day SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) log and questionnaire entries from the Actiwatch in the experiment's HRF1 laptop application.

FE-2 Reiter performed the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

Before monitoring 23P proximity ops from the TORU station in the SM, Tyurin and Lopez-Alegria also completed final preparations for the ship's arrival. *[These started with deactivation of the amateur (ham) radio stations in the FGB (Ericsson) and SM (Kenwood) to prevent any interference with Progress/KURS radio traffic (MISSE-5's transmitter was also temporarily turned off and inhibited remotely by DOD), and activation of the SSC (Station Support Computer) A31p laptop in the FGB for handling the video transmission from the Russian segment (RS) via single cable to Ku-band assets equipment in the US segment (USOS). Later, the ham stations were reactivated for backup use, should they have become necessary during the reduced-power free drift period.]*

The FE-1 serviced the Harmful Impurities Removal System (BMP), starting the "bake-out" cycle to vacuum on absorbent bed #2 of the regenerable dual-channel filtration system. Before sleep time today, the bake-out will be terminated. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

Tyurin and Lopez-Alegria performed the mandatory CHeCS (Crew Health Care Systems) emergency/contingency medical OBT (on-board training) drill, a one-hour U.S. exercise designed to refresh crewmembers' acuity in applying ACLS (Advanced Cardio Life Support) in an emergency. *[Setting up (but not actually operating/manipulating) onboard equipment such as the RSP (Respiratory Support Pack), ALSP (Advanced Life Support Pack), intubation kit, HMS defibrillator, all stowed in the Lab CHeCS rack, and the CMRS (Crew Medical Restraint System), Misha and LA stepped through the ACLS algorithm manual to resolve a simulated*

medical emergency onboard ISS. Objectives of the exercise include practicing communication and coordination necessary to perform medical emergency procedures, locating appropriate emergency medical components, and determining each crewmember's individual method of delivering CPR (cardio-pulmonary resuscitation) in zero-G. After the drill, Leroy stowed the equipment but left the CMRS deployed (for the duration of this increment).]

FE-2 Reiter worked on the ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS), rotating the instrument to change orientation of the AST Spectrometer on SM panel 437. *[ALTCRISS uses the AST spectrometer employed by VC8 guest cosmonaut Roberto Vittori last year in the DC1 for the Italian LAZIO (Low Altitude Zone/Ionization Observatory) experiment.]*

Reiter also conducted the monthly PEP (portable emergency provisions) safety inspection, his third. *[The IMS-supported inspection involves verification that PFEs (portable fire extinguishers), PBAs (portable breathing apparatus), QDMAs (quick-don mask assemblies) and EHTKs (extension hose/tee kits) are free of damage to ensure their functionality, and to track shelf life/life cycles on the hardware. In the U. S. segment (USOS), there are a total of 5 PFEs and 7 PBAs, plus 7 QDMAs and 4 EHTKs. In the Node, Thomas made sure that no more than three PBA bottles are stowed in the locker, to reduce the risk of getting too much oxygen concentration inside the stowage area in case of bottle leakage.]*

Mike LA conducted the weekly audit/inventory of the available CWCs (collapsible water containers) and their contents, to keep track of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week. The current cue card lists 33 water containers (~1185 liters total) for the four types of water identified on board: technical water (for Elektron, flushing, hygiene; ~999.1 liters), potable water (~129 liters), condensate water (for processing, 28.03 liters) and other (TCS fluid, EMU waste water, 28.6 liters). Water was delivered by 12A and is re-supplied from processed condensate. There is no water on 23P.]*

The FE-2 continued the current round of the monthly preventive maintenance of RS ventilation systems, today in the DC1 (Docking Compartment), where he cleaned the V3 fan grille and air duct.

Reiter had more time reserved for continuing the current audit/inventory behind FGB panels of various Russian equipment items delivered over time for noise abatement, of which a major portion have been reported as missing.

Thomas also conducted the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables and today also the periodic (currently daily) checkout/

verification of IP-1 airflow sensors in the various RS hatch openings in the SM, FGB and DC1.

In addition, the FE-2 did the daily update/edit of the standard IMS (Inventory Management System) "delta file", including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

In the Lab, the CDR continued the simulation activities on the Robotics Onboard Trainer (ROBoT) that he was unable to finish yesterday. *[After the simulation session, the A31p's were to be reconfigured for their normal SSC (Station Support Network) functions and the ROBoT equipment left in the setup configuration until at least 10/30. ROBoT uses DOUG (Dynamic Operations Ubiquitous Graphics)-type software, dedicated rotational and translational hand controllers, electronics that power and convert the hand controller signals into a serial data bus format, cabling, two existing on-board laptops (one for graphics, one for the simulation) and hardware to mount the system on existing seat tracks for on-orbit training of MSS (Mobile Service System) and SSRMS (Space Station Remote Manipulator System) operations.]*

After maintenance efforts by Mike LA succeeded last night in getting the RED (Resistive Exercise Device) back to nominal operation, the CDR today performed a "mini-calibration" of the system before his and Reiter's scheduled exercise sessions. *[RED had been temporarily off-limits for the crew due to a "grinding" noise heard on Tuesday after the pulley cable replacement on 10/23. The calibration of the Schwinn RED canisters re-establishes the relationship of specific load settings with a specific number of pulls per setting, followed by recording of the load values measured with a calibration tool and steel handles from the on-orbit calibration kit.]*

After the docking issue was resolved and 23P firmly linked, the crew worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1), RED (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1, FE-2).

Afterwards, LA transferred his, Misha's and Thomas's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

U.S. "Job Jar": The crew's discretionary task list for today held one item: the daily CEO shoot.

Additional U.S. task-listed items for the current Increment include:

- ACS (Atmosphere Control System) hatch seal inspections (CDR, FE-2),
- Airlock & Node BF/SD (CO₂ Filter/Smoke Detector) inspections (CDR, FE-2),
- Airlock/Node/Lab ELPS (Emergency Lighting Power Sources) inspection,
- SEM payload (Space Experiment Module) photography,
- CARD (Investigation of Mechanisms of Heart Disease with New Portable Equipment) hardware locating/gathering,
- BBA (Baseplate Ballast Assembly) R&R and LHA (Lamp Housing Assembly) troubleshooting.

Today's CEO photo targets, from the Lab nadir/science window, were **Mekong River Delta** (*Researchers are monitoring the Mekong Delta because of dynamic changes that are expected to occur. The Mekong is undergoing intense modification because of an expansion of dams along the Mekong. These dams have an effect on water and sediment flow. Increasing population is also expressed in land use change along the river and in the delta. The crew was asked to use this pass to get context views of the Mekong River and delta. The center point of the box for the Mekong Delta is 10.0N, 105.5E*), **Xianggang (Hong Kong), China** (*Xianggang [Hong Kong] is one of the "megacities" being documented by CEO. The population of this major city increased dramatically during the 1990's reaching 6.86 million in 2005. Xianggang is located on the eastern side of the Pearl River Delta on the southeastern coast of the People's Republic of China, facing the South China Sea. This increase in population can significantly alter the landscape, ecology and climatology of the local region. Global urban remote sensing projects use astronaut photography as independent reference data in combination with data from other satellites. Center point for Xianggang is 22.28N, 114.17E*), **S. Mozambique** (*regional development far from cities is what is occurring presently in Mozambique because of natural gas drilling. Researchers are anticipating the development of infrastructure that will change the appearance of this area. Their goal is to acquire baseline imagery before the major development of this infrastructure occurs. The gas fields are located northeast of the capital city of Maputo. Center Point for this target is 24S, 34E*), and **Etna volcano** (*Dynamic Event: Explosive activity has resumed at the summit of Mt. Etna as recently as October 22. While the crew probably won't be able to catch any steam or gas eruptions, they should be able to document lava flows surrounding the volcano. Etna is one of the largest continental volcanoes, with a base of about 60 by 40 km. Center Point for Etna is 37.73N, 15.00E*).

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are

downloaded by the public each month from this "Gateway" site);
<http://earthobservatory.nasa.gov>
<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 6:20am EDT [= epoch]*):

Mean altitude -- 338.1 km
Apogee height -- 346.6 km
Perigee height -- 329.7 km
Period -- 91.30 min.
Inclination (to Equator) -- 51.63 deg
Eccentricity -- 0.0012601
Solar Beta Angle -- 8.7 deg (magnitude decreasing)
Orbits per 24-hr. day -- 15.77
Mean altitude loss in last 24 hours -- 108 m
Revolutions since FGB/Zarya launch (Nov. 98) -- 45386

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12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss
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06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 10/25/06
Date: Wednesday, October 25, 2006 2:19:29 PM
Attachments:

ISS On-Orbit Status 10/25/06

All ISS systems continue to function nominally, except those noted previously or below.

Progress M-58/23P is continuing its rendezvous flight to the ISS. All onboard tests (TORU, TV, etc.) have been nominal to date. The third midcourse correction burn, DV3 (0.49 m/s), was performed today at ~10:20am EDT. 23P is currently “barbecuing” around its roll axis for thermal control. Docking is still scheduled for tomorrow at ~10:28am EDT at the Service Module (SM) aft port (+x-axis).

After wakeup (2:00am), CDR Lopez-Alegria continued his first 7-day SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) log and questionnaire entries in the experiment’s laptop application. *[The experiment is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the CDR’s sleep/wake patterns and light exposure, LA is wearing a special Actiwatch device which measures the light levels encountered by the CDR as well as his patterns of sleep and activity throughout the Expedition.]*

FE-2 Reiter performed the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

FE-1 Tyurin serviced the Russian Harmful Impurities Removal System (BMP), starting the periodic “bake-out” cycle to vacuum on absorbent bed #1 of the regenerable dual-channel filtration system. Before sleep time today, the bake-out will be terminated. Regeneration of bed #2 follows tomorrow. *[Regeneration of each of the two cartridges takes about 12 hours and is conducted only during crew awake periods.]*

In support of the ongoing TROPI (Analysis of a Novel Sensory Mechanism in Root Phototropism) experiment, started on 10/20, the FE-2 twice replaced the tape in the video recorder of the EMCS (European Modular Cultivation System) with a blank cassette, one at the beginning and one at the end of the day for Run 2. Reiter then terminated the current TROPI run, securing the samples in the MELFI (Minus-Eighty Laboratory Freezer for ISS), and started Run 2. *[The tapes have recorded the growth of the plants in the ECs (Experiment Containers), and downlinked images have confirm that the cress seedlings have developed OK. Today, the four ECs with the TROPI seedlings were transferred from the EMCS centrifuge to the MWA (Maintenance Work Area), the specimens removed and placed in cold stowage bags, and the latter were inserted in the MELFI. New ECs with fresh seeds (lentil seedling roots) were then installed for Run 2 (GRAVI). EMCS, delivered on ULF1.1, is a combination centrifuge/growth chamber that allows plant growth experiments to be carried out in controlled partial and microgravity conditions. Main research focus is on multi-generation (seed-to-seed) experiments, studies on gravity effects on early development and growth, and on signal perception and transduction in plant tropisms. Experiments with insects, amphibian and invertebrates as well as studies with cell and tissue cultures are also foreseen for EMCS. By sprouting seeds under different levels of partial gravity, and different frequencies of light, this experiment should help to better understand the different systems used by plants to determine in what direction their roots and shoots should grow. In this NASA-sponsored study, Arabidopsis thaliana plants (or thale cress, with a small-sized genome which makes it useful for genetic mapping and sequencing) sprouted from seeds will be video taped and mature plants will be harvested. The ESA-sponsored adjunct experiment GRAVI (Threshold Acceleration for Gravisensing) experiment will grow lentil seedling roots under various gravity conditions. Later, the mature plants will be analyzed at the molecular level to determine what genes are responsible for successful plant growth in microgravity. Insights gained from TROPI can lead to sustainable onboard agriculture for future long duration space missions.]*

In the Lab, CDR Lopez-Alegria started the scheduled Robotics Onboard Trainer (ROBoT) activation/checkout by first making room in the Lab1D1 area by removing filled CTBs (Cargo Transfer Bags) to the Node for temporary stowage, then setting up the ROBoT simulator, configuring its A31p laptops and performing the checkout procedures of the new training tool. After the simulation session, the A31p's were reconfigured for their normal SSC (Station Support Network) functions. *[ROBoT uses DOUG (Dynamic Operations Ubiquitous Graphics) software, a hand controller and two laptops (one for graphics, one for the simulation) for on-orbit training of MSS (Mobile Service System) and SSRMS (Space Station Remote Manipulator System) operations.]*

Mike LA also conducted the periodic quick status check on the ALTEA (Anomalous

Long-Term Effects on Astronauts) payload, using the ELC4 (EXPRESS Rack 4) laptop with the revised software, inspecting the dosimetry LEDs (light emitting diodes) and checking whether the hardware is securely mounted.

Thomas and LA reviewed briefing material on the SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite) payload to familiarize themselves with the test plan and goals of the experiment series, scheduled to resume on Friday (10/27) with Session 5. A teleconference with the Payload Developer (at ~12:35pm EDT) supported the activity. *[SPHERES is to demonstrate the basics of formation flight and autonomous docking, using a beacon as reference for two satellites, to dock and reconfigure under a variety of initial conditions. Previous tests included basic attitude control (performing a series of rotations) with one satellite, attitude-only tracking, attitude and range tracking, and docking with handheld beacon. The payload consists of up to three self-contained 8-inch dia. free-floating satellites which perform the various algorithms (control sequences), commanded and observed by the crew members which provide feedback to shape algorithm development. Each satellite has 12 thrusters and a tank with CO₂ for propellant (tests have shown that the satellites use three times less gas than expected). The first tests used only one satellite (plus two beacons – one mounted and one hand-held); the second satellite arrived on ULF1.1, and the third will be delivered on 12A.1. Formation flight and autonomous docking are important enabling technologies for distributed architectures.]*

Lopez-Alegria deployed two passive FMK (formaldehyde monitoring kit) sampling assemblies in the Lab (below CEVIS) and SM (most forward handrail), to catch any atmospheric formaldehyde on a collector substrate for subsequent analysis on the ground.

As a standard activity before arrival of a visiting vehicle, the crew conducted the periodic sampling of cabin air for subsequent analysis on the ground. *[LA started out by collecting samples with a GSC (Grab Sample Container) at the center of the SM and Lab, while Mikhail Tyurin later used the AK-1M adsorber to sample the air in the SM and FGB and to check for leaked-out Freon with AK-1M-F; he also checked for CO (Carbon Monoxide) in the SM with the IPD-CO Draeger tubes sampler.]*

Tyurin conducted the periodic audit/health check of audit of all stationary SD lighting fixtures in the Russian segment (RS). *[The audit involved 17 lights in SM, 12 in FGB, and three in DC-1. For the health check, Misha used a functioning reference lamp and a reference power supply to test lighting fixtures with one or two faulty lamps and failed power supplies.]*

Thomas Reiter meanwhile performed an audit of various Russian equipment items delivered over time to the ISS for noise abatement. Using an uplinked list, the FE-2 conducted the inventory on items listed as stored behind FGB panels, with a major portion of this equipment having been reported as missing.

The FE-1 transferred U.S. Lab condensate from EDV container to SM tankage using the BPK condensate feed unit.

Afterwards, Mikhail worked on the Russian SRVK-2M condensate water processor, removing its BKO multifiltration/purification unit, which has reached its service life limit, and replacing it with a new unit. The old BKO was stowed for deorbiting in Progress 22. *[The BKO, which contains five purification columns to remove dissolved mineral and organic impurities from the condensate, has a service lifetime of at least 450 liters throughput. The purified (deionized) water is used in the Elektron for electrolysis or, after treatment in the BKV water conditioning unit with salts for taste and silver ions for preservation, as potable water in the KPV container.]*

The crew performed a number of preparatory activities for Progress 23 arrival. First, the CDR hooked up the ER1 ITCS MTL (EXPRESS Rack 1/Internal Thermal Control System/Moderate Temperature Loop) quick disconnect jumpers to the UIP (Utility Interface Panel) in order to support the Progress docking with an active MAMS (Microgravity Acceleration Measurement System).

LA also set up the IWIS (Internal Wireless Instrumentation System) equipment with the desired run times for tomorrow's docking, after powering off the SVG (Space Video Gateway) camcorder and reconfiguring the UOP-5 (Utility Outlet Panel 5) from powering the camcorder to powering the IWIS NCU (Network Control Unit).

Afterwards, the CDR set up and configured television connections in the SM for covering the docking with U.S. assets. This includes the UOP-DCP (Utility Outlet Panel-to-Display & Control Panel) bypass power cable which LA hooked up yesterday at the Cupola RWS (Robotics Work Station). TV set-up preps concluded with a downlink test of the configuration via Ku-band, after which the A31p was deactivated, with all cabling left intact until after the docking. *[With the video available on an SSC (Station Support Computer) A31p laptop in the SM, it can be routed by single cable through the FGB and then via OpsLAN to the US segment (USOS) and downlinked from the Lab to MCC-Houston via Ku-band for subsequent transmittal to TsUP-Moscow.]*

In the U.S. Airlock (A/L), Lopez-Alegria terminated the regeneration on METOX (Metal Oxide) canisters #0007 & #0011, started yesterday, and afterwards supported deactivation of the A/L CCAA (Common Cabin Air Assembly) air

conditioner, now no longer required, by switching the CCAA flex duct from the supply air ducting to the IMV (Intermodular Ventilation) return port. *[Recyclable METOX canisters replaced the old one-way/expendable LiOH (lithium hydroxide) canisters as carbon dioxide (CO₂) removal system in the EMU/spacesuits in 2001. During use, CO₂ is absorbed by them and later removed through a special valve opening by “baking” (heating), which takes place in a special oven in the A/L.]*

On the TVIS, Mike LA performed the weekly maintenance, primarily checking the condition of the SPDs (subject positioning devices) and recording time & date values.

Working off his discretionary task list, the FE-1 conducted the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM.

Misha also updated/edited the standard IMS (Inventory Management System) “delta file”, including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1, CDR), and VELO bike with bungee cord load trainer (FE-1, FE-2). *[The RED resistive exerciser is currently off-limits for the crew due to a “grinding” noise heard yesterday after the pulley cable replacement on 10/23. Photographs were taken and an investigation by specialists is underway.]*

Afterwards, LA transferred his, Misha’s and Thomas’s exercise data files to the MEC for downlink (done six times a week).

Remote Power Controller (RPC) #8 in RPCM S02BE has tripped. No impact on station ops since the RPC supports the non-operating GPS Antenna #4.

Update on S-band/String 1: Troubleshooting continues on the ground on the S-band/String 1 anomaly. 23P docking will be covered by String 2 as per plan, with String 1 on standby as “hot backup”, despite possible intermittent forward link.

Update on CDRA: The Carbon Dioxide Removal Assembly continues to operate well after the IFM on 10/27. There have been no issues with the ASVs (Air Supply Valves).

Update on PCBA: The Portable Clinical Blood Analyzer reported missing by the

crew on 10/19 has been located among the down cargo returned to Earth on STS-115. Until the PCBA is replaced, alternate means such as the sophisticated Russian Reflotron-4 analyzer will be used to fill in for it.

U.S. "Job Jar": The crew's discretionary task list for today held one item: the daily CEO shoot.

Additional U.S. task-listed items for the current Increment include:

- ACS (Atmosphere Control System) hatch seal inspections (CDR, FE-2),
- Airlock & Node BF/SD (CO₂ Filter/Smoke Detector) inspections (CDR, FE-2),
- Airlock/Node/Lab ELPS (Emergency Lighting Power Sources) inspection,
- SEM payload (Space Experiment Module) photography,
- CARD (Investigation of Mechanisms of Heart Disease with New Portable Equipment) hardware locating/gathering,
- BBA (Baseplate Ballast Assembly) R&R and LHA (Lamp Housing Assembly) troubleshooting.

Today's CEO photo targets, from the Lab nadir/science window, were **Chiang Mai, Thailand** (*ISS had a near-nadir pass in good light and fair weather over this major city in NW Thailand. It is situated in the Ping River valley near some of the country's highest mountains. On this pass the crew was advised to shoot just left of track and try to map the urban area in detail with the long lens*), **Mt. Kilimanjaro, Kenya** (*the station had a nadir pass in high sun over this volcanic peak with its small snow and icecap. Looking carefully because it should still have been visible in a field of lower broken clouds well below the summit. Using the long lens for details of the ice fields and glacial features. Center point is at 3.07S, 37.35E*), and **Lake Poopo, Bolivia** (*clear weather and high sun were expected for this nadir pass over this saline lake. Researchers are looking for changes in lake level here so the crew was to try mapping the shoreline in detail. Center point is at 18.35S, 67.08W*).

CEO photography can be viewed and studied at the websites:

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<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

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ISS Orbit (*as of this morning, 7:31am EDT [= epoch]*):

Mean altitude -- 338.2 km

Apogee height -- 346.8 km

Perigee height -- 329.7 km

Period -- 91.30 min.

Inclination (to Equator) -- 51.64 deg
Eccentricity -- 0.001272
Solar Beta Angle -- 13.3 deg (magnitude decreasing)
Orbits per 24-hr. day -- 15.77
Mean altitude loss in last 24 hours -- 106 m
Revolutions since FGB/Zarya launch (Nov. 98) -- 45371

Significant Events Ahead (all dates Eastern and subject to change):

10/26/06 -- Progress M-58/23P docking (SM aft port; 10:28am; NASA TV)
11/03/06 -- ISS Reboost
11/22/06 -- Russian EVA-17 (3-9pm)
11/30/06 -- ISS Reboost
12/07/06 -- STS-116/12A.1 launch
12/09-16/06 -- STS-116/12A.1 docked mission w/ISS -- P5 truss
12/18/06 -- STS-116/12A.1 landing @ KSC
01/10/07 -- Progress M-57/22P undocking (DC1) & reentry
01/19/07 -- US EVA-6
01/23/07 -- US EVA-7
01/27/07 -- US EVA-8
02/07/07 -- Progress M-59/24P launch (may move to 01/18/07)
02/09/07 -- Progress M-59/24P docking (DC1)
03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses (NET; requires 14Slip)
03/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);
CC:
Subject: ISS On-Orbit Status 10/24/06
Date: Tuesday, October 24, 2006 3:04:41 PM
Attachments:

ISS On-Orbit Status 10/24/06

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After wakeup (2:00am), CDR Lopez-Alegria continued his first 7-day SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) log and questionnaire entries in the experiment's laptop application. *[The experiment is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the CDR's sleep/wake patterns and light exposure, LA is wearing a special Actiwatch device which measures the light levels encountered by the CDR as well as his patterns of sleep and activity throughout the Expedition.]*

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research focus is on multi-generation (seed-to-seed) experiments, studies on gravity effects on early development and growth, and on signal perception and transduction in plant tropisms. Experiments with insects, amphibian and invertebrates as well as studies with cell and tissue cultures are also foreseen for EMCS. By sprouting seeds under different levels of partial gravity, and different frequencies of light, this experiment should help to better understand the different systems used by plants to determine in what direction their roots and shoots should grow. In this NASA-sponsored study, Arabidopsis thaliana plants (or thale cress, with a small-sized genome which makes it useful for genetic mapping and sequencing) sprouted from seeds will be video taped and mature plants will be harvested. Later, the mature plants will be analyzed at the molecular level to determine what genes are responsible for successful plant growth in microgravity. Insights gained from TROPI can lead to sustainable onboard agriculture for future long duration space missions.]

Thomas also set up and configured the MWA (Maintenance Work Area) for tomorrow's session with the ESA-sponsored experiment GRAVI (Threshold Acceleration for Gravisensing). *[GRAVI, an adjunct to TROPI, will grow lentil seedling roots under various gravity conditions (from 1/10th - 1/100th of Earth gravity, generated by the EMCS centrifuge) to determine the amount of acceleration force sufficient to stimulate the direction of root growth. During stimulation the gravitropic response (root curvature) will be recorded by time-lapse video during centrifugation to determine the threshold acceleration at which the root responds to the gravity stimulus. This work is relevant to growing sufficient edible crops on future long duration space missions. Gravi is the first ISS experiment to investigate the graviperception and gravisensing abilities of lentil roots. Previous experiments have been flown on the Space Shuttle starting with the Spacelab-D1 mission in 1985, and including STS-107, the tragic last mission of the Columbia.]*

CDR Lopez-Alegria conducted the periodic noise level measurements program in the station interior, using the U.S. sound level meter (SLM) for a 2h 15m acoustic survey. The recorded data were later transferred to the MEC (Medical Equipment Computer). *[Acoustic measurements were obtained at 13 locations in the Lab and 15 locations in the SM. The survey also included five crew preference locations taken at their perceived loudest locations in the station. The SLM gives instantaneous noise levels and their frequency spectra, which are transferred to the MEC laptop via an RS232 cable and later downlinked with regular CHeCS (Crew Health Care Systems) data dump or via OCA. For today's survey, LA was also asked to collect noise level measurements at the LAB1P6 & LAB1S6 racks of the ITCS (Internal Thermal Control System), of the LTL (Low Temperature Loop) pump, with the ground adjusting pump speed and then transitioning the ITCS from single-loop LT to single-loop MT (Moderate Temperature) and back.]*

FE-1 Tyurin performed the periodic transfer of U.S. Lab condensate from EDV container using the BPK condensate feed unit.

Tyurin also worked on the Elektron-VM oxygen generator system, removing and replacing the failed BSSK signal & command matching unit of the SKO oxygen supply system with a new spare, then connecting the BSSK to the BITS2-12 onboard telemetry system for ground checkout. The activities were supported by ground specialist tagup via S-band.

In addition, the FE-1 continued his outfitting work of routing and installing another five new cables in the Russian segment (RS) for the Onboard Equipment Control System (SUBA), to handle new equipment. The job was supported by repeated tagup/discussions with ground specialists.

The FE-2 conducted the periodic/long-term visual inspection of the pressure hull in the SM Working Compartment (RO), behind panels 130, 134, 135, 138 and underneath the TVIS treadmill, looking for any moisture, deposits, mold, corrosion and pitting. *[Thomas inspected the hull surface, which is coated with a primer and dark-green enamel, using cleaning napkins to wipe the area in question if required and reporting results to the ground.]*

Reiter conducted the first 2-hr. session of the ERB (Erasmus Recording Binocular) experiment, taking mapping imagery of the FGB interior with three cameras for high accuracy. *[ERB uses a three-dimensional (3-D) video camera, the Sony DSR PD150P camcorder and a Nikon SSM-3DC-101 3D photo camera for taking imagery of the environment onboard the ISS for an accurate map of the station's interior. The images will be transferred by a computer application into a 3D model to be viewed in the Virtual Reality Theater of ESA's Erasmus Center.]*

Mike LA performed the scheduled monthly routine maintenance on both CSA-CP (Compound Specific Analyzer-Combustion Products) units currently in use as prime and backup (#1043 & #1045). *[The prime unit received a fresh battery, and both units were "zero" calibrated. Following the zero calibration, the backup unit (#1045), attached to the sampling pump, was returned to the Node, while the prime unit's datalogger function was turned on to collect data at the SM Central Post as a spot check. After one hour, the datalogger was deactivated.]*

Using a digital still camera, the CDR took a photo survey of the 4B SAW (Solar Array Wing), in two 45-min. sessions. Both SAWs were feathered and latched for 23P docking for plume protection, 2A at 75.9 deg, 4A at 281 deg.

In the U.S. Airlock (A/L), Lopez-Alegria terminated the regeneration on METOX (Metal Oxide) canisters #0007 & #0011, started yesterday, and initiated the process

on two other canisters (#0017 & #0020). *[Recyclable METOX canisters replaced the old one-way/expendable LiOH (lithium hydroxide) canisters as carbon dioxide (CO₂) removal system in the EMU/spacesuits in 2001. During use, CO₂ is absorbed by them and later removed through a special valve opening by “baking” (heating), which takes place in a special oven in the A/L.]*

The FE-2 conducted the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables and today also the weekly BRPK air/liquid condensate separator apparatus inspection.

The CDR updated/edited the standard IMS (Inventory Management System) “delta file”, including locations, for the regular weekly automated export/import to its three IMS databases on the ground (Houston, Moscow, Baikonur).

In preparation for a scheme test of the Ku-band system tomorrow and the viewing of 23P docking on Thursday, Mike LA hooked up the UOP-DCP (Utility Outlet Panel-to-Display & Control Panel) bypass power cable at the Cupola RWS (Robotics Work Station) for the Robotics video equipment.

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1), RED resistive exerciser (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, LA transferred his, Misha’s and Thomas’s exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the RED workouts, followed by their erasure on the HRM storage medium (done six times a week).

At ~6:35am EDT, the crew downlinked two TV PAO messages of greetings and congratulations, first to the winners of this year’s 14th International Space Olympiad of School Students at Korolev near Moscow, the other to the participants of the Telefood 2006 Charity event in Cuba under the auspices of the United Nations. *[Participants in the traditional annual Space Olympiad are from Russia/Korolev, Australia, Greece, Germany, Great Britain, Kazakhstan and the USA. This year, the Olympiad is dedicated to the 60th Anniversary of RSC Energia. Telefood 2006 is an audiovisual “marathon” event organized by the UN Organization for Food and Agriculture (FAO), to be transmitted from Havana, Cuba, on 11/11. The funds collected in each Telefood marathon are directly destined for specific projects to solve urgent food problems.]*

At ~9:55am, the three crewmembers conducted an interactive PAO TV interview event with the Orange County Register (Gary Robbins), with focus on Mike LA's background and time spent in California.

Update on TRRJ Testing: Both S1 and P1 TRRJs (Thermal Radiator Rotary Joints) rotated together for the first time ever yesterday, completely successfully. Today's TRRJ plan includes a checkout of the string switchover software on each loop, followed by more Autotrack time. For 23P docking, both TRRJs will be temporarily parked and locked at 0 degrees. There is no ammonia flowing through the radiators at this time. *[This is the fourth on-orbit TRRJ checkout. Anomalies were discovered during the three previous tests, several of which have now been fixed. TRRJ functionality is required at 12A.1 with ETCS (External Thermal Control System) activation.]*

U.S. "Job Jar": Mike LA's discretionary task list for today held two items: setting up the Robotics Onboard Trainer (ROBoT) structural components in the Lab ("hard"-scheduled tomorrow), and the daily CEO shoot.

--Additional U.S. task-listed items for the current Increment include:
--ACS (Atmosphere Control System) hatch seal inspections (CDR, FE-2),
--Airlock & Node BF/SD (CO₂ Filter/Smoke Detector) inspections (CDR, FE-2),
--Airlock/Node/Lab ELPS (Emergency Lighting Power Sources) inspection,
--SEM payload (Space Experiment Module) photography,
--CARD (Investigation of Mechanisms of Heart Disease with New Portable Equipment) hardware locating/gathering,
--BBA (Baseplate Ballast Assembly) R&R and LHA (Lamp Housing Assembly) troubleshooting.

Today's CEO photo targets, from the Lab nadir/science window, were **Mekong River Delta** (*scientists are monitoring the Mekong Delta because of dynamic changes that are expected to occur. The Mekong is undergoing intense modification because of an expansion of dams along the river. These dams have an effect on water and sediment flow. Increasing population is also expressed in land use change along the river and in the delta. The crew was asked to use this pass to get context views of the Mekong River and delta. The center point of the box defined for the Mekong Delta is 10.0N, 105.5E*), **Ganges River Delta** (*the orbit track took ISS just to the S and E of the Ganges River delta. As with most deltas, increased population pressure manifests itself as dynamic land use change and thus sediment discharge in the delta. Using this opportunity to acquire context views of the delta. As with most deltas, it was expected that there were some popcorn cumulus in the area, but the crew should still have been able to get useful imagery. The center point of the box defined for the Ganges Delta is 23.0N, 93.0E*), and **Aorounga Impact Crater** (*Aorounga impact crater is one of the more*

interesting craters in Africa. One reason is that it is located just to the S and E of the Tibesti Plateau, a large dark feature that sits well above the Sahara. Numerous volcanic craters are present on the plateau. Aorounga was confirmed as an impact crater when scientists found the presence of shocked features within samples taken from the crater. The minerals found could only be created from intense heat and pressure created from an impact and not from a volcano. Aorounga appears almost as if it were a "bulls-eye" with concentric rings. There are also large wind grooves transgressing through the crater. The Tibesti plateau sits high enough that wind flow does not go over the top of the plateau but around it. Center point of this feature is 19.10N, 19.2E).

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11/30/06 -- ISS Reboost

12/07/06 -- STS-116/12A.1 launch

12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss

12/18/06 -- STS-116/12A.1 landing @ KSC

01/10/07 -- Progress M-57/22P undocking (DC1) & reentry

01/19/07 -- US EVA-6

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03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses (NET; requires 14Slip)
03/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);
CC:
Subject: ISS On-Orbit Status 10/23/06
Date: Monday, October 23, 2006 2:29:34 PM
Attachments: [image002.gif](#)

ISS On-Orbit Status 10/23/06

All ISS systems continue to function nominally, except those noted previously or below.
Underway: Week 5 of Increment 14.

Progress M-58 (23P) launched flawlessly on time at 9:41:35am EDT from Baikonur/Kazakhstan (18:41 local time, *see **picture at bottom***). After normal separation of the first, second and third stage of the Soyuz-U rocket, antennas and solar arrays deployed nominally at orbit insertion (9:50am). With that, the new cargo ship, of ~7200 kg mass including ~2400 kg of cargo, is on its way to rendezvous with ISS. **Docking is on 10/26 (~10:28am EDT)** at the Service Module (SM) aft port (+x). *[At orbit insertion, Progress unfolded two solar arrays, four Kurs antennas, one TORU/Rassvet-M antenna and one telemetry antenna. Later, the docking probe (SSh) was extended, followed by a 6-min long self-test of both subsets of the Kurs-A MCS (motion control system) including the Klest TV system. Two orbit adjustment burns of 5 min duration each were executed, DV1 (11.60 m/s) at ~1:16pm EDT and DV2 (3.83 m/s) at ~1:55pm, both with the SKD main engine. DV3 is scheduled for Wednesday (10/25), followed by Progress Kurs-A activation and self-test on Thursday (10/26). As Kurs-A and Kurs-P (on SM) confer and "compare notes", Klest TV camera & floodlight are turned on at 8 km (9:52am). Three successive braking burns lead into flyaround mode (400 m, 10:08am), stationkeeping (160 m), and final approach (10:19am). After the three-day "chaser" flight, 23P will dock at the SM +x (aft) port on 10/26 at ~10:28am. 23P cargo (~2.5 tons total) comprises ~870 kg propellants, ~50 kg gaseous oxygen, and ~1263 kg dry cargo, including food, crew provisions, CHecs and maintenance gear (221 total items: 144 Russian, 75 NASA, 2 ESA). Water will not be delivered this time. High-priority items include research payloads, EVA equipment and some immediately-needed Elektron repair parts (however, a new Elektron BZh Liquid Unit is scheduled for 24P, as are 350 new SFOG cartridges, using NaClO₄ {Sodium Perchlorate} instead of LiClO₄ {Lithium Perchlorate} and thermal ignition, for 262 man-days).]*

CDR Lopez-Alegria started his first seven-day SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) sleep log and questionnaire entries in the experiment's laptop application. *[The experiment is supported by the HRF1 (Human Research Facility 1) laptop. To monitor the CDR's sleep/wake patterns and light exposure, he is wearing a special Actiwatch device which measures the light levels encountered by the CDR as well as his patterns of sleep and activity throughout the Expedition.]*

FE-2 Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize*

different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]

The CDR, assisted by FE-1, undertook his second general U.S. PFE (Periodic Fitness Evaluation), a monthly 1.5-hr. procedure to check up on blood pressure and electrocardiogram (ECG) during programmed exercise on the CEVIS (Cycle Ergometer with Vibration Isolation) in the Lab. Readings were taken with the BP/ECG (Blood Pressure/Electrocardiograph) and the HRM (Heart Rate Monitor) watch with its radio transmitter. *[BP/ECG provides automated noninvasive systolic and diastolic blood pressure measurements while also monitoring and displaying accurate heart rates on a continual basis at rest and during exercise.]*

On the HRF-2 (Human Research Facility 2) rack, Thomas Reiter broke out and installed the PFE OUM (Periodic Fitness Evaluation/Oxygen Uptake Measurement) equipment to obtain measurements on himself according to protocol, with Mike LA acting as OUM-PFE operator. *[Later in the day, the evaluation protocol was updated, the gear deactivated and stored and the OUM-PFE laptop powered down.]*

FE-1 Tyurin performed Part 2 of the previously begun outfitting work in the SM of installing and routing new cables for the Onboard Equipment Control System (SUBA), to handle new equipment. The activities were supported by ground specialist tagup via S-band.

Afterwards, the Russian Flight Engineer used the "Elektronika" Multimeter (MMTs-01) for voltage measurements, checking on continuity of the SUBA bus connections and the BKS onboard cable network.

Mikhail also worked on the backup Central Processor system (PTsB) of the BITS2-12 onboard telemetry system, removing and replacing its data storage unit (PZU-B) with a new spare.

In the Lab, Thomas set up the batteries of the ERB (Erasmus Recording Binocular) experiment in the Cannon dual lithium ion battery charger for the 4-hr. charging process for another upcoming session. *[ERB is a three-dimensional (3-D) video camera being employed for taking imagery of the environment onboard the ISS. The images will be used to create an accurate map of the station's interior. For deriving an accurate model of the interior, specialists will use the images from the ERB, the Sony PD-150P video camera and the Nikon 3-D still camera.]*

Reiter had 4.5 hrs reserved to work in the FGB where he prepared and installed new cargo containers behind panel 221 (Zone 38), supported by ground specialist tagup.

Tyurin completed the periodic switchover of the Russian STTS telephone/telegraph subsystem to an alternate string, today to the primary string after its operation on the backup string since 10/13. *[The "Voskhod-M" STTS enables telephone communications between the SM, FGB, DC1 and U.S. segment (USOS), and also with users on the ground over VHF channels selected by an operator at an SM comm panel, via STTS antennas on the SM's outside. There are six comm panels in the SM with pushbuttons for accessing any of three audio channels, plus an intercom channel. Other modes of the STTS include telegraphy (teletype), EVA voice, emergency alarms, Packet/Email, and TORU docking support.]*

In the DC1 Docking Compartment, Tyurin worked on the Matryoshka-R radiation payload, removing science hardware from the MOSFET (metal oxide semiconductor field-effect transistor)

radiation dosimeter of the payload's Phantom Sphere and transferring the Phantom from the SM to a storage area. The installation site of the MOSFET Dosimeter unit was photographed and the pictures transferred to the RSK1 laptop for downlink to Earth via OCA. *[The complex Matryoshka payload suite is designed for sophisticated radiation studies. Besides the Phantom Sphere containers in the SM, the human torso in the DC1 is equipped with individual horizontal slice-like layers with 356 thermoluminescent detectors (TLDs) and five nuclear radiation tracking detectors (NTDPs). The mannequin is covered with a "poncho" and "hood" and used for studies of on-orbit radiation and long-term dose accumulation. Note: Matryoshka is the name for the traditional Russian set of nested dolls.]*

Misha also performed the routine task of taking two photos of the FGB nadir port's docking cone, used for the recent Soyuz TMA-9/13S relocation from the SM aft port, a standard practice after Russian dockings. These images are used to refine current understanding of docking conditions. The pictures were later downlinked via OCA assets. *[The objective is to take photo imagery of the scratch or scuff mark left by the head of the docking probe on the internal surface of the drogue (docking cone) ring, now rotated out of the passageway. As other crewmembers before him, the FE-1 used the Nikon D1X digital still camera to take two pictures each with the hatch closed down]*

In the U.S. Airlock (A/L), Mike LA terminated the regeneration on METOX (Metal Oxide) canisters #0012 & #0013, started yesterday, and initiated the process on two other canisters (#0007 & #0011). *[Recyclable METOX canisters replaced the old one-way/expendable LiOH (lithium hydroxide) canisters as carbon dioxide (CO₂) removal system in the EMU/spacesuits in 2001. During use, CO₂ is absorbed by them and later removed through a special valve opening by "baking" (heating), which takes place in a special oven in the A/L.]*

LA also worked on the RED (Resistive Exercise Device), replacing its pulley cables (done after every 53,515 cycles, based on life cycle testing results & safety controls), and then completed the on-orbit load calibration of its Flexpack canisters as required after cable replacements. (Last time done: 1/17/06). *[The calibration of the Schwinn RED cans re-establishes the relationship of specific load settings with a specific number of pulls per setting, followed by recording of the load values measured with a calibration tool and steel handles from the on-orbit calibration kit.]*

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR), and VELO bike with bungee cord load trainer (FE-1), with LA's and Thomas' CEVIS runs performed as part of their PFE (Physical Fitness Evaluation) sessions today.

Afterwards, LA transferred his, Misha's and Thomas's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

The CDR also conducted the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables, and the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/Moscow.

At ~2:30pm, LA, Misha and Thomas held their standard weekly teleconference with the JSC Astronaut Office, via S-band S/G (space-to-ground). *[The new Head of the Astronaut Office is Steven Lindsey (Shuttle CDR of STS-121/Discovery).]*

Update on CDRA: On Friday (10/27), the crew successfully completed the extensive CDRA IFM (Carbon Dioxide Removal Assembly/Inflight Maintenance), in the process overcoming a number of installation anomalies/ obstacles. Lessons learned from the activity are being incorporated into future CDRA IFM procedures. CDRA is currently operating nominally in single bed mode. *[CDRA will remain operational throughout the week to support CO₂ removal during METOX regeneration (see above) and the planned SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellites) sessions, which use CO₂ as propellant gas.]*

Update on TRRJ Testing: Both S1 and P1 TRRJs (Thermal Radiator Rotary Joints) are now in Autotrack, for the first time in ISS Program history simultaneously. Ground engineers are today starting a 5-day operational checkout of the assemblies, consisting of FDIR (Failure, Detection, Isolation and Recovery) testing, collecting data on previous on-orbit anomalies, and general characterization of TRRJ performance over an extended period. For 23P docking, both TRRJs will be temporarily parked and locked at 0 degrees. There is no ammonia flowing through the radiators at this time. *[This is the fourth on-orbit TRRJ checkout. Anomalies were discovered during the three previous tests, several of which have now been fixed. TRRJ functionality is required at 12A.1 with ETCS (External Thermal Control System) activation.]*

From his discretionary “job jar” task list, Mike LA has now completed the current ISS Video Tour taping. One item remaining on the task list for the current week is setting up the Robotics Onboard Trainer (ROBoT) structural components in the Lab.

Additional U.S. task-listed items for the current Increment include:

- ACS (Atmosphere Control System) hatch seal inspections (CDR, FE-2),
- Airlock & Node BF/SD (CO₂ Filter/Smoke Detector) inspections (CDR, FE-2),
- Airlock/Node/Lab ELPS (Emergency Lighting Power Sources) inspection,
- SEM payload (Space Experiment Module) photography,
- CARD (Investigation of Mechanisms of Heart Disease with New Portable Equipment) hardware locating/gathering,
- BBA (Baseplate Ballast Assembly) R&R and LHA (Lamp Housing Assembly) troubleshooting.

No CEO (Crew Earth Observations) targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (as of this morning, 6:48am EDT [= epoch]):

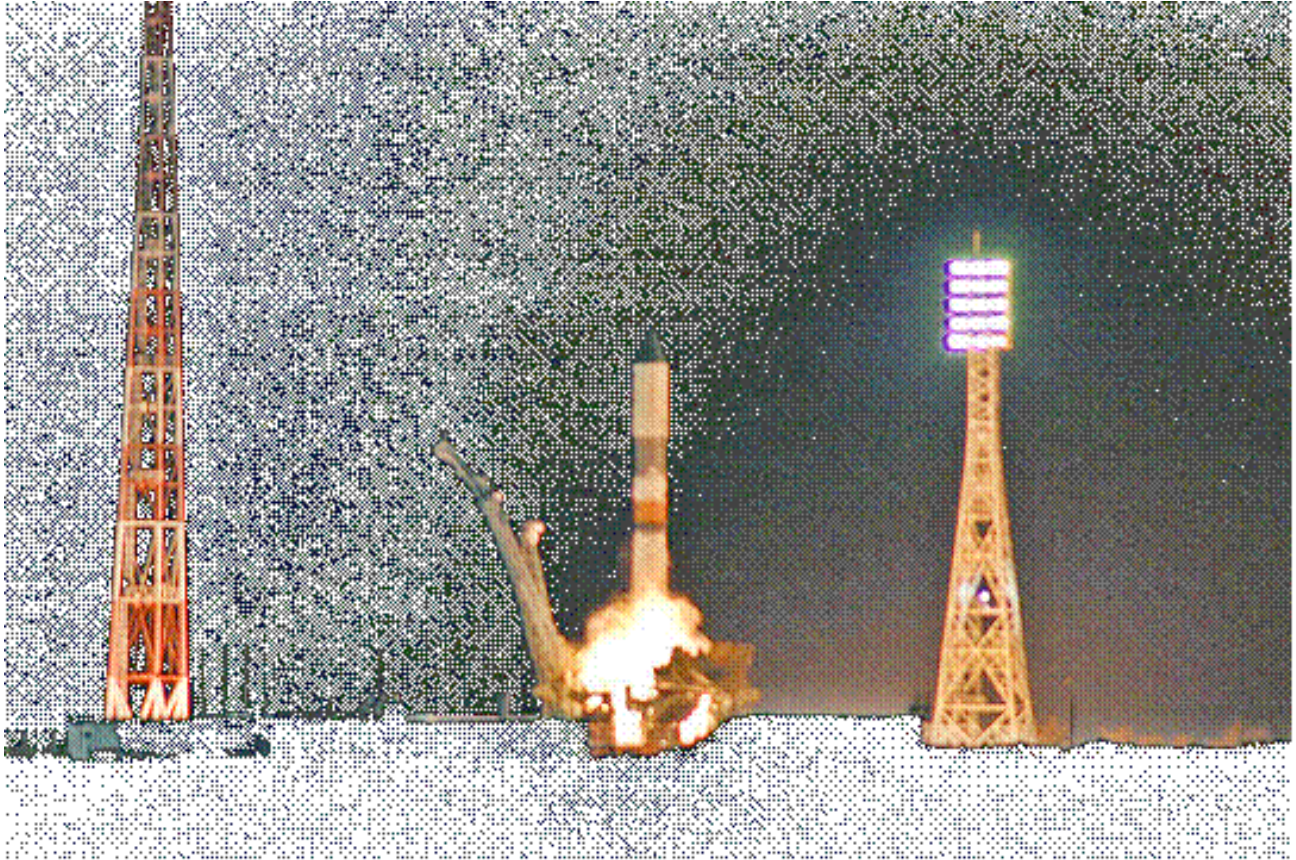
Mean altitude -- 338.4 km

Apogee height -- 347.1 km
Perigee height -- 329.7 km
Period -- 91.30 min.
Inclination (to Equator) -- 51.63 deg
Eccentricity -- 0.0012958
Solar Beta Angle -- 21.9 deg (magnitude decreasing)
Orbits per 24-hr. day -- 15.77
Mean altitude loss in last 24 hours -- 177 m
Revolutions since FGB/Zarya launch (Nov. 98) -- 45339

Significant Events Ahead (all dates Eastern and subject to change):

10/26/06 -- Progress M-58/23P docking (SM aft port; 10:28am; NASA TV)
11/03/06 -- ISS Reboost
11/22/06 -- Russian EVA-17 (3-9pm)
11/30/06 -- ISS Reboost
12/07/06 -- STS-116/12A.1 launch
12/09-16/06 -- STS-116/12A.1 docked mission w/ISS -- P5 truss
12/18/06 -- STS-116/12A.1 landing @ KSC
01/10/07 -- Progress M-57/22P undocking (DC1) & reentry
01/19/07 -- US EVA-6
01/23/07 -- US EVA-7
01/27/07 -- US EVA-8
02/07/07 -- Progress M-59/24P launch (may move to 01/18/07)
02/09/07 -- Progress M-59/24P docking (DC1)
03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses (NET; requires 14Slip)
03/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

Launch of Progress M-58/23P on Soyuz-U (10/23/06; 6:41pm local time).



From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 10/22/06
Date: Sunday, October 22, 2006 12:52:00 PM
Attachments:

ISS On-Orbit Status 10/22/06

All ISS systems continue to function nominally, except those noted previously or below. *Sunday -- off-duty day for CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Thomas Reiter, except for regular maintenance and voluntary work. Ahead: Week 5 of Increment 14.*

Thomas Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

The CDR conducted the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the Service Module (SM), including the ASU toilet facilities systems/replaceables, and the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/Moscow.

In the U.S. Airlock (A/L), Mike LA installed two METOX canisters (Metal Oxide, #0012 & #0013) in the oven and started their regeneration. *[Recyclable METOX canisters replaced the old one-way/expendable LiOH (lithium hydroxide) canisters as carbon dioxide (CO₂) removal system in the EMU/spacesuits in 2001. During use, CO₂ is absorbed by them and later removed through a special valve opening by "baking" (heating), which takes place in a special oven in the A/L.]*

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR), and VELO bike with bungee cord load trainer (FE-1).

Reiter and Lopez-Alegria had their weekly PFCs (private family conferences) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop, currently SSC-8 in the Lab at portside), Thomas at 10:50am EDT, LA at 3:42pm.

No CEO (Crew Earth Observation) photo targets uplinked today.

From his discretionary “job jar” task list, Mike LA has now completed unpacking the IMAK (ISS Medical Accessory Kit) and reconfiguring MELFI (Minus-Eighty Laboratory Freezer for ISS) (consolidating all individual NUTRITION urine sample Ziploc bags in one container). Items remaining on the task list for the week ahead are more of the current ISS Video Tour taping and setting up the Robotics Onboard Trainer (ROBoT) structural components in the Lab.

Task-listed items for the current Increment include:

- ACS (Atmosphere Control System) hatch seal inspections (CDR, FE-2),
- Airlock & Node BF/SD (CO₂ Filter/Smoke Detector) inspections (CDR, FE-2),
- Airlock/Node/Lab ELPS (Emergency Lighting Power Sources) inspection,
- SEM payload (Space Experiment Module) photography,
- CARD (Investigation of Mechanisms of Heart Disease with New Portable Equipment) hardware locating/gathering,
- BBA (Baseplate Ballast Assembly) R&R, and LHA (Lamp Housing Assembly) troubleshooting.

Update on Progress M-58/23P: At Baikonur/Kazakhstan, L-1 launch preparations are continuing on schedule for tomorrow’s liftoff (9:40am EDT).

No CEO (Crew Earth Observations) targets uplinked for today.

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 6:17am EDT [= epoch]*):

Mean altitude -- 338.6 km

Apogee height -- 347.3 km

Perigee height -- 330.0 km

Period -- 91.31 min.
Inclination (to Equator) -- 51.63 deg
Eccentricity -- 0.0012864
Solar Beta Angle -- 25.9 deg (magnitude decreasing)
Orbits per 24-hr. day -- 15.77
Mean altitude loss in last 24 hours -- 107 m
Revolutions since FGB/Zarya launch (Nov. 98) -- 45323

Significant Events Ahead (all dates Eastern and subject to change):

10/23/06 -- Progress M-58/23P launch (9:40:34am)
10/26/06 -- Progress M-58/23P docking (SM aft port; 10:28am; NASA TV)
11/03/06 -- ISS Reboost
11/22/06 -- Russian EVA-17 (3-9pm)
11/30/06 -- ISS Reboost
12/07/06 -- STS-116/12A.1 launch
12/09-16/06 -- STS-116/12A.1 docked mission w/ISS -- P5 truss
12/18/06 -- STS-116/12A.1 landing @ KSC
01/10/07 -- Progress M-57/22P undocking (DC1) & reentry
01/19/07 -- US EVA-6
01/23/07 -- US EVA-7
01/27/07 -- US EVA-8
02/07/07 -- Progress M-59/24P launch (may move to 01/18/07)
02/09/07 -- Progress M-59/24P docking (DC1)
03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses (NET; requires 14Slip)
03/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\);](#)
CC:
Subject: ISS On-Orbit Status 10/21/06
Date: Saturday, October 21, 2006 1:49:00 PM
Attachments: [image003.gif](#)
[image004.gif](#)
[image005.gif](#)

ISS On-Orbit Status 10/21/06

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 14 crew CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Thomas Reiter.*

Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

The crew completed the regular weekly three-hour task of thorough station cleaning, wearing protective garment. *["Uborka", normally done every Saturday, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with "Fungistat" disinfectant wipes; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

Working on the MEC (Medical Equipment Computer), the CDR filled out the regular weekly FFQ (food frequency questionnaire), his fourth, which keeps a personalized log of his nutritional intake over time on special MEC software. *[The FFQ records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins.]*

The FE-2 conducted the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables and today also the weekly BRPK air/liquid condensate separator apparatus inspection.

At ~8:52am EDT, the crew engaged in their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

At ~12:01pm Mikhail Tyurin had his weekly PFC (private family conference) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop, currently SSC-8 in the Lab at portside).

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exercise device (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1). *[TVIS running speed limit for Exp-14 is set at 10 mph/16.1 km/h.]*

Afterwards, Mike LA transferred his, Misha's and Thomas' exercise data files to the MEC for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Lopez-Alegria's discretionary "job jar" task list is showing the following jobs for the week ahead:

- IMAK (ISS Medical Accessory Kit) unpacking,
- More of the current ISS Video taping,
- MELFI (Minus-Eighty Laboratory Freezer for ISS) reconfiguring, i.e., consolidating all individual NUTRITION urine sample Ziploc bags in one container), and
- Setting up the Robotics Onboard Trainer ROBoT) structural components in the Lab.

Task-listed items for the current Increment include:

- ACS (Atmosphere Control System) hatch seal inspections (CDR, FE-2),
- Airlock & Node BF/SD (CO₂ Filter/Smoke Detector) inspections (CDR, FE-2),
- Airlock/Node/Lab ELPS (Emergency Lighting Power Sources) inspection,
- SEM payload (Space Experiment Module) photography,
- CARD (Investigation of Mechanisms of Heart Disease with New Portable Equipment) hardware locating/gathering,
- BBA (Baseplate Ballast Assembly) R&R; LHA (Lamp Housing Assembly) troubleshooting.

Update on Progress M-58/23P: At Baikonur/Kazakhstan, the work programmed for "first launch day" is underway on Progress M-58. This morning at 5:00am Moscow Time, the assembled Soyuz launch system was rolled out from the Integration & Checkout Facility to the launch pad and the Soyuz-U carrying the 23P cargo vehicle was erected on the launch pad (**see pictures at bottom**).

Weekly Science Update (*Expedition Fourteen -- 4th*):

ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS): Nominal operations. Next activities with ALTEINO are currently planned on 10/26 and 10/27 – only rotation of the instrument is foreseen.

ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System): Continued into the Increment 14.

BASE: Complete.

BCAT-3 (Binary Colloidal Alloy Test-3): Planned.

CARD (Latent Virus Shedding during Spaceflight, ESA): Planned.

CBOSS (Cellular Biotechnology Support Systems): Complete.

CFE (Capillary Flow Experiment): Complete.

CULT (Cultural Factors Questionnaire): Fourth session for Thomas Reiter has been performed nominally 10/6.

DAFT (Dust & Aerosol Measurement Feasibility Test): Complete.

Earth Knowledge Acquired by Middle School Students (EarthKAM): Planned.

EMCS (European Modular Cultivation System, ESA): EMCS ops completed for Increment 13 with some forward work for Increment 14.

ETD (Eye Tracking Device): Sixth session for Thomas Reiter is currently planned on 10/25.

GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology): Planned

IMMUNO (Saliva Sampling): Complete.

InSPACE (Investigating the Structure of Paramagnetic Aggregates from Colloidal Emulsions): Complete.

LBP (Lower Back Pain): Complete.

LEUKIN: Complete.

MISSE (Materials ISS Experiment): Ongoing.

MTR-2 (Russian radiation measurements): Passive dosimeters measurements in DC1 "PIRS".

NOA (Nitric Oxide Analyzer): The eighth session for Thomas Reiter has been performed nominally on 10/19.

Nutrition: Planned.

PFMI (Pore Formation & Migration Investigation): Complete.

PFS (Pulmonary Function System, upgrade of existing system): Complete.

PK-3 (Plasma Crystal 3): Second set of experiments with Thomas Reiter is under execution this week, from 10/16 to 10/20.

POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G): Planned.

RC (Refrigerated Centrifuge): Planned.

RS (Renal Stone): Planned.

SAMPLE: Complete.

SLEEP: Planned.

SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite): Planned.

Swab (Characterization of Microorganisms & Allergens in Spacecraft): Planned.

TROPI (Study of Novel Sensory Mechanism in Root Phototropism): After Thomas' preparation tasks at the EMCS (European Modular Cultivation System), the first TROPI science run was initiated at 10/20. Automated hydration of the seeds was successfully completed and confirmed by downlinked images. The seeds will now start to germinate, and the photo-stimulation portion of the experiment will follow in four day's time. The TROPI team thanks Thomas for his efforts in initiating the experiment.

YING (Yeast in No Gravity): Complete.

CEO (Crew Earth Observations): Through 10/14, the ground has received a total of 417 of Inc14 CEO images for review and cataloging. Researchers are "well pleased" with the section of High Andean Glacier site that were acquired last week. "These are the best images to date we have of Cordillera Blanca of Peru. You also made an excellent acquisition with the 400mm lens of the tiny impact crater, Roter Kamm in southern Namibia. We continue to see improvement in focus of your long lens photography and feel you are ready to begin practice at 800mm using the doubler. We will continue to work with you on whatever techniques you prefer to use on locating our targets efficiently and we really appreciate all the feedback you are providing our team."

Today's CEO photo targets, from the Lab nadir/science window, were **Roter Kamm Impact Crater** (*ISS had a near nadir pass in clear weather and high sun over this impact site. Trying for detailed views using the 400mm lens with doubler. This small, 2.5km diameter, feature is situated near the eastern edge of coastal dunes and just north of the Orange River near 27.8S 16.3E*), **Vista Alegre Impact Crater** (*weather was marginal, but ISS had a nadir pass in high sun over this impact feature. It is 9.5km is diameter and about 65 million years old. Trying for contextual mapping views of the vicinity of this feature for later use. The site is in an agricultural area of dissected hills near 25.0S 52.7W*), and **Lake Poopo, Bolivia** (*the visible hydrology of Lake Poopo and its neighboring salars [= dry lake beds] is strongly linked to the El Nino climate cycle. This pass was to the NW so the crew looked right of track and tried for context views this time. Poopo is a saline lake situated at the opposite [southern] end of the Andean Altiplano from Lake Titicaca near 18.7S 68.0W*).

Why CEO?

Astronaut acquired imagery documents human impacts on the Earth—such as city growth, agricultural expansion, and reservoir construction. Today, handheld photography of the world from human spaceflight missions, spanning more than 40 years, provides valuable insight into Earth processes and the effects of human activities on the planet. Photographic images taken by astronauts serve as both primary data on the state of the Earth and as secondary data to be combined with images from other satellites in orbit. Through their photography of the Earth, International Space Station crewmembers will build on the time series of imagery started with the first human spaceflights, ensuring that this continuous record of Earth remains unbroken. Photographs taken from ISS also represent new advances in the way that the Earth is documented. The use of long lenses can produce high spatial resolution images that have no equal among publicly available image sources. To date, over 250,000 of CEO images have been taken in the first six years of the ISS, about one third of the total number of images taken from orbit by astronauts. CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 7:30am EDT [= epoch]*):

Mean altitude -- 338.7 km

Apogee height -- 347.5 km

Perigee height -- 329.5 km

Period -- 91.31 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0013062

Solar Beta Angle -- 29.7 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 97 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45308

Significant Events Ahead (all dates Eastern and subject to change):

10/23/06 -- Progress M-58/23P launch (9:40:34am) – see pictures below
10/26/06 -- Progress M-58/23P docking (SM aft port; 10:28am; NASA TV)
11/03/06 -- ISS Reboost
11/22/06 -- Russian EVA-17 (3-9pm)
11/30/06 -- ISS Reboost
12/07/06 -- STS-116/12A.1 launch
12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss
12/18/06 -- STS-116/12A.1 landing @ KSC
01/10/07 -- Progress M-57/22P undocking (DC1) & reentry
01/19/07 -- US EVA-6
01/23/07 -- US EVA-7
01/27/07 -- US EVA-8
02/07/07 -- Progress M-59/24P launch (may move to 01/18/07)
02/09/07 -- Progress M-59/24P docking (DC1)
03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses (NET; requires 14Slip)
03/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

23P rollout to pad – 10/21/06



Soyuz-U w/Progress M-58 being erected on Pad 1



L-2 launch preparations underway – 10/21/06



From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Von Puttkamer, Jesco H. \(HQ-CE010\)](#);
CC:
Subject: ISS On-Orbit Status 10/20/06
Date: Friday, October 20, 2006 2:00:42 PM
Attachments: [image001.gif](#)

ISS On-Orbit Status 10/20/06

All ISS systems continue to function nominally, except those noted previously or below. *11th anniversary of Mike LA's first space flight (STS-73/Columbia, 10/20-11/5/1995); three more to follow to date.*

FE-2 Thomas Reiter conducted the third and final experiment of the current science session with the Russian/German TEKh-20 Plasma Crystal-3+ (PK-3+) payload, modified from yesterday's run. The hardware was then torn down. *[After wakeup, Reiter again activated the PK-3/N turbopump in the Service Module (SM) Transfer Compartment (PkhO) to keep the work chamber (ZB) in the SM RO (Work Compartment) at a vacuum. Then he set up the experiment, supported by tagup with the ground via S-band. Video recording began ~6 min after experiment initiation. The experiment, running in automatic mode, is performed on plasma, i.e., fine particles charged and excited by HF (high frequency) radio power inside the evacuated work chamber. Particle sizes today were 3.4 and 6.8 microns in diameter. Main objective was to obtain images of wave propagation at various pressures and particle quantity with and without superimposition of an LF (low-frequency) harmonic electrical field at variable frequency. Afterwards, PK-3+ was terminated and disassembled, after collected data were downlinked via OCA laptop (from USB stick). (Cosmonauts appreciate PK-3+ particularly because it allows them to actually see the results of their work, as opposed to past crystal growth experiments).]*

Reiter also continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

CDR Lopez-Alegria, assisted in part by Thomas Reiter, had six hours allocated on

the timeline for today's major IFM (Inflight Maintenance) on the U.S. CDRA (Carbon Dioxide Removal Assembly) in the Lab's AR (Atmosphere Revitalization) rack, removing and replacing the two Air Selector Valves (ASVs) which regulate air flow into the regenerable desiccant/sorbent beds. *[The time consuming job involved demating ITCS (Internal Thermal Control System) supply & return line QDs (quick disconnects), rotating the AR rack away from the Lab wall, and opening its back for accessing, disconnecting, unbolting and removing the CDRA from the rack. Afterwards, these steps were to be executed in reverse order for reinstallation. In addition to the replacement of ASV #101 (Bed 1) and #102 (Bed 2), Mike LA was also to install a sock filter in absorption bed #1 and inspect/clean the 1.5-in sock filter in bed #2. Zeolite powder and debris leaking from the beds have caused the ASVs to stick and fail, previously on two valves during Increment 5 and now on ASV 101 (ASV 102 was also to be replaced, to avoid having to remove CDRA again in the near future).]*

After a preparatory review of procedures and ground specialist tagup via S-band, FE-1 Tyurin conducted the annual inspection and photo-documentation of window panes in the SM. The observed defects were recorded in image and text files on the RSK1 laptop for subsequent downlink via U.S. OCA assets. *[Objective of the inspection, using digital still camera (Nikon D1X w/SB-28DX flash) and voice recorder, was to assess the pane surfaces on SM windows 1, 6, 7, 8, 9 for any changes (new cavities, scratches, new or expanded old stains or discolorations affecting transparency properties) since the last inspection, performed by Valery Tokarev on 12/20/05. The new assessment will be compared to the earlier observations. Defects are measured with the parallax method which uses eyeball-sighting with a ruler and a right isosceles triangle to determine the defects' size and position with respect to the window's internal surface (parallax being the apparent change in an object's position resulting from changing the observer's position).]*

Later, using the pump/hose hookup configured earlier by Reiter (10/5), Tyurin performed another urine transfer from filled EDV-U liquid waste containers to the BV1 "Rodnik" water tank of the 22P cargo ship-turned-trash can for disposal. *[Each of the two spherical Rodnik tanks (BV1 & BV2) consists of a hard shell with a soft membrane (bladder) composed of elastic fluoroplastic. The bladder is used to expel water from the tank by compressed air pumped into the tank volume surrounding the membrane.]*

The two FEs joined forces in conducting a comprehensive audit/inventory of SSGO sanitary-hygiene systems, either for pre-packing used/expired items for disposal on 22P or designating others (e.g., wipes, towels) for priority use pending approaching expiration dates.

LA performed the periodic (~weekly) atmospheric status check for ppO₂ (Partial Pressure Oxygen) and ppCO₂ (pp Carbon Dioxide), taking CSA-CP (Compound Specific Analyzer-Combustion Products) readings and also using the CSA-O₂ (Compound Specific Analyzer-Oxygen Sensor) and CDMK (CO₂ Monitoring Kit).

[CSA-CP measurements were gathered with unit #1043 (prime) at the SM Central Post and with #1045 (backup unit) in the Node, CSA-O2 (#1042, #1063) in the Lab, and CDMK (#1009) in SM and Lab. The instruments were turned off afterwards, except for the prime CSA-CP which continues to run.]

Weekly cabin air readings were also collected by Misha with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system of the SM SOGS (Pressure Control & Atmospheric Monitoring System). *[GANK tests for Methane (CH₄), Ammonia (NH₃), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO₂), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

Mike LA took his Sony camcorder for another video tour of the ISS compartments for subsequent downlink to MCC-Houston. *[The footage provides valuable situational insight in the current configuration of the station interior for the FCT (Flight Control Team) and will also be used for upcoming Expedition and Shuttle crews for pre-flight "handover" training.]*

FE-1 Tyurin conducted the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

Mikhail also worked on the IMS (Inventory Management System) to update/edit its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

All crewmembers exercised in their regular 2.5-hr. program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1).

Afterwards, Reiter transferred his, Misha's and LA's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~4:15am, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~3:30pm, the crew is scheduled for their regular weekly tagup with the Lead Flight Director at MCC-H/JSC.

LA and Thomas were thanked by Payloads ground personnel for conducting the successful test on the HRF-2 (Human Research Facility 2) Rack and its PC yesterday. *[A reboot of the laptop solved a remaining IP address problem. Both HRF racks and their laptops are now open for business, and HRF2 in particular should be ready for Monday's scheduled PFE/OUM (Periodic Fitness Evaluation with Oxygen Uptake Measurement) activities.]*

Heads-up on S-Band Anomaly: Last night, communications with ISS (voice, payload & systems commanding) on S-band/String 1 began locking up and failing on the forward link (= the uplink from ground station to TDRS satellite plus the downlink from TDRS to ISS). Comm was switched to S-band/String 2 and is performing nominally on both forward and return links. *[Repeated attempts by ground stations over two TDRSs appear to indicate a problem with onboard/external hardware (not antenna blockage). Specialists are continuing to troubleshoot String 1. While two good comm systems are desired, no impacts on flight operations are expected from the current one-string connection.]*

Update on Progress M-58/23P: At Baikonur/Kazakhstan, prelaunch processing of Progress M-58 continues on schedule. Today, the complete Orbital Module containing the loaded and fueled Progress spacecraft was mated and integrated with the Soyuz-U launcher in the Processing Facility (see picture below). Technical management meetings, chaired by Nikolay Sevastiyarov, and the State Commission gave the Go-ahead for tomorrow's rollout to the launch pad. *[Liftoff is scheduled on 10/23 (Monday) at 9:40am EDT and docking at SM aft port on 10/26 (Thursday) at 10:28am. 23P cargo (~2.5 tons total) comprises ~870 kg propellants, ~50 kg gaseous oxygen, and ~1263 kg dry cargo, including food, crew provisions, CHeCS and maintenance gear (221 total items: 144 Russian, 75 NASA, 2 ESA). Water will not be delivered this time. High-priority items include research payloads, EVA equipment and some immediately-needed Elektron repair parts (however, a new Elektron BZh Liquid Unit is scheduled for 24P, as are 350 new SFOG cartridges, using NaClO₄ {Sodium Perchlorate} instead of LiClO₄ {Lithium Perchlorate} and thermal ignition, for 262 man-days).]*

Today's CEO photo targets, from the Lab nadir/science window, were **Piccaninny Impact Crater** (ISS had a fine pass over this small site, however it is only 7km in

diameter and difficult to distinguish from the surrounding terrain. Trying for a nadir mapping swath at the time of this pass to obtain context views for later use. The crater is located to the south of Lake Argyle amongst ancient folded rocks), and **Volcanic Eruption, Reunion Island** (the Pinton de la Fournaise volcano, located on the southern end of Reunion Island, began erupting Aug. 30 and has continued to the present. The new lava flows at the bottom of the crater are up to 10 m thick. Taking detailed images of the volcano and new lava flows).

To date, over 250,000 of CEO images have been taken in the first six years of the ISS, about one third of the total number of images taken from orbit by astronauts.

CEO photography can be viewed and studied at the websites:

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<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (as of this morning, 7:08am EDT [= epoch]):

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Apogee height -- 347.5 km

Perigee height -- 330.2 km

Period -- 91.31 min.

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Eccentricity -- 0.0012879

Solar Beta Angle -- 33.1 deg (magnitude decreasing)

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Revolutions since FGB/Zarya launch (Nov. 98) -- 45292

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10/26/06 -- Progress M-58/23P docking (SM aft port; 10:28am; NASA TV)

11/03/06 -- ISS Reboost

11/22/06 -- Russian EVA-17 (3-9pm)

11/30/06 -- ISS Reboost

12/07/06 -- STS-116/12A.1 launch

12/09-16/06 -- STS-116/12A.1 docked mission w/ISS -- P5 truss

12/18/06 -- STS-116/12A.1 landing @ KSC

01/10/07 -- Progress M-57/22P undocking (DC1) & reentry

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06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

***Upper stage w/Progress M-58/23P mated with Soyuz-U launch vehicle
(10/20/06)***



From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Jesco von Puttkamer \(jvonputt@hq.nasa.gov\)](mailto:jvonputt@hq.nasa.gov);
CC:
Subject: ISS On-Orbit Status 10/19/06
Date: Thursday, October 19, 2006 1:56:42 PM
Attachments: [image001.gif](#)
[image004.gif](#)

ISS On-Orbit Status 10/19/06

All ISS systems continue to function nominally, except those noted previously or below.

After wakeup (2:00am EDT), before breakfast & first exercise, CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Thomas Reiter completed their first (except for FE-2) monthly session with the Russian crew health-monitoring assessment MO-9/Biochemical Urinalysis. Afterwards, Tyurin stowed the Urolux hardware. *[MO-9 is conducted regularly every 30 days (and also before and after EVAs) and is one of five nominal Russian medical tests adopted by NASA for U.S. crewmembers for IMG PHS (Integrated Medical Group/Periodic Health Status) evaluation as part of the "PHS/Without Blood Labs" exam. The analysis uses the sophisticated in-vitro diagnostic apparatus Urolux developed originally for the Mir program. Afterwards, the data are entered in the MEC (Medical Equipment Computer)'s special IFEP software (In-Flight Examination Program).]*

Later in the day, the crew also conducted the IMG PHS (Integrated Medical Group/Periodic Health Status)/Without Blood Labs evaluation, part of the MO-9 examination performed in the morning. The scheduled blood testing portion using the PCBA (Portable Clinical Blood Analyzer) was cancelled when the crew was unable to locate the PCBA and the Control Solutions Kit in the AMP (Ambulatory Medical Pack). *[PHS data were obtained on all crewmembers, who assisted each other in turn as CMO (Crew Medical Officer). After the crew had also performed the Clinical Evaluation protocol, the data were logged in the MEC IFEP software, and Tyurin stowed the equipment.]*

In the Russian segment, FE-2 Reiter conducted the second experiment session with the Russian/German TEKh-20 Plasma Crystal-3 (PK-3+) payload. Television

of the start of operations was again transmitted to TsUP via VHF & S-band. After experiment termination Reiter also downlinked data from the hard drive and then deactivated the hardware. *[As yesterday, Thomas activated the PK-3/N turbopump in the Service Module's Transfer Compartment (SM PkhO) first thing in the morning, tagged up with ground specialists and started the evacuation of the vacuum chamber (ZB) in the SM Work Compartment (RO), then conducted PK-3+ operations. At Experiment Start +6 min, video recording began. The turbopump will be deactivated tonight (~5:25pm EDT). The experiment is performed on plasma, i.e., fine particles charged and excited by HF (high frequency) radio power inside the evacuated work chamber. Main objective is to repeat the modified basic experiment to obtain a homogeneous plasma dust cloud at various pressures and RF power outputs on particles, and search for conditions under which thread-like structures are formed. Today, the task was a manual search by the FE-2 for the structure mode without a void in the center with particles 6.81 microns in diameter.]*

Thomas Reiter also continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

The FE-2 set up for his eighth (of 13 planned) biweekly NOA/Nitric Oxide Analyzer session and undertook the procedure, later downlinking the measurements from the RSE1 laptop to the ground via the BSR-TM telemetry channel. *[Purpose of the ESA experiment ESANO1, consisting of the "Platon" analyzer and its power supply, is to monitor expired nitric oxide (NO) in the subject's exhaled air to detect signs of airway inflammation and indications of venous gas emboli (bubbles) that may be caused by inhalation of pollutants in the closed environment of the ISS cabin and increased risk of decompression sickness.]*

CDR Lopez-Alegria performed troubleshooting on the A31p laptop of the HRF-2 (Human Research Facility 2) rack and succeeded in establishing nominal operation. *[After swap-out of the old HRF-2 laptop, an IBM 760XD, with the newer model A31p on 10/16, the rack did not properly communicate with its laptop. After today's troubleshooting, comm is now good.]*

In preparation for the Progress 23 docking next week, Mike LA and Misha Tyurin conducted the standard 40-min. vehicle-to-vehicle test of the TORU between the SM and the docked Progress M-57/22P, closely monitored by ground personnel during DO15 (Daily Orbit 15). Progress approach & attitude control thrusters (DPO) were inhibited and not involved. *[Correction: Yesterday's TORU activity by LA and Misha, erroneously reported here as vehicle-to-vehicle test, was the regular 3-hr. TORU onboard training (OBT) session. The OBT included procedure review,*

rendezvous, docking data and rendezvous math modeling data review, fly-around, final approach, docking and off-nominal situations (e.g., video or comm loss). The TORU teleoperator control system lets an SM-based crewmember perform the approach and docking of automated Progress vehicles in case of KURS failure. Receiving a video image of the approaching ISS, as seen from a Progress-mounted docking television camera ("Klest"), on a color monitor ("Simvol-Ts", i.e. "symbol center") which also displays an overlay of rendezvous data from the onboard digital computer, Vinogradov would steer the Progress to mechanical contact by means of two hand controllers, one for rotation (RUO), the other for translation (RUD), on adjustable armrests. The controller-generated commands are transmitted from the SM's TORU control panel to the Progress via VHF radio. In addition to the Simvol-Ts color monitor, range, range rate (approach velocity) and relative angular position data are displayed on the "Klest-M" video monitor (VKU) which starts picking up signals from Progress when it is still approximately 7 km away. TORU is monitored in real time from TsUP over Russian ground sites (RGS) and via Ku-band from Houston, but its control can not be taken over from the ground.]

After the TORU test, Lopez-Alegria and Tyurin worked in the Progress 22 vehicle, dismantling the KURS-A rendezvous & approach radar system of its motion control & navigation system (SUDN) and removing it from the transport drone, a 3-hr. job. These valuable components, stowed in the FGB, will be returned to Earth on the next Shuttle for reuse. *[KURS-A is the active half of the Russian space program's proven S-band radar system for automated flight, which measures relative motion parameters between Progress (or Soyuz) and the ISS during rendezvous operations, to enable the autopilot's calculation of corrective impulses. The system's passive transponder counterpart (KURS-P) is on the Service Module (SM), with one antenna each at the tip of the two solar array wings.]*

Mike LA conducted the weekly audit/inventory of the available CWCs (collapsible water containers) and their contents, to keep track of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week. The current cue card lists 33 water containers (~1203 liters total) for the four types of water identified on board: technical water (for Elektron, flushing, hygiene; ~999.1 liters), potable water (~129 liters), condensate water (for processing, 46.5 liters) and other (TCS fluid, EMU waste water, 28.6 liters). Water was delivered by 12A and is re-supplied from processed condensate.]*

The FE-2 performed the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

Thomas also worked on the IMS (Inventory Management System) to update/edit its standard "delta file", including locations, for the regular weekly automated export/

import to its three databases on the ground (Houston, Moscow, Baikonur).

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-1), TVIS treadmill (FE-1), RED resistive exerciser (CDR, FE-2), and VELO bike with bungee cord load trainer.

Afterwards, Thomas transferred his, Misha's and LA's exercise data files to the MEC for downlink, as well as the daily wristband HRM data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~12:40pm EDT, the crew used the Russian TV equipment in the SM to downlink a message of greetings and welcome to the young attendees at tomorrow's opening ceremony of the 14th International Space Olympiad of School Students, being held at Korolev near Moscow. There are also plans for a conference with the ISS crew on 10/25 with the best student representative organizations during their TsUP tour on 10/25. Participants in the traditional annual event are from Russia/Korolev, Australia, Greece, Germany, Great Britain, Kazakhstan and the USA. This year, the Olympiad is dedicated to the 60th Anniversary of RSC Energia.

At ~4:10pm, the crew is scheduled for their weekly teleconference with ISS Program Management at JSC/Houston via S-band/audio.

Yesterday's successful "shakedown" testing of the new SVG (Space Video Gateway) was received with great excitement and applause at MCC-Houston, in the presence of representatives of the Discovery Channel and Japan's NHK. *[SVG is a specialized computer designed to capture, encode, packetize and downlink HDTV live via Ku-band assets or to record it on the hard drive. HDTV uses the Sony HDW-750 camcorder with Sony F115 microphone and V10 VTR (Video Tape Recorder). The flight-certified SVG hardware was provided by NASA and JAXA (Japanese Aerospace Exploration Agency) for temporary installation in the ISS Lab under an agreement between NASA, the Japan Broadcasting Corporation NHK (Nippon Hoso Kyokai) and Discovery Communications, Inc. (DCI). Yesterday's test verified proper functioning of the SVG system in preparation of two upcoming in-flight events, one with the Discovery Channel, the other with NHK.]*

Update on CDRA: An extensive repair operation on the U.S. Carbon Dioxide Removal Assembly is scheduled for tomorrow. Plans for the IFM (Inflight Maintenance) are to remove and replace the CO₂ ASVs (Air Selector Valves) ##102 & 101 (in that order), then install a sock filter in the #1 Desiccant/Sorbent Bed and finally inspect and clean the 1.5-inch sock filter in the #2 Bed upstream of the #102

ASV. The IFM should restore both beds to full operability. *[To accomplish these tasks, the CDRA must first be removed from the AR (Atmosphere Revitalization) Rack and later replaced, each step a 2-hour job for two crews. Zeolite powder and debris leaking from the adsorption beds has caused the ASVs in the AR Rack to stick and fail, previously on two valves during Increment 5 and now on ASV 101 (ASV 102 will also be replaced, to avoid having to remove CDRA again in the near future).]*

Update on CMG-3: The recent low-speed drag torque tests on Control Moment Gyroscope 3 went nominally, and the resulting data are currently being evaluated, with plans being formulated for more testing in the near future. *[Should, in the worst-case scenario, CMG-3 replacement become necessary, there is one spare unit on the ground that could be flown as soon as STS-118/13A.1 (June '07). The redesigned CMG which includes lessons from the failed CMG returned on LF1 will be ready for re-flight NET April '08.]*

Update on Progress M-58/23P: The IMMT (ISS Mission Management Team) today found the ISS ready to receive 23P and gave the green light for the cargo ship's docking on 10/26. At Baikonur/Kazakhstan, the orbital module of the Soyuz-U launch vehicle, containing the liquid-loaded Progress spacecraft, was today transported by rail from the Spacecraft Processing Facility to the Launch Vehicle Integration Site (**see picture below**). Launch is scheduled on 10/23 (Monday) at 9:40am EDT and docking at SM aft port on 10/26 (Thursday) at 10:28am. Next steps will be: Integration with the Soyuz-U launch vehicle -- 10/20; rollout plus launch pad operations -- 10/21-10/23. 23P cargo (~2.5 tons total) comprises ~870 kg propellants, ~50 kg gaseous oxygen, and ~1263 kg dry cargo, including food, crew provisions, CHeCS and maintenance gear (221 total items: 144 Russian, 75 NASA, 2 ESA). Water will not be delivered this time. High-priority items include Elektron repair parts, research payloads, and EVA equipment.

Update on ISS-13 Post-Landing Activities: Yesterday, at the GCTC (Gagarin Cosmonaut Training Center) House of Cosmonauts in Star City, the ISS-13 crew of Pavel Vinogradov and Jeff Williams (in Army uniform) plus Anousheh Ansari, the first woman space tourist, received a "Red Carpet Welcome" (**see picture below**). The cosmonauts were offered congratulations and presented gifts and souvenirs by representatives of Roskosmos, GCTC RGNII, NASA, ESA and public organizations. President & General Designer of RSC-Energia Nikolay N. Sevastyanov congratulated the crew on a successful mission and presented traditional sets of RSC-Energia medals. The cosmonauts told about their on-orbit activities and thanked all specialists for supporting the flight.

Today's CEO photo targets, from the Lab nadir/science window, were **Kerguelen Islands** (*weather and target visibility are always challenging to anticipate in the*

southern Indian Ocean. However, ISS had a nadir pass in good light over this rugged island group. Using the long lens settings and mapping in detail), **Roter Kamm Impact Crater** (now that the crew has successfully acquired good imagery of this target with the 400mm lens settings, they were to try it with the doubler (800mm). As ISS crossed the Namibian coast from the SW, they were to shoot just right of track), and **Patagonian Glaciers** (weather was still marginal for this target area, but light was good and the crew had a nadir pass over the S end of the Southern Patagonian Ice Field. Using the long lens settings and trying for the smaller glacial features as far S as visibility permitted).

To date, over 250,000 of CEO images have been taken in the first six years of the ISS, about one third of the total number of images taken from orbit by astronauts.

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (as of this morning, 7:56am EDT [= epoch]):

Mean altitude -- 338.9 km

Apogee height -- 347.6 km

Perigee height -- 330.2 km

Period -- 91.31 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0012947

Solar Beta Angle -- 36.1 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 46 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45277

Significant Events Ahead (all dates Eastern and subject to change):

10/23/06 -- Progress M-58/23P launch (9:40:34am)

10/26/06 -- Progress M-58/23P docking (SM aft port; 10:28am; NASA TV)

11/03/06 -- ISS Reboost

11/22/06 -- Russian EVA-17 (3-9pm)

11/30/06 -- ISS Reboost

12/07/06 -- STS-116/12A.1 launch

12/09-16/06 -- STS-116/12A.1 docked mission w/ISS -- P5 truss

12/18/06 -- STS-116/12A.1 landing @ KSC

01/10/07 -- Progress M-57/22P undocking (DC1) & reentry

01/19/07 -- US EVA-6
01/23/07 -- US EVA-7
01/27/07 -- US EVA-8
02/07/07 -- Progress M-59/24P launch
02/09/07 -- Progress M-59/24P docking (DC1)
03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses (NET; requires 14Slip)
03/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
04/06/07 -- Progress M-59/24P undocking (DC1) & reentry
04/09/07 -- Progress M-60/25P launch
04/11/07 -- Progress M-60/25P docking (DC1)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

***Soyuz-U Orbital Module with Progress 22 en route to Launch Vehicle Mating/
Integration (10/19/06)***



Red Carpet at GCTC for Jeff, Pavel & Anousheh, 10/18/06



From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Jesco von Puttkamer \(jvonputt@hq.nasa.gov\)](mailto:jvonputt@hq.nasa.gov);
CC:
Subject: ISS On-Orbit Status 10/18/06
Date: Wednesday, October 18, 2006 2:40:35 PM
Attachments:

ISS On-Orbit Status 10/18/06

All ISS systems continue to function nominally, except those noted previously or below.

In the Russian segment (RS), FE-2 Reiter conducted the first experiment session with the Russian/German TEKh-20 Plasma Crystal-3 (PK-3) payload. TV of the start of operations was downlinked to TsUP via VHF. After experiment termination Reiter also downlinked data from the hard drive and then deactivated the hardware. *[After spending the preceding two days on hardware setup, leak checks of the electronics box, evacuation of the work chamber, uploading new software, doing additional leak checks and verifying the readiness of the experiment, Thomas today activated the PK-3/N turbopump in the Service Module's Transfer Compartment (SM PkhO), tagged up with ground specialists and started the evacuation of the vacuum chamber (ZB) in the SM Work Compartment (RO), then monitored PK-3 operations. At Experiment Start +6 min, video recording began. The turbopump will be deactivated tonight (~5:25pm EDT). The experiment is performed on plasma, i.e., fine particles (2.55 microns diameter) charged and excited by HF (high frequency) radio power inside the evacuated work chamber. Main objective is to repeat the modified basic experiment to obtain a homogeneous plasma dust cloud at various pressures and RF power outputs on particles 2.55 microns in diameter. The experiment is conducted in automated mode.]*

Thomas Reiter also continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. Today, he also conducted skin measurements, to evaluate the past treatment, and filled out the experiment questionnaire. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit. The noninvasive medical equipment used by the experiment are the Tewameter (from TEWL = transepidermal water loss, one of the most important biophysical*

parameters for evaluating the efficiency of the human skin water barrier), the Corneometer (to accurately determine the hydration level of the skin surface) and the VisioScan which takes direct measurements of the skin topography (structure & level of dryness) with a special UV-A (Ultraviolet A) light video camera with high resolution.]

CDR Michael Lopez-Alegria concluded his 2nd session with the new NASA/JSC experiment NUTRITION, finishing the required 24-hour data collection by securing the last urine specimen for immediate placement in the MELFI (Minus-Eighty Laboratory Freezer for ISS) freezer. *[The Clinical Nutritional Assessment profile, currently required on all U.S. Astronauts, collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing inflight samples and an additional postflight sample. Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

FE-1 Mikhail Tyurin performed the third and last part of his first MBI-8 Profilaktika ("Countermeasures") fitness assessment, first with the usual blood-letting before breakfast (to determine lactate and creatine kinase levels in the blood with the AccuSport equipment), later in the day by a physical exercise session on the TVIS treadmill, supported by tagup with a ground specialist. *[The 90-min. TVIS test is identical to the MO-3 test performed on the treadmill in idling (non-motorized) mode with free choice of speeds within certain specified ranges (idle/walk/slow run/moderate run/fast run/walk/recovery). In addition to the nominal test procedure, MBI-8/Part 3 calls for the use of the TEEM-100M gas analyzer during the test, the blood lactate measurements, and subjective evaluation of physical exertion levels (using the Borg Perceived Exertion Scale, viz., 10 steps from very light over hard and very hard to maximum) during the test. At the end of the creatine kinase tests, the results were logged, copied from Cardiocassette-2000 recording to OCA for downlink, and reported to the ground via tagup.]*

CDR Lopez-Alegria had his first monthly SLEEP (Sleep-Wake Actigraphy & Light Exposure during Spaceflight) Actiwatch data download. *[The experiment is*

supported by the HRF1 (Human Research Facility 1) laptop, which LA set up along with the Actiwatch Reader, and turned off again later in the day, also stowing Reader and kit. After taking off the Actiwatch, he downloaded its accumulated data, then re-initialized it and put it back on. To monitor the CDR's sleep/wake patterns and light exposure, the special Actiwatch device measures the light levels encountered by the CDR as well as his patterns of sleep and activity throughout the Expedition.]

Afterwards, Mike LA worked on the EXPRESS Rack 3 (ER3) laptop, powering it up for Thomas Reiter's subsequent EMCS activities.

To prepare the EMCS (European Modular Cultivation System) for the initiation of the upcoming TROPI science run, Thomas replaced the tape in its video recorder with a blank tape cassette and installed four new ECs (Experiment Containers) on centrifuge rotor A. *[EMCS, delivered on ULF1.1, is a combination centrifuge/growth chamber that allows plant growth experiments to be carried out in controlled partial and microgravity conditions. Main research focus is on multi-generation (seed-to-seed) experiments, studies on gravity effects on early development and growth, and on signal perception and transduction in plant tropisms. Experiments with insects, amphibian and invertebrates as well as studies with cell and tissue cultures are also foreseen for EMCS. TROPI (Analysis of a Novel Sensory Mechanism in Root Phototropism): By sprouting seeds under different levels of partial gravity, and different frequencies of light, this experiment should help to better understand the different systems used by plants to determine in what direction their roots and shoots should grow. In this NASA-sponsored study, Arabidopsis thaliana plants (or thale cress, with a small-sized genome which makes it useful for genetic mapping and sequencing) sprouted from seeds will be video taped and mature plants will be harvested. Later, the mature plants will be analyzed at the molecular level to determine what genes are responsible for successful plant growth in microgravity. Insights gained from TROPI can lead to sustainable onboard agriculture for future long duration space missions.]*

Mike LA and Thomas powered up the new SVG (Space Video Gateway), configured the HDTV (High Definition TV) camera, and the CDR conducted the first live downlink test of HDTV image & sound, via Ku- and S-band, on a video "tour" of the Airlock as Thomas worked in it on completing stowing. *[SVG is a specialized computer designed to capture, encode, packetize and downlink HDTV live via Ku-band assets or to record it on the hard drive. HDTV uses the Sony HDW-750 camcorder with Sony F115 microphone and V10 VTR (Video Tape Recorder). The flight-certified SVG hardware was provided by NASA and JAXA (Japanese Aerospace Exploration Agency) for temporary installation in the ISS Lab under an agreement between NASA, the Japan Broadcasting Corporation NHK (Nippon Hoso Kyokai) and Discovery Communications, Inc. (DCI). Today's test was*

intended to verify proper functioning of the SVG system in preparation of two upcoming in-flight events, one with the Discovery Channel, the other with NHK.]

Thomas also performed the first session with the ESA experiment ERB (Erasmus Recording Binocular), using both the ERB and PD-150P camcorders for filming a guided tour of the FGB for public relations purposes. A test run of ERB was conducted on 9/6 by Thomas and Pavel. *[ERB is a three-dimensional (3-D) video camera being employed for taking slow-motion imagery of the environment onboard the ISS. The images will be used to create an accurate map of the station's interior. For deriving an accurate model of the interior, specialists will use the images from the ERB, the Sony PD-150P video camera and the Nikon 3-D still camera.]*

In the RS, Tyurin spent time on testing two Nikon D1X digital still cameras (#03, #04) to assess their performance. Photography of the ISS interior was obtained with the SB-28DX flash and different lenses (187-55mm, 80-400mm). All test images were then to be downlinked via OCA from the RSK1 laptop.

In preparation for the upcoming Progress 23 docking (10/26), the Mike LA and Misha Tyurin conducted the standard 3-hour vehicle-to-vehicle test of the TORU between the Service Module (SM) and the docked Progress-357/22P, closely monitored by ground personnel during DO15 (Daily Orbit 1). Progress approach & attitude control thrusters (DPO) were inhibited and not involved. *[TORU lets an SM-based crewmember perform the approach and docking of automated Progress vehicles manually in case the KURS autopilot system fails.]*

The FE-1 conducted the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables and today also the weekly BRPK air/liquid condensate separator apparatus inspection. In addition, Misha performed the periodic (currently daily) checkout/verification of IP-1 airflow sensors in the various Russian segment (RS) hatch openings in the SM, FGB and DC1.

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (CDR, FE-2), and RED resistive exerciser (CDR), while Tyurin's workout today was part of his third Profilaktika session on the TVIS in the SM.

Afterwards, Thomas transferred his and LA's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

On the TVIS, Mikhail Tyurin performed the weekly maintenance, primarily checking the condition of the SPDs (subject positioning devices) and recording time & date values.

Update on Progress M-58/23P: At Baikonur/Kazakhstan, the 23P transport vehicle was mated yesterday with its transfer compartment in the Spacecraft Assembly & Testing Facility. Launch is scheduled on 10/23 (Monday) at 9:40am EDT and docking at SM aft port on 10/26 (Thursday) at 10:28am. Current steps are: 10/17-10/19 -- liquids loading at the special filling station plus upper stage assembly & checkout from; 10/20 -- integration with the Soyuz-U launch vehicle; 10/21-23 -- rollout plus launch pad operations. 23P cargo (~2.5 tons total) comprises ~870 kg propellants, ~50 kg gaseous oxygen, and ~1263 kg dry cargo, including food, crew provisions, CHECS and maintenance gear (221 total items: 144 Russian, 75 NASA, 2 ESA). Water will not be delivered this time. High-priority items include Elektron parts, research payloads, and EVA equipment.

Today's CEO photo targets, from the Lab nadir/science window, were **Shoemaker Impact Crater** (*ISS had a nadir pass in good light and fair weather over this very ancient impact site [estimated to be over 1.6 billion years old]. The feature is about 30km in diameter and marked by numerous intermittent lakes. Using the long lens to carefully map this feature*), **Piccaninny Impact Crater** (*the crew had a fine pass over this small site; however, it is only 7km in diameter and difficult to distinguish from the surrounding terrain. Trying for a nadir mapping swath at the time of this pass to obtain context views for later use*), and **Patagonian Glaciers** (*although weather may have been closing in from the SW at the time of this pass, the crew should have a nadir view in high sun of the Northern Patagonian Ice Field. Using the long lens and trying for any of the visible glacier features there*).

To date, over 250,000 of CEO images have been taken in the first six years of the ISS, about one third of the total number of images taken from orbit by astronauts.

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

Significant Events Ahead (all dates Eastern and subject to change):

10/23/06 -- Progress M-58/23P launch (9:40:34am)

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11/03/06 -- ISS Reboost
11/22/06 -- Russian EVA-17
11/30/06 -- ISS Reboost
12/07/06 -- STS-116/12A.1 launch
12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss
12/19/06 -- Progress M-57/22P undocking (DC1) & reentry
12/20/06 -- Progress M-59/24P launch
12/22/06 -- Progress M-59/24P docking (DC1)
01/22/07 -- US EVA-6
01/26/07 -- US EVA-7
01/31/07 -- US EVA-8
02/06/07 -- Progress M-59/24P undocking (DC1) & reentry
02/07/07 -- Progress M-60/25P launch
02/09/07 -- Progress M-60/25P docking (DC1)
03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses (NET; requires 14Slip)
03/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Jesco von Puttkamer \(jvonputt@hq.nasa.gov\)](mailto:jvonputt@hq.nasa.gov);
CC:
Subject: ISS On-Orbit Status 10/17/06
Date: Tuesday, October 17, 2006 2:19:07 PM
Attachments: [image001.gif](#)
[image003.gif](#)

ISS On-Orbit Status 10/17/06

All ISS systems continue to function nominally, except those noted previously or below.

CDR Michael Lopez-Alegria completed Day 2 of his 2nd session with the new NASA/JSC experiment NUTRITION. *[For the session, he had to forego exercising and food intake for eight hours. During the day, he collected urine samples for immediate insertion into the MELFI (Minus-Eighty Laboratory Freezer for ISS) freezer and blood samples (assisted by FE-2 Reiter), which were first spun in the RC (Refrigerated Centrifuge) and then also placed in MELFI. The RC was later powered off after a temperature reset to limit wear on the compressor, and cleaned. [Background: The Clinical Nutritional Assessment profile, currently required on all U.S. Astronauts, collects blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing inflight samples and an additional postflight sample. Furthermore, additional measurements are included for samples from all sessions, including additional markers of bone metabolism, vitamin status, and hormone and oxidative stressor tests. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection (made possible by MELFI), normative markers of nutritional assessment, and a return session plus 30-day (R+30) session to allow evaluation of post-flight nutrition and implications for rehabilitation.]*

Thomas Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

FE-1 Mikhail Tyurin performed Part 2 of his first "Profilaktika" (MBI-8, "Countermeasures") preventive health maintenance fitness test series, today using the resistive NS-1 force trainer, keeping a log and supported by tag-up with medical support personnel at TsUP/Moscow. Part 3, on the TVIS treadmill, will conclude the assessment tomorrow. *[Today's Russian fitness test consists of four types of exercise, viz., neck stretching (back/forward), simultaneous upper arm flexing, trunk extension, and trunk flexes. Each type of exercise requires a series of 15 motions repeated two times. Load levels are selected by the ground and do not change from test to test. Total duration of the test is ~13 min. Gas analysis using a mask and the TEEM-100M gas analyzer, followed by subjective evaluation of physical exertion levels were also performed as a part of this test. The lactate blood test was done twice at the end of the session, using the ACCUSPORT analyzer and REFLOTRON-4 accessories. Results were entered on a log sheet. TEEM and ECG (electrocardiograph) data were transferred to the Laptop 3, also on a tape cassette (Cardiocassette-2000), and prepared for later downlink via Regul-Packet comm. Results were also called down to specialists standing by at TsUP/Moscow.]*

Tyurin also continued his outfitting work in the Service Module (SM), today routing and installing five new cables for the Onboard Equipment Control System (SUBA), to handle new equipment. The activities were supported by ground specialist tagup via S-band.

FE-1 Tyurin completed a hardware health check on the Russian Reflotron-4 analyzer and its set of accessories. *[Reflotron-4 is a clinical analyzer used for periodic biochemical blood and saliva analysis to monitor crew health or to be used diagnostically on Flight Surgeon request. Built originally by Boehringer in Mannheim/Germany for the Mir program, the Reflotron-4 consists of the analyzer itself, which has a mass of 13-lbs. and uses 40W power, a set of measuring strips and a small equipment kit.]*

Mike LA performed the CHeCS CMO (Crew Health Care Systems/Crew Medical Officer) on-board training drill, a 30-min. video & audio refresher course to hone the CMO's acuity in emergency medical operations. *[Today's proficiency drill, guided by a number of training videos and concluding with a self-assessment questionnaire, focused on re-familiarization with skills and techniques required in procedures related to eye treatment, medication administration, and fractures & dislocations.]*

The CDR disconnected the EXPRESS Rack 1 from the ITCS MTL (Internal Thermal Control System/Moderate Temperature Loop).

Afterwards, LA conducted a checkout of the new A31p laptop of the HRF1 (Human Research Facility 1) rack, essentially verifying its correct boot order and checking the post-launch condition of its HDD (hard disk drive). *[The A31p was installed on 10/3. For today's checkout, it was powered from the HRF1 instead of UOP3 (Utility Outlet Panel 3), which currently supports the SVG (Space Video Gateway).]*

Thomas powered up SVG for a testing run, during which he used the new HDTV (High Definition TV) camera to record video and audio to HDTV tape on the V10 VTR (Video Tape Recorder) for later playback/downlink. The SVG downlink test is scheduled for tomorrow. *[SVG is a specialized computer designed to capture, encode, packetize and downlink HDTV live via Ku-band assets or to record it on the hard drive. HDTV uses the Sony HDW-750 camcorder with Sony F115 microphone and V10 VTR (Video Tape Recorder). The flight-certified SVG hardware was provided by NASA and JAXA (Japanese Aerospace Exploration Agency) for temporary installation in the ISS Lab under an agreement between NASA, the Japan Broadcasting Corporation NHK (Nippon Hoso Kyokai) and Discovery Communications, Inc. (DCI). The test on 10/18 is intended to verify proper functioning of the SVG system in preparation of two upcoming in-flight events, one with the Discovery Channel, the other with NHK.]*

The CDR performed the periodic quick status check on the ALTEA (Anomalous Long-Term Effects on Astronauts) payload, using the ELC4 (EXPRESS Rack 4) laptop with the revised software, inspecting the dosimetry LEDs (light emitting diodes) and checking whether the hardware is securely mounted.

In the Lab, Thomas set up the batteries for the ERB (Erasmus Recording Binocular) experiment in the Cannon dual lithium ion battery charger for the 4-hr. charging process. *[ERB is a three-dimensional (3-D) video camera being employed for taking imagery of the environment onboard the ISS. The images will be used to create an accurate map of the station's interior. For deriving an accurate model of the interior, specialists will use the images from the ERB, the Sony PD-150P video camera and the Nikon 3-D still camera.]*

The two Flight Engineers worked together on another session of the LDM Astrolab educational experiment DVD-4 Demo, with Thomas acting as demonstrator of the robotic program (ROBoT) and Mikhail as cameraman filming footage that will be used to produce a DVD lesson for use by teachers and their students aged 12-18 years across ESA member states. *[Four schools in Austria, Switzerland, Sweden and the UK are participating in filming accompanying on-ground demonstrations.]*

DVD-4 continues a pedagogical series of lessons initiated on previous ESA missions.]

The FE-2 conducted the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

The CDR updated/edited the standard IMS “delta file”, including stowage locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-2), and RED resistive exerciser, while Misha Tyurin’s workout today was part of his Profilaktika session on the VELO bike with bungee cord load trainer.

Afterwards, LA transfers his and Thomas’ exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Over RGS (Russian Ground Site) at ~10:30am, Thomas ran another VHF-1 (Russian: UKV-1) voice communications test with the ground to check the external telephone link with the Columbus Control Center (Col-CC) at Oberpfaffenhofen outside Munich/Germany.

Thomas Reiter continued preparations for operating the Russian/German TEKh-20 Plasma Crystal-3 Plus (PK-3+) experiment payload, supported by ground specialist tagup via S-band. *[After yesterday’s hardware setup, leak checking of the electronics box and evacuation of the vacuum work chamber (ZB) with the turbopump, Thomas today conducted more hardware testing and calibration, uploaded new software from a USB stick, checked out the software installation and verified the readiness of the experiment. After additional leak checking on the work chamber during the day, the FE-2 will deactivate the turbopump tonight at ~5:25pm EDT. The experiment is performed on plasma, i.e., fine particles charged and excited by HF (high frequency) radio power inside the evacuated work chamber. Main objective is to obtain a homogeneous plasma dust cloud at various pressures and particle quantities with or without superimposition of an LF (low frequency) harmonic electrical field. The experiment is conducted in automated mode. PK-3+ has more advanced hardware and software than the previously used Russian PKE-Nefedov payload.]*

Afterwards, at 7:12am EDT, Reiter demonstrated the PK-3+ experiment on live PAO/TV downlink to students at Col-CC. *[Timed by the SM's automated onboard program sequencer (SPP) over RGS, the downlink was part of the ISS Education Program of ESA's Astrolab mission and a lecture about plasma physics for students in the European Masters Program in Aeronautics and Space Technology at the Technical University Munich. Four additional universities in France, United Kingdom, Italy and Estonia listened in per videoconference.]*

At ~11:25am, the crew participated in an interactive PAO TV interview event with two Spanish-language television networks, Noticiero Telemundo (Angie Sandoval) and Univision (Neida Sandoval), with main focus on Mike LA's background and aspirations to become an astronaut.

At ~11:30am, the station was turned 90 degrees as it maneuvered from earth-fixed LVLH -YVV (local vertical local horizontal/minus y-axis in velocity vector) to LVLH +XVV (plus x-axis in velocity vector). The maneuver was executed with the USTO (US Thruster Only) controller which commands the Russian thrusters without requiring handover between MCSs (motion control systems).

Update on CMG-3: Control Moment Gyroscope #3 remains spun down as data evaluation of yesterday's low speed drag characterization test is continuing. [MAMS (Microgravity Acceleration Measurement System) data were used to check against the internal CMG accelerometer. But future MAMS support beyond this specific CMG-3 activity may be problematic due to cancellation of MAMS payload data requirements at GRC (Glenn Research Center) and commensurate loss of expertise.]

Update on Progress M-58/23P: At Baikonur/Kazakhstan, the 23P transport vehicle was today mated with its transfer compartment in the Spacecraft Assembly & Testing Facility (see picture below). Launch is scheduled on 10/23 (Monday) at 9:40am EDT and docking at SM aft port on 10/26 (Thursday) at 10:28am. Next steps will be: 10/17-10/19 -- liquids loading at the special filling station plus upper stage assembly & checkout from; 10/20 -- integration with the Soyuz-U launch vehicle; 10/21-23 -- rollout plus launch pad operations. 23P cargo (~2.5 tons total) comprises ~870 kg propellants, ~50 kg gaseous oxygen, and ~1263 kg dry cargo, including food, crew provisions, CHeCS and maintenance gear (221 total items: 144 Russian, 75 NASA, 2 ESA). Water will not be delivered this time. High-priority items include Elektron parts, research payloads, and EVA equipment.

Now this from NASA TV (see picture below): National Hockey League star Alexander Ovechkin, born in Russia and playing for the Washington Capitals, poses proudly with an autographed photo of FE-1 Mikhail Tyurin. (Ovechkin: "Cosmonauts...very important people for any country, Russia or U.S.")

Today's CEO photo targets, from the Lab nadir/science window, were **Lawn Hill Impact Crater** (*this ancient, heavily weathered impact site is located in northern Queensland, Australia, just inland from the Gulf of Carpentaria near the edge of the Barkly Tableland. It is over 515 million years old and about 22km in diameter. This is a fairly subtle feature to recognize and for their initial encounter the crew was asked to use a near-nadir mapping pass with the 180mm lens*), **Kerguelen Islands** (*weather satellite imagery suggested much better than usual weather conditions for this target area at the time of this ISS pass. Using the long lens setting and concentrating on the glacial features on the western end of this rugged archipelago*), and **Vista Alegre Impact Crater** (*the crew had a near-nadir pass in fair weather and good light over this small crater in southern Brazil. It is a fairly recent impact, about 65 million years old, and only 9.5km in diameter. Because of its small size, its location in dissected hills, and the presence of agricultural fields, this is a challenging feature to locate. For now researchers were simply requesting a mapping pass to obtain a contextual view they can use later to help the crew locate and shoot it in detail*).

To date, over 250,000 of CEO images have been taken in the first six years of the ISS, about one third of the total number of images taken from orbit by astronauts.

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 6:24am EDT [= epoch]*):

Mean altitude -- 339.0 km

Apogee height -- 347.5 km

Perigee height -- 330.4 km

Period -- 91.31 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0012724

Solar Beta Angle -- 40.8 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 50 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45244

Significant Events Ahead (*all dates Eastern and subject to change*):

10/23/06 -- Progress M-58/23P launch (9:40:34am)

10/26/06 -- Progress M-58/23P docking (SM aft port; 10:28am; NASA TV)
11/03/06 -- ISS Reboost
11/22/06 -- Russian EVA-17
11/30/06 -- ISS Reboost
12/07/06 -- STS-116/12A.1 launch
12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss
12/19/06 -- Progress M-57/22P undocking (DC1) & reentry
12/20/06 -- Progress M-59/24P launch
12/22/06 -- Progress M-59/24P docking (DC1)
01/22/07 -- US EVA-6
01/26/07 -- US EVA-7
01/31/07 -- US EVA-8
02/06/07 -- Progress M-59/24P undocking (DC1) & reentry
02/07/07 -- Progress M-60/25P launch
02/09/07 -- Progress M-60/25P docking (DC1)
03/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/16/07 -- STS-117/13A launch -- S3/S4 trusses (NET; requires 14Slip)
03/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
06/28/07 -- STS-118/13A.1 -- S/Hab-SM, S5, ESP3
09/07/07 -- STS-120/10A -- Node 2 (requires 15S slip).

Progress M-58/23P mated



Russian-born Alexander Ovechkin of the Washington Capitals



From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Jesco von Puttkamer \(jvonputt@hq.nasa.gov\)](mailto:jvonputt@hq.nasa.gov);
CC:
Subject: ISS On-Orbit Status 10/16/06
Date: Monday, October 16, 2006 2:57:34 PM
Attachments:

ISS On-Orbit Status 10/16/06

All ISS systems continue to function nominally, except those noted previously or below. *Underway: Week 4 of Increment 14.*

CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Thomas Reiter began the day by performing, before breakfast, their second periodic Russian biomedical assessments PZEh-MO-7 (Calf Volume Measurement) and PZEh-MO-8 (Body Mass Measurement), using the IM mass measurement device, later breaking it down for stowage. *[Calf measurements (left leg only) are taken with the IZOG device, a custom-sewn fabric cuff that fits over the calf, using the knee and lower foot as fixed reference points, to provide a rough index of deconditioning in zero-G and effectiveness of countermeasures. For determining body mass in zero-G, where things are weightless but not massless, the Russian IM "scales" measure the inertial forces that arise during the oscillatory motion of a mass driven by two helical metering springs with known spring constants. By measuring the time period of each oscillation of the unknown mass (the crewmember) and comparing it to the period of a known mass, the crewmember's mass is calculated by the computer and displayed.]*

Also before breakfast, Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

Tyurin and Reiter took the periodic (generally monthly) health test with the cardiological experiment PZEh MO-1 "Study of the Bioelectric Activity of the Heart at Rest" on the TVIS (Treadmill with Vibration Isolation & Stabilization), assisting each other in turn. *[During the 30-min. test, the crew tagged up with ground specialists on Russian ground site (RGS) passes on Daily Orbit 12 & 13 (~5:20am*

& ~6:50am EDT) via VHF and downlinked data from the Gamma-1M ECG (electrocardiograph) for about 5-6 minutes.]

Tyurin also completed Part 1 of his first onboard "Profilaktika" (MBI-8, "Countermeasures") preventive health maintenance fitness test series, on the VELO cycle ergometer. Misha will do Part 2 tomorrow on the VELO with NS-1 force loader, and Part 3 on Wednesday on the TVIS treadmill. *[The MBI-8 test differs from the similar MO-5 cardiovascular evaluation during graded exercises by additional gas analysis with the TEEM-100 gas analyzer, measurement of blood lactate level, and subjective evaluation of physical exertion levels during the test. The lactate blood samples were taken twice at the end of the session, using the ACCUSPORT analyzer and REFLOTRON-4 accessories. Results were entered on a log sheet for subsequent downlink. TEEM and ECG (electrocardiograph) data were transferred to the Laptop 3, also on a tape cassette (Cardiocassette-2000), and prepared for later downlink via Regul-Packet comm. Results were also called down to specialists standing by at TsUP.]*

CDR Lopez-Alegria switched the IBM 760XD laptop of the HRF--2 (Human Research Facility 2) rack with the newer model A31p and conducted a checkout of the new laptop. The hard disk of the 760XD was taken out and stowed. *[After the arrival of a special A31p laptop stowage liner on Mission 12A.1, the location of the new HRF-2 machine will be in Drawer K of the rack.]*

FE-1 Tyurin conducted the periodic electrical plug-in audit in the Russian segment, i. e. Service Module (SM), FGB, Docking Compartment (DC1). *[Using an uplinked tracking list, Misha compared the onboard situation (panel locations, power outlet designations, users, operating mode) against listed plug-in data, updated the listing where necessary and prepared the file for downlink via OCA.]*

After turning off the OpsLAN SSC9 (Operations Local Area Network/Station Support Computer 9) laptop and Node UOP2 (Utility Outlet Panel 2), Thomas Reiter replaced failed RPCMs (Remote Power Controller Modules) with new spares, one in the Lab, two in the Node. SSC9 and UOP2 were later powered up again and all gear restowed. *[The old units will be returned on 12A.1 for replacement of their FET (field effect transistor) Hybrid Controllers that are subject to additional failures, and the three spares replaced with new RPCMs to be delivered on 12A.1.]*

Tyurin performed a three-hour outfitting job in the SM, installing and routing/rerouting two cables to connect the SSC1 laptop to the System Power Panel (PPS) and Smart Switch Router (BRI). The work was supported by ground specialist tagup.

Thomas Reiter made preparations for his first experiment session with the Russian/

German TEKh-20 Plasma Crystal-3 Plus (PK-3+) payload, scheduled for tomorrow, by unstowing, gathering and setting up its hardware, Telescience gear and two manometer pressure gauges, then installing the hardware in the SM and starting the standard 20-min. leak check on the vacuum work chamber (ZB) before its evacuation with the turbopump. *[The experiment will be performed on plasma, i.e., fine particles, charged and excited by RF/radio frequency power, inside the evacuated work chamber where they are studied in various modes and with various RF-discharge power levels, pressures, and quantities of particles. The experiment will run in automated mode. Main objective is to study dust plasma crystallization processes at a specified power of HF (high frequency) discharge, pressure, and a varied number of particles with subsequent reduction of HF discharge power, then to observe melting of the structures formed earlier.]*

The FE-2 also performed the monthly recharging of the Motorola-9505 Iridium satellite phone. *[After retrieving it from its location in the Soyuz TMA-9/13S descent module (BO), Thomas initiated the recharging of its lithium-ion battery, a 30-min. process, monitoring the process every 10-15 minutes as it took place. Upon completion Thomas returned the phone inside its SSSP Iridium kit and stowed it back in the BO's operational data files (ODF) container. The satphone accompanies returning ISS crews on Soyuz reentry and landing for contingency communications with SAR (Search-and-Rescue) personnel after touchdown. The Russian-developed procedure for the monthly recharging has been approved jointly by safety officials. During the procedure, the phone is left in its fluoroplastic bag with open flap.]*

Misha pumped 18 liters of condensate water from a U.S. CWC (Contingency Water Container, #1057) to an EDV container using the BP condensate feed unit and U.S. condensate filter, as a first coarse cleaning of the USOS/Lab condensate. *[Next step will be to connect the EDV to the SRV-K2M water processing/supply subsystem for further processing for electrolysis in the Elektron O₂ generator.]*

In the Node, Reiter inspected, audited and photographed "unknown"/unidentified items accumulated in a CTB (Crew Transfer Bag, #1039) for identification by ground specialists.

For his second NUTRITION session, beginning tomorrow, Mike LA unstowed the necessary payload hardware, verifying with the IMS (Inventory Management System) that he will not accidentally use expired items. *[The NASA/JSC-sponsored NUTRITION experiment, the most comprehensive inflight study done to date of human physiologic changes during long-duration space flight, requires LA to forego exercising and eating 8 hours before drawing his blood sample. The Clinical Nutritional Assessment profile currently required on all U.S. Astronauts collects*

blood and urine samples preflight and postflight. NUTRITION expands this protocol by also capturing inflight samples and an additional postflight sample. The results will be used to better understand the impact of countermeasures (exercise and pharmaceuticals) on nutritional status and nutrient requirements. The Clinical Nutritional Assessment profile (MR016L), first started on two Mir crewmembers and then on all ISS US crews, nominally consists of two pre-flight and one post-flight analysis of nutritional status, as well as an in-flight assessment of dietary intake using the FFQ (Food Frequency Questionnaire). The current NUTRITION project expands MR016L testing in three ways: Addition of in-flight blood & urine collection, normative markers of nutritional assessment, and a return session plus 30-day (R +30) session to allow evaluation of post-flight nutrition and implications for rehabilitation. Note: To date, it has not been possible to assess nutritional status during flight because blood and urine could not be collected, stowed frozen, and returned during ISS missions. MELFI (Minus-Eighty Laboratory Freezer for ISS) now makes it possible.]

The FE-1 conducted the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables.

The FE-2 updated/edited the standard IMS “delta file”, including stowage locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The CDR had an additional half hour for finishing the U.S. Airlock restowing, which had been on his discretionary “job jar” task list for a while.

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-2), RED resistive exerciser (CDR), and VELO bike with bungee cord load trainer (FE-1, FE-2).

Afterwards, Reiter transfers his, LA’s and Misha’s exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

As per crew report, the “Makita” battery charger appears not to work properly. The crew will attempt to charge additional batteries for further analysis.

Update on CMG-3: Beginning at ~7:00am EDT, MCC-H has conducted a >7-hr. test of the Control Moment Gyroscope, which has been removed from its steering function on 9/28/06 and spun down on 10/10/06 because of vibrations over 0.46g

as measured by its accelerometer. The drag test, mostly designed to gain insight into the health of the accelerometer, spun the CMG up to 500 rpm and then let it coast down to zero while acceleration data were taken with the MAMS (Microgravity Acceleration Measurement System) to correlate/compare with the internal CMG accelerometer. An initial review of the available data indicated no vibration events. However, analyses of these data are continuing to determine forward troubleshooting plans. *[Should CMG-3 need to be replaced, a replacement unit could be flown up on STS-118/13A.1.]*

Update on RJMC: As a result of evaluation of the failed S1-1 RJMC (Rotary Joint Motor Controller), removed by McArthur and Tokarev during EVA-4 on 11/7/05 and returned to Earth, a failed transistor was found in the device. After replacement with a new transistor, RJMC continues to operate nominally. The transistor has been shipped to JSC for further analysis.

No CEO photo targets uplinked for today.

To date, over 250,000 of CEO images have been taken in the first six years of the ISS, about one third of the total number of images taken from orbit by astronauts.

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 7:31am EDT [= epoch]*):

Mean altitude -- 339.0 km

Apogee height -- 347.6 km

Perigee height -- 330.4 km

Period -- 91.31 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0012785

Solar Beta Angle -- 42.2 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 160 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45229

Significant Events Ahead (*all dates Eastern and subject to change*):

10/23/06 -- Progress M-58/23P launch

10/26/06 -- Progress M-58/23P docking (SM aft port; on NASA TV)

11/03/06 -- ISS Reboost
11/22/06 -- Russian EVA-17
11/30/06 -- ISS Reboost
12/07/06 -- STS-116/12A.1 launch
12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss
12/19/06 -- Progress M-57/22P undocking (DC1) & reentry
12/20/06 -- Progress M-59/24P launch
12/22/06 -- Progress M-59/24P docking (DC1)
01/22/07 -- US EVA-6
01/26/07 -- US EVA-7
01/31/07 -- US EVA-8
02/06/07 -- Progress M-59/24P undocking (DC1) & reentry
02/07/07 -- Progress M-60/25P launch
02/09/07 -- Progress M-60/25P docking (DC1)
02/22/07 -- STS-117/13A launch – S3/S4 trusses (may slip to 3/16)
02/24-03/03/07 -- STS-117/13A docked mission w/ISS (earliest)
3/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
06/11/07 -- STS-118/13A.1 (slip to 6/28??) -- S/Hab-SM, S5, ESP3
08/09/07 -- STS-120/10A (slip to 09/07??) -- Node 2.

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Jesco von Puttkamer \(jvonputt@hq.nasa.gov\)](mailto:jvonputt@hq.nasa.gov);
CC:
Subject: ISS On-Orbit Status 10/15/06
Date: Sunday, October 15, 2006 3:07:21 PM
Attachments:

ISS On-Orbit Status 10/15/06

All ISS systems continue to function nominally, except those noted previously or below. *Sunday -- off-duty day for CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Thomas Reiter, except for regular maintenance and voluntary work. Ahead: Week 4 of Increment 14.*

After wakeup (2:00am EDT), before breakfast, Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

The CDR completed the visual "T+2 Day" microbial (bacterial & fungal) analysis of the Week 3 potable water samples, collected on 10/13 from the SRV-K hot tap and the EDV container of the water supply system (SVO-ZV), with the WMK (water monitoring kit) and MWAK (Microbial Water Analysis Kit). *[The T+2d analysis uses incubated MCDs (Microbial Capture Devices) and CDBs (Coliform Detection Bags) from the MWAK.]*

The FE-1 conducted the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the Service Module (SM), including the ASU toilet facilities systems/replaceables, the weekly inspection of the BRPK air/liquid condensate separator apparatus and the weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/Moscow.

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1, FE-2), RED resistive

exerciser (CDR), and VELO bike with bungee cord load trainer (FE-1).

Reiter and Lopez-Alegria had their weekly PFCs (private family conferences) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop, currently SSC-8 in the Lab at portside), Thomas at 10:35am EDT, LA at 12:15pm.

No CEO (Crew Earth Observation) photo targets uplinked today.

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CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

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<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 7:10am EDT [= epoch]*):

Mean altitude -- 339.2 km

Apogee height -- 348.1 km

Perigee height -- 330.3 km

Period -- 91.32 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0013213

Solar Beta Angle -- 43.0 deg (magnitude decreasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 76 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45213

Significant Events Ahead (*all dates Eastern and subject to change*):

10/23/06 -- Progress M-58/23P launch

10/26/06 -- Progress M-58/23P docking (SM aft port; on NASA TV)

11/03/06 -- ISS Reboost

11/22/06 -- Russian EVA-17

11/30/06 -- ISS Reboost

12/07/06 -- STS-116/12A.1 launch

12/09-16/06 -- STS-116/12A.1 docked mission w/ISS -- P5 truss

12/19/06 -- Progress M-57/22P undocking (DC1) & reentry

12/20/06 -- Progress M-59/24P launch

12/22/06 -- Progress M-59/24P docking (DC1)

01/22/07 -- US EVA-6
01/26/07 -- US EVA-7
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02/24-03/03/07 -- STS-117/13A docked mission w/ISS (earliest)
3/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
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03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
06/11/07 -- STS-118/13A.1

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Jesco von Puttkamer \(jvonputt@hq.nasa.gov\)](mailto:jvonputt@hq.nasa.gov);
CC:
Subject: ISS On-Orbit Status 10/14/06
Date: Saturday, October 14, 2006 12:51:31 PM
Attachments:

ISS On-Orbit Status 10/14/06

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – off-duty for the Expedition 14 crew CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Thomas Reiter.*

After wakeup (2:00am EDT), before breakfast, Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with the daily hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit. The noninvasive medical equipment used by the experiment are the Tewameter (from TEWL = transepidermal water loss, one of the most important biophysical parameters for evaluating the efficiency of the human skin water barrier), the Corneometer (to accurately determine the hydration level of the skin surface) and the VisioScan which takes direct measurements of the skin topography (structure & level of dryness) with a special UV-A (Ultraviolet A) light video camera with high resolution.]*

The crew completed the regular weekly three-hour task of thorough station cleaning, wearing protective garment. *["Uborka", normally done every Saturday, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with "Fungistat" disinfectant wipes; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

FE-1 Tyurin conducted the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the Service Module (SM), including the ASU toilet facilities systems/replaceables.

At ~8:05am, the crew engaged in their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exercise device (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1). *[TVIS running speed limit for Exp-14 is set at 10 mph/16.1 km/h.]*

Afterwards, FE-2 Reiter transferred his, Tyurin's and Lopez-Alegria's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~7:55am Thomas conducted an LDM (Long-Duration Mission) PAO/TV teleconference with a government event in Northern Germany, an open air stage show in Oldenburg, organized by the State Chancellery of Niedersachsen (Lower Saxony). Headed by Niedersachsen Prime Minister Christian Wulff, VIPs included personnel from DLR and ESA plus former German astronaut Ulf Merbold. Purpose of the event: put focus on technology achievements in Lower Saxony (including troubled EADS). *[The audio/video connection was made by the Russian Segment's SPP automated onboard program sequencer over RGS (Russian Ground Site), and the VHF/TV signal was routed from RGS through TsUP/Moscow via IGS network and Ostankino TV satellite to Oldenburg.]*

Due to an incorrectly located MEC computer file, Mike LA was unable yesterday to finish his first MedOps WinSCAT (Spaceflight Cognitive Assessment Tool) session. Completion of the run has now been placed on the discretionary "job jar" task list for LA and can also be timeline-rescheduled. *[WinSCAT is a time-constrained questionnaire test of cognitive abilities, routinely performed by astronauts aboard the ISS every 30 days before or after the PHS (periodic health status) test or on special CDR's, crewmembers or flight surgeons request.]*

Since begin of Increment 14, the crew has had problems with placing calls with the IP (Internet Protocol) phone on several SSCs (Station Support Computers). IP phone use is continuing with limited success rate (~10%). Ground is investigating.

Update on CMG-3: Control Moment Gyroscope 3 remains spun down. Next troubleshooting activity is scheduled early next week with a short-term low-level spinup of the CMG to take accelerometer data for analysis (checking out the sensor). Further troubleshooting efforts will be developed after completion of this

analysis.

Weekly Science Update (*Expedition Fourteen -- 3rd*):

CULT (Cultural Factors Questionnaire): Fourth session for Thomas Reiter has been performed nominally 10/6..

CARD (Latent Virus Shedding during Spaceflight, ESA): Planned.

NOA (Nitric Oxide Analyzer): Seventh session for Thomas Reiter performed nominally on 10/6.

EMCS (European Modular Cultivation System, ESA): EMCS ops completed for Increment 13 with some forward work for Increment 14.

MTR-2 (Russian radiation measurements): Passive dosimeters measurements in DC1 "PIRS".

ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS): During the last activity with ALTEINO on 10/6, two files have been reported by the crew on the memory card (only one file is expected). Issue indicates (inadvertent) reboot of facility. Cause and impact unknown. Similar case occurred during Inc13. Analysis of data to be done upon reception by scientists to understand cause and impact.

TROPI (Study of Novel Sensory Mechanism in Root Phototropism): Planned for Increment 14.

RC (Refrigerated Centrifuge): Planned.

GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology): Planned

RS (Renal Stone): Planned.

Nutrition: CDR Lopez-Alegria performed the first of eight Nutrition sessions, collecting a 24 hour urine pool and blood samples.

CFE (Capillary Flow Experiment): Complete.

IMMUNO (Saliva Sampling): Complete.

SAMPLE: Complete.

BASE: Complete.

LEUKIN: Complete.

LBP (Lower Back Pain): Complete.

SLEEP: Planned.

YING (Yeast in No Gravity): Complete.

Swab (Characterization of Microorganisms & Allergens in Spacecraft): Planned.

PK-3 (Plasma Crystal 3): Second set of experiments with Thomas Reiter will be replanned from Week 5 to Week 4 (starting 10/16, ending 10/20) (To be confirmed).

ETD (Eye Tracking Device): Fifth session for Thomas Reiter has been performed nominally on 10/6.

PFS (Pulmonary Function System, upgrade of existing system): Complete.

BCAT-3 (Binary Colloidal Alloy Test-3): Planned.

PFMI (Pore Formation & Migration Investigation): Complete.

POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G): Planned.

DAFT (Dust & Aerosol Measurement Feasibility Test): Complete.

CBOSS (Cellular Biotechnology Support Systems): Complete.

MISSE (Materials ISS Experiment): Ongoing.

InSPACE (Investigating the Structure of Paramagnetic Aggregates from Colloidal Emulsions): Complete.

ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System): Continued into the Increment 14.

SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite): Planned.

Earth Knowledge Acquired by Middle School Students (EarthKAM): Planned.

Crew Earth Observations (CEO): Through 10/9, the ground has received a total of 279 of Inc14 CEO images for review and cataloging. The crew has been able to respond to eight of investigators' target requests. "The quality of your imagery is generally excellent in terms of composition and content. You are making good progress with the use of the 400mm lens. Consistency in focus will improve with more practice". In the coming weeks, as the station's daylight-awake orbit tracks shift towards the north again, the ground will be able to offer more targets for the crew and will "also continue to work on our end to better help you locate our targets using maps, images, and written descriptions".

Today's CEO photo targets, from the Lab nadir/science window, were **Roter Kamm Impact Crater** (*this small, 3.7 million year old impact crater is located in extreme southern Namibia near the coastal dune fields just north of the Orange River. ISS had a near nadir pass in fair light and weather to acquire this feature which is only 2.5km in diameter, so the crews needed long lens settings for detail*), and **Patagonian Glaciers** (*weather was marginal for this target area at the time of this pass as clouds and weather close from the SW. Shooting just right of track for openings to map the glacier features of the Northern Patagonian Ice Field, using the long lens settings for detail*).

To date, over 250,000 of CEO images have been taken in the first six years of the ISS, about one third of the total number of images taken from orbit by astronauts.

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<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

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<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

ISS Orbit (*as of this morning, 6:54am EDT [= epoch]*):

Mean altitude -- 339.3 km

Apogee height -- 348.1 km

Perigee height -- 330.4 km

Period -- 91.32 min.

Inclination (to Equator) -- 51.63 deg

Eccentricity -- 0.0013178

Solar Beta Angle -- 43.1 deg (magnitude peaking today)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 30 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45197

Significant Events Ahead *(all dates Eastern and subject to change):*

10/23/06 -- Progress M-58/23P launch
10/26/06 -- Progress M-58/23P docking (SM aft port; on NASA TV)
11/03/06 -- ISS Reboost
11/22/06 -- Russian EVA-17
11/30/06 -- ISS Reboost
12/07/06 -- STS-116/12A.1 launch
12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss
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06/11/07 -- STS-118/13A.1

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Jesco von Puttkamer \(jvonputt@hq.nasa.gov\)](mailto:jvonputt@hq.nasa.gov);
CC:
Subject: ISS On-Orbit Status 10/13/06
Date: Friday, October 13, 2006 1:43:48 PM
Attachments:

ISS On-Orbit Status 10/13/06

All ISS systems continue to function nominally, except those noted previously or below.

After wakeup, before breakfast, Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with a hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

The two Flight Engineers spent several hours on Progress M-57/22P unloading, transfers and commensurate updating of the IMS (Inventory Management System).

Preceding the 22P transfer & stowage activities, at 4:30am EDT FE-1 Tyurin linked up with TsUP-Moscow stowage specialists via S-band to conduct the weekly IMS tagup, discussing transfer details, stowage locations and bar code identifications for the IMS databases, as well as hardware slated for disposal in 22P.

After locating and unstowing two specific new laptop cables, Mikhail Tyurin installed/routed one cable behind Service Module (SM) panels in preparation for a new laptop, RSS2, to be delivered on Progress M-58/23P on 10/26, the other in place of the RSE1 laptop's former power cable. The tasks were supported by ground specialist tagup. *[For the replacement, RSE1 was powered down and subsequently turned on again.]*

FE-2 Reiter deactivated and dismantled the ESA LDM (long-duration mission) student experiment UTBI, installed by Mikhail Tyurin in the "Pirs" Docking Compartment (DC1) on 9/28 after its arrival on Soyuz TMA-9, and prepared the UTBI kit for return to Earth. *[UTBI (Under the Background Influence) had the main goal of measuring the background radiation inside the ISS/DC1 using a new type of*

radiation sensor, made from an alloy of Cadmium, Zinc and Tellurium, without requiring cryogenic cooling. Since X-rays, gamma rays and other particles (protons, neutrons, electrons) have a very important effect outside the Earth's geomagnetic field, their measurement will help in the development of future space vehicles and other space technologies. UTBI is demonstrating this particular detector technology for the first time in space,]

In the Lab (rack LAB1D3), Thomas Reiter also unpacked and deployed the SVG (Space Video Gateway) computer system, connecting it to power (UOP3/Utility Outlet Panel 3), HRDL (High Data Rate Link) at MELFI for video data downlink, and OpsLAN (Operations Local Area Network) for command & control (either local via SSC laptop or remote from MCC-H). The SVG system will be checked out next Monday (10/16) and tested with its HDW-750 camcorder in a live downlink on Wednesday (10/18). *[SVG is a specialized computer designed to capture, encode, packetize and downlink HDTV (High Definition TV) live via Ku-band assets or to record it on the hard drive. HDTV uses the Sony HDW-750 camcorder with Sony F115 microphone and V10 VTR (Video Tape Recorder). The flight-certified SVG hardware was provided by NASA and JAXA (Japanese Aerospace Exploration Agency) for temporary installation in the ISS Lab under an agreement between NASA, the Japan Broadcasting Corporation NHK (Nippon Hoso Kyokai) and Discovery Communications, Inc. (DCI). The test on 10/18 is intended to verify proper functioning of the SVG system in preparation of two upcoming in-flight events, one with the Discovery Channel, the other with NHK.]*

CDR Lopez-Alegria conducted "Week 3" sampling of potable water for chemical and microbial analysis from the SVO-ZV tap and the SRV-K warm tap, the latter after preliminary heating of the water (two heating cycles) and flushing. *[From each port, Mike collected two 225 mL microbial samples for on-board processing and two 750 mL chemical archival (post-flight) samples for return to Earth, using Russian collection procedures. The flush water, collected in a water bag, was then reclaimed for technical use. For the in-flight chemistry/microbiology analysis, LA used MCDs (microbial capture devices) from the U.S. WMK (water microbiology kit) for treatment/processing after no more than 6 hours of the collection (done at ~8:00am EDT). Sample analysis included subsequent processing of water samples in the MWAK (microbial water analysis kit) for inflight coliform bacteria (Escherichia coli) detection, at ~12:00pm. Results of the on-board processing will be available after a two-day incubation period, in case of the MWAK after 4-6 days of incubation.]*

For his first MedOps WinSCAT (Spaceflight Cognitive Assessment Tool) session, Lopez-Alegria logged in on the MEC (Medical Equipment Computer) and performed the psychological evaluation exercise on the laptop-based WinSCAT experiment. *[WinSCAT is a time-constrained questionnaire test of cognitive abilities, routinely performed by astronauts aboard the ISS every 30 days before or after the PHS*

(periodic health status) test or on special CDR's, crewmembers or flight surgeons request.]

All crewmembers took the periodic on-orbit hearing assessment (O-OHA) test, a 30-min. NASA environmental health systems examination to assess the efficacy of acoustic countermeasures, using a special MEC laptop application. It was the first session for LA and Misha, the second for Thomas. *[The O-OHA audiography test involves minimum audibility measurements for each ear over a wide range of frequencies (0.25-10 kHz) and sound pressure levels, with the crewmembers using individual-specific Prophonics earphones, Bose ANC headsets and the SLM (sound level meter). To conduct the testing, the experimenter is supported by special EarQ software on the MEC, featuring an up/down-arrow-operated slider for each test frequency that the crewmember moves to the lowest sound pressure level at which the tone can still be heard. The baseline test is required not later than about Flight Day 14 for each new Expedition and is then generally performed once per month.]*

Reiter took the periodic sensor readings of the Russian "Pille-MKS" (MKS = ISS) radiation dosimetry experiment which has ten sensors placed at various locations in the Russian segment (port cabin window, starboard cabin window, ASU toilet facility, control panel, etc.). Nine of the ten dosimeters are read manually (last time done: 8/4/06).

Over RGS (Russian Ground Site) at ~12:20pm, Thomas ran another VHF-1 (Russian: UKV-1) voice communications test with the ground to check the external telephone link with the Columbus Control Center (COL-CC) at Oberpfaffenhofen near Munich.

Tyurin completed the periodic switchover of the Russian STTS telephone/telegraph subsystem to an alternate string, today to a backup system in nominal mode, after its operation on the primary string since 10/2. *[The "Voskhod-M" STTS enables telephone communications between the SM, FGB, DC1 and U.S. segment (USOS), and also with users on the ground over VHF channels selected by an operator at an SM comm panel, via STTS antennas on the SM's outside. There are six comm panels in the SM with pushbuttons for accessing any of three audio channels, plus an intercom channel. Other modes of the STTS include telegraphy (teletype), EVA voice, emergency alarms, Packet/Email, and TORU docking support.]*

The CDR performed the periodic atmospheric status check for ppO₂ (Partial Pressure Oxygen) and ppCO₂ (pp Carbon Dioxide), taken readings of the CSA-CP (Compound Specific Analyzer-Combustion Products) datalogger and using the CSA-O₂ (Compound Specific Analyzer-Oxygen Sensor) and CDMK (CO₂ Monitoring Kit). *[CSA-CP (#1043) measurements were gathered at the SM Central Post (prime*

unit #1043) and in the Node (backup unit #1045), CSA-O2 (#1042, #1063) in the Lab, and CDMK (#1009) in SM and Lab.]

Afterwards, Mike LA also handled the regular maintenance reboots on the SSC (Station Support Computer) File Server and OCA Comm Router laptops.

Working on the MEC, LA filled out the regular weekly FFQ (food frequency questionnaire), his third, which keeps a log of his nutritional intake over time on special MEC software. *[The CDR's personalized Expedition 14 FFQ data tables have meanwhile been uplinked to the MEC for his use. The FFQ records amounts consumed during the past week of such food items as beverages, cereals, grains, eggs, breads, snacks, sweets, fruit, beans, soup, vegetables, dairy, fish, meat, chicken, sauces & spreads, and vitamins. IBMP/Moscow (Institute of Biomedical Problems, Russian: IMBP – Institute of Medico-Biological Problems) recommended average daily caloric value of the crew's food intake is 2200-2300 cal. If larger quantities of juices and fruits are taken into account, the value can go to 2400-2500 cal.]*

LA and Misha again had one hour set aside on today's schedule for ISS familiarization and adaptation, to help in adjusting to their new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

At ~4:15am, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~1:10pm Mike LA had his weekly PFC (private family conference) via S-band/ audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop, currently SSC-8 in the Lab at portside).

At ~3:35pm, the crew is scheduled for their regular weekly tagup with the Lead Flight Director at MCC-Houston.

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parts, research payloads, and EVA equipment.

Today's CEO photo targets, from the Lab nadir/science window, were **Kerguelen Islands** (*this was the best picture-taking light and position for two passes today over this target. Weather was marginal, but the crew was told to look for this isolated, rugged archipelago between clouds. Of interest here is spring snow cover, sea ice, and, if possible, glacial features on the mountainous western side. Using the long lens settings*), and **Patagonian Glaciers** (*during a first pass, weather was marginal for good views, but the crew was to try for detailed, between-clouds views of the less-well photographed glaciers on the western side of the Southern Patagonian Ice Field. Of particular interest here is where the glaciers reach the sea at the head of fjords. A second pass, over the southern end of this target area, was further south. Light was still good and the weather perhaps a little better for viewing. Using the long lens again and trying for glaciers on the Pacific side, as far south as possible*).

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From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Jesco von Puttkamer \(jvonputt@hq.nasa.gov\)](#);
CC:
Subject: ISS On-Orbit Status 10/12/06
Date: Thursday, October 12, 2006 2:37:23 PM
Attachments: [image002.gif](#)

ISS On-Orbit Status 10/12/06

All ISS systems continue to function nominally, except those noted previously or below. *Today is the 100th day in space for FE-2 Reiter. Thomas, wir gratulieren! Also, 514 years ago today (10/12/1492) Christopher Columbus, Italian: Cristoforo Colombo, "discovered" America, sighting land which he later christened San Salvador (Bahamas).*

After wakeup, before breakfast, Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with a hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

After disconnecting the BITS2-12 onboard telemetry system, FE-1 Mikhail Tyurin removed and replaced the expired String 3 BRPK air/liquid condensate separator apparatus of the condensate water processor (SRVK-2M) that prepares the condensate coming from the currently active air conditioner (SKV) for the Elektron. *[BITS2-12 was later reconnected to support ground checkout of the R&R.]*

Afterwards, when the BSV-M time synchronization unit on the PPS (System Power Panel) master clock unit was turned off by the ground, Tyurin switched the Vozdukh CO₂ removal system to automatic cycle control mode. *[Later in the afternoon (~2:30pm EDT), after the reactivation of the BSV-M, Vozdukh will be switched back to manual Mode 5.]*

Continuing the on-going campaign to improve noise/vibration reduction in the Russian segment, Thomas Reiter installed a soft-fabric acoustic damper/isolator for a fan (VPO1) behind panels #412 & #413 in the Service Module Transfer Compartment (SM PkhO). *[For the activity, VPO1 was powered off at the PPS-22 systems power panel.]*

In the same vein, Misha Tyurin installed a new sound-reducing soft-fabric damper in the air duct fan box of the starboard crew quarter, after temporarily closing the BVK-2

vacuum valves and shutting off the VKYu ventilator. The muffler in the port crew quarter was installed by the Expedition 13 crew last month (9/2).

The two Flight Engineers restored access to the Progress M-57/22P cargo ship which had been closed off for the Soyuz relocation, with more cargo unloading ahead. *[After the obligatory 1-hr. Progress/DC1 interface leak check, Misha & Thomas opened the DC1-SU (vestibule) and Progress-SU transfer hatches, rigidized the link-up with the QD (quick release) screw clamps, deactivated the spacecraft and installed the ventilation air duct. 22P will remain docked at the "Pirs" module until late in December.]*

CDR Lopez-Alegria and FE-2 Reiter performed the 3-hr. maintenance job of removal & replacement (R&R) of the Airlock Common Cabin Air Assembly (A/L CCAA)'s Water Separator (WS), during which the crewmembers also were to inspect a Heat Exchanger Hydraflow coupling for indications of blockage, and document activities photographically. *[Over the past year, increasing indications of wetness by the WS liquid sensor were noted, particularly during campout, METOX regenerations and 12A ORCA (Oxygen Recharge Compressor Assembly) ops. They signal increasing filter blockage which, when complete, would block water flow from the WS to the condensate tank and instead release it into the A/L cabin. The R&R required Mike LA to rotate the A/L 1A1 rack with Reiter's assistance and then remove 44 fasteners and demate two electrical connectors, two Hydraflow Couplings and one QD connector.]*

Mike LA also had two hours reserved for extensive restowing of hardware in the A/L and reorganizing the "Quest" module.

As is standard practice after a Soyuz relocation to the easily-observable FGB nadir port, Misha took external pictures of the Soyuz TMA-9/13S spacecraft to assess the condition of its MLI (multi-layer insulation) cover on the Descent Module (DM) and Propulsion Compartment (PAO), and also at the joints between the modules where MLI blankets are fastened by spring clips and contain vent valve openings. *[The FE-1 used the Nikon D1X digital camera with 80-400mm lens, without flash, from the DC1 EVA hatch 2 (VL2) window, later downloading the images to the RSK1 laptop for subsequent downlink via OCA comm.]*

Thomas Reiter completed the periodic cleaning and disinfecting of MELFI (Minus-Eighty Laboratory Freezer for ISS) facility dewars.

During the completion of relocation clean-up ops, the U.S. TEPC (Tissue Equivalent Proportional Counter) was left unpowered. The unit has recently been declared failed and will be replaced with a new instrument on Mission 13A (February 2007).

Reiter conducted the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables and the weekly inspection of the BRPK.

The CDR worked on the IMS (Inventory Management System) to update/edit its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

All crewmembers performed their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1), RED resistive exerciser (CDR, FE-2), and VELO bike with bungee cord load trainer (FE-1, FE-2).

Later tonight, LA will transfer his, Thomas' and Misha's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~10:45am EDT, the crew held the traditional teleconference with the next ISS crew, Expedition 15 (CDR Fyodor Yurchikin, FE-1 Oleg Kotov, FE-2 Sunita Williams), via S-band. *[These exchanges are performed every other week, for about 30 minutes, to pass on the lessons learned to the upcoming Expedition Crew. Purpose: to begin the handover process prior to the arrival on orbit through videocons and data exchanges between the current crew and the upcoming crew. These tagups start normally toward the end of the first month on orbit.]*

As all new station crews, LA and Misha had one hour set aside on today's schedule for ISS familiarization and adaptation, to help in adjusting to their new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

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*The time of the station's nadir probably beat the diurnal cloud formation. Because of the seasonal nature of the river's volume of flow, its heavy sediment load, and low gradient, the Beni exhibits extraordinary and dynamic meander patterns in its floodplain. Trying for a mapping pass from S to N), and **Patagonian Glaciers** (clearing weather was expected over this target area at the time of this pass. Taking this opportunity to map the less-frequently photographed glacial features of the smaller Northern Patagonian Ice Field).*

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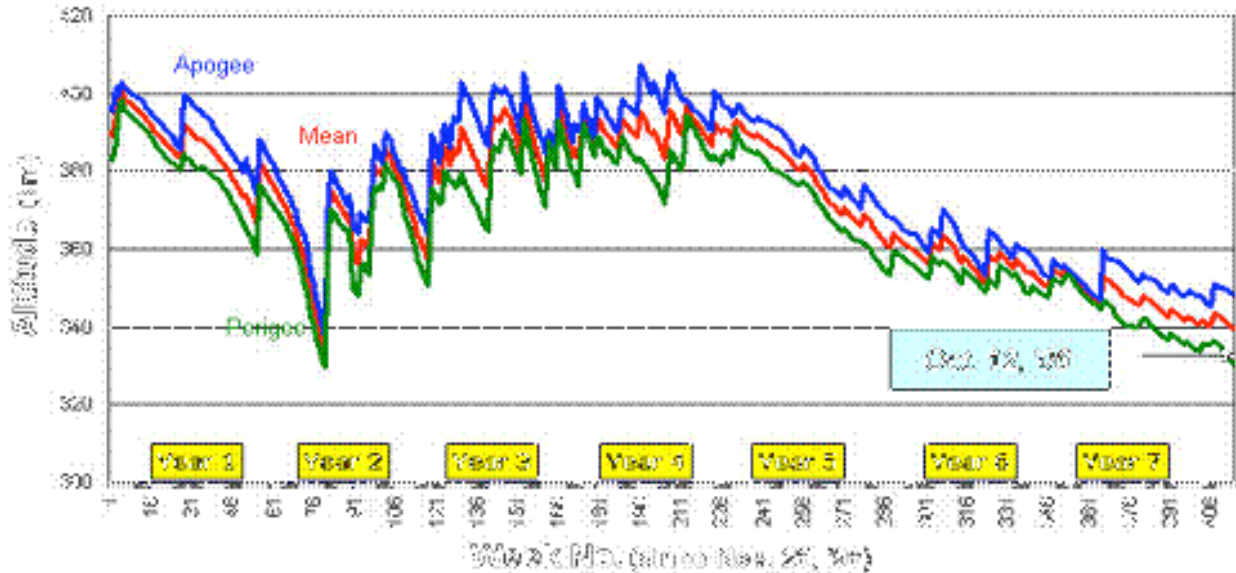
Eccentricity -- 0.0013173

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- 03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
- 03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
- 03/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
- ??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
- 06/11/07 -- STS-118/13A.1

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Jesco von Puttkamer \(jvonputt@hq.nasa.gov\)](mailto:jvonputt@hq.nasa.gov);
CC:
Subject: ISS On-Orbit Status 10/11/06
Date: Wednesday, October 11, 2006 2:01:03 PM
Attachments:

ISS On-Orbit Status 10/11/06

All ISS systems continue to function nominally, except those noted previously or below. *A short & almost duty-free day after yesterday's successful Soyuz relocation.*

To make up for last night's late bedtime, the crew got extended sleep time today, until ~7:40am EDT. Tonight, sleep/wake cycle moves back to regular hours (5:30pm – 2:00am).

After wakeup, before breakfast, FE-2 Thomas Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with a hand application of the experimental skin cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit. The noninvasive medical equipment used by the experiment are the Tewameter (from TEWL = transepidermal water loss, one of the most important biophysical parameters for evaluating the efficiency of the human skin water barrier), the Corneometer (to accurately determine the hydration level of the skin surface) and the VisioScan which takes direct measurements of the skin topography (structure & level of dryness) with a special UV-A (Ultraviolet A) light video camera with high resolution.]*

Afterwards, finishing the clean-up after the relocation, Reiter spent some time on returning U.S. items from the Russian Segment (RS) to the U.S. Segment (USOS). *[This included the A31p PCS (Portable Computer System) laptop which had temporarily joined the A31p permanently located in the FGB.]*

CDR Lopez-Alegria reviewed uplinked descriptive and procedural material in preparation for a 3-hr. maintenance job on the A/L CCAA (Airlock Common Cabin Air Assembly) scheduled for tomorrow. During the IFM (In-Flight Maintenance), the CCAA WS (Water Separator) will be removed and replaced with a new spare, and a Heat Exchanger Hydraflow coupling inspected for blockage. *[Increasing "Wet"*

indications by the WS liquid sensor over the past year, particularly during campout, METOX regenerations and ORCA (Oxygen Recharge Compressor Assembly) ops during 12A, indicate increasing filter blockage, threatening to block the water flow from the WS to the condensate tank and then releasing it into the A/L cabin. The R&R (removal & replacement) requires A/L 1A1 rack rotation with Reiter's assistance, removing 44 fasteners and demating two electrical connectors, two Hydraflow Couplings and one QD (quick release) connector.]

For LA, the NASA-JSC experiment SLEEP-LONG (Sleep-Wake Actigraphy & Light Exposure During Spaceflight) continues, monitoring his sleep/wake patterns and light exposure with an Actiwatch. *[This special "watch" measures the light levels the CDR encounters as well as his patterns of sleep and activity throughout the Expedition.]*

Thomas Reiter continued the current round of the monthly preventive maintenance of RS ventilation systems in the FGB (*Funktionalnyi-Grusovoi Blok*), cleaning interior closeout panel vent screens (panels 201, 301, 401).

FE-1 Tyurin meanwhile collected weekly cabin air readings with the Russian GANK-4M Real-Time Harmful Contaminant Gas Analyzer system of the SM SOGS (Pressure Control & Atmospheric Monitoring System). *[GANK tests for Methane (CH₄), Ammonia (NH₃), Carbon Monoxide (CO), Formaldehyde (HCHO), Nitrogen Oxides (NO, NO₂), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), and Hydrogen Cyanide (HCN).]*

Mike LA also conducted the weekly audit/inventory of the available CWCs (collapsible water containers) and their contents, to keep track of onboard water supplies. *[Updated "cue cards" based on the crew's water calldowns are sent up every other week. The current cue card lists 31 water containers (~1225.2 liters total) for the four types of water identified on board: technical water (for Elektron, flushing, hygiene; ~999.1 liters), potable water (~151 liters), condensate water (for processing, 46.5 liters) and other (TCS fluid, EMU waste water, 28.6 liters). Water was delivered by 12A and is re-supplied from processed condensate.]*

Afterwards, the CDR performed a quick status check on the ALTEA (Anomalous Long-Term Effects on Astronauts) payload, using the ELC4 (EXPRESS Rack 4) laptop with the revised software, inspecting the dosimetry LEDs (light emitting diodes) and checking whether the hardware is securely mounted.

Lopez-Alegria also did the periodic (every two weeks) routine inspection of the RED (Resistive Exercise Device), checking squat harness components, adjusting accessory straps and tightening Flexpak canister bolts.

All crewmembers worked out in an abbreviated physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (FE-2), TVIS treadmill (FE-1), and RED (CDR).

Afterwards Thomas transferred his, LA's and Misha's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

Mike LA completed the daily routine maintenance of the SM's SOZh environment control & life support system, with the regular insert replacements in its toilet system (ASU), and also conducted the periodic checkout/verification of IP-1 airflow sensors in the various RS hatchways, including the SM-to-DC1 (22P) tunnel, and the SM-to-DC1, FGB-to-Node and FGB-to-Soyuz passageways.

As all new station crews, LA and Misha had one hour set aside on today's schedule for ISS familiarization and adaptation, to help in adjusting to their new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

As a new addition to the U.S. "job jar" task list, LA, Misha and Thomas, on their discretion, are to deactivate IWIS (Internal Wireless Instrumentation System) Sync Mode after the TMA-9 relocation, retrieving the data from the Lab and Node RSUs (Remote Sensor Units) for subsequent downlinking to MCC-H.

A second item on the voluntary task list is to look for and verify availability of a power cable needed for the SVG (Space Video Gateway) outfitting work scheduled for 10/13 (Friday). *[SVG is a specialized computer designed to capture, encode, packetize and downlink HDTV (High Definition TV) live via Ku-band assets or to record it on the hard drive. HDTV uses the Sony 750 camcorder with Sony F115 microphone and V10 VTR (Video Tape Recorder). The deployment & installation of the high-tech SVG will connect it to power (UOP3), HRDL (High Data Rate Link) at MELFI for video data downlink, and OpsLAN (Operations Local Area Network) for command & control (either local via SSC laptop or remote from MCC-H).]*

Update on Control Moment Gyroscope 3: CMG-3 is off. Its shutdown was commanded yesterday morning at 1:28am EDT when vibration spikes of 0.426 g were observed after it had been running at a reduced 6269 RPM for ~5 hours. During spindown there were four instances where vibration spikes reached 1.0 g. CMG-3 remains spun down, and teams will reconvene on 10/13 (Friday) to determine the forward plan. *[CMGs 1, 2, and 4 are functioning nominally, and there is no immediate impact to ISS attitude control. There are possible attitude*

control implications to future mated missions if CMG-3 remains shut down.]

Update on Elektron/Oxygen: Elektron-VM continues to be off. Its repair is planned for the period of 10/30-11/01/06, with spare parts to be delivered on Progress 23P. Until then, ISS will be repressed with O₂ from USOS resources (A/L HPGT), possibly to be replaced by O₂ delivered on 12A.1 in December. Consideration is being given to returning the failed BZh-8 Liquid Unit on 12A.1 and to delivering the remaining U.S. OGS (Oxygen Generation System) parts on 12A.1 as an Elektron alternative.

Update on CDRA: Carbon Dioxide Removal System repairs are planned for around 10/20 to restore dual bed ops (involved replacement of two valves and "sock" filter installation).

Today's CEO photo targets, from the Lab nadir/science window, were **High Central Andean Glaciers** (*these small ice fields and glaciers are situated at the very crest of this tropical section of the Andes Mountains in Peru and Bolivia. As with other glaciers located in the tropics, they are considered to be sensitive indicators of global climate fluctuations. These are challenging targets to acquire because of their small size and the frequent diurnal development of clouds near the mountain crest. ISS had an early morning pass here and should have been a couple of hours ahead of significant cloud formation. As the station tracked parallel to the Peruvian coast, the crew was to look well left of track for small patches of ice and tiny glacier features, using the long lens here for detail*), and **Coral reefs, American Samoa** (*these beautiful volcanic islands support magnificent fringing coral reef structures. The condition and extent of these and other reefs are the subject of international programs to document and manage the Earth's coral reef systems. ISS had a nadir pass in good light and fair weather. The crew used the long lens settings to acquire details of the reefs*).

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Period -- 91.32 min.
Inclination (to Equator) -- 51.64 deg
Eccentricity -- 0.0013302
Solar Beta Angle -- 39.6 deg (magnitude increasing)
Orbits per 24-hr. day -- 15.77
Mean altitude loss in last 24 hours -- 125 m
Revolutions since FGB/Zarya launch (Nov. 98) -- 45150

Significant Events Ahead *(all dates Eastern and subject to change):*

10/23/06 -- Progress M-58/23P launch
10/26/06 -- Progress M-58/23P docking (SM aft port; on NASA TV)
11/22/06 -- Russian EVA-17
12/07/06 -- STS-116/12A.1 launch
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From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Jesco von Puttkamer \(jvonputt@hq.nasa.gov\)](mailto:jvonputt@hq.nasa.gov);
CC:
Subject: ISS On-Orbit Status 10/10/06
Date: Tuesday, October 10, 2006 3:45:49 PM
Attachments:

ISS On-Orbit Status 10/10/06

All ISS systems continue to function nominally, except those noted previously or below.

Soyuz TMA-9 (13S) relocation went smoothly. After a brief ride in their crew return vehicle, CDR Michael Lopez-Alegria (left seat), FE-1 Mikhail Tyurin (center) and FE-2 Thomas Reiter (right) docked at the FGB nadir port at 3:34pm EDT, completing the spacecraft's relocation from the Service Module (SM) aft port in just 20 minutes. *[After on-time undocking at 3:14pm, Soyuz CDR Tyurin backed away from the station 25-30 m, then translated the spacecraft to the left, flying sideways, along the ISS toward the tail before turning nose-forward and rotating ("indexing") the Soyuz around its longitudinal axis to align its periscope with the docking target on the SM aft end, spending a short time in station-keeping mode. Final approach began at ~3:32pm, with docking at 3:34pm, about 5 min. earlier than expected. After hooks and latches were engaged, the crew conducted leak checks and then reentered the station through the SM.]*

For the relocation, crew wakeup was slipped to ~4:40am EDT. Sleep time begins tonight at ~11:10pm (until 7:40am tomorrow morning).

After wakeup, before breakfast, FE-2 Thomas Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, with a hand application of the experimental skin treatment cream. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

Preparing the US segment (USOS) for decrewing, CDR Lopez-Alegria configured the ECLSS (Environment Control & Life Support System) and ITCS (Internal Thermal Control System), to be ready in the eventuality of a failed redocking of the crew. *[The ER1 (EXPRESS Rack 1) was powered off. After installation of jumpers*

(fluid hoses) for the racks by Mike LA, the ground transitioned the TCS to Dual-Loop Mode, and the LTL (Low Temperature Loop) set point was raised, in order to provide redundancy in the USOS for critical avionics, for the unlikely event that a leak in one of the loops causes that loop to shut down, and to minimize the impacts of a depressurization.]

Meanwhile, FE-2 Thomas Reiter configured the USOS OpsLAN (Operations Local Area Network), including the two situation-monitoring Sony videocams in the USOS.

Afterwards, at ~7:15am, LA closed the Lab & Node hatches, isolating the USOS from the Russian segment (RS).

After starting final preparations in the RS, FE-1 Mikhail Tyurin was joined by the CDR and FE-2 to complete systems reconfigurations for decrewing, including -

- Deactivation of
 - SOTR thermal control system,
 - Vozdukh CO₂ removal system (7:45am)
 - ASU toilet system,
 - SKV air conditioner,
 - SRVK-2M water processing/supply system,
 - SOP food supply system,
 - PILLE radiation sensor system
 - FGB air ventilation fans
 - PSS Caution & Warning System in SM and FGB
 - PPS System Power Panel in the SM
 - DSD Pressure Alarm Sensor,
 - Laptops & other plugged equipment,
 - TVIS treadmill, followed by
- Closing external shutters on SM windows (#6, 8, 12, 13, 14),
 - Deactivation of DC1 Docking Compartment,
 - Deactivation of SM ventilation system,
 - Dismantling air ducts between DC1 & SM and in the FGB,
 - Disconnecting the VD1 & VD2 air duct filters in the FGB,
 - Removing the GA-PGO hatch frame ring in the FGB
 - Removing the RO-PrK hatch frame ring in the SM/DC1 vestibule,
 - Powering down SM fans.

Hatches were closed at ~9:40am between the FGB/SM, at ~10:05am between DC1/SM. *[During the relocation, both PCS (Portable Computer System) laptops in the FGB and the PSS Caution & Warning (C&W) panels in all Russian modules were*

powered off prior to ingressing the Soyuz. Thus, there is a period of time without C&W audio annunciations in the RS and without an active PCS. Deactivation of ham radio in FGB: ~9:30am, of the FGB PCS: ~9:35am.]

RS thrusters were disabled at ~10:10am. Then, QD (quick disconnect) screw clamps were removed in the RO-PrK transfer tunnel at the SM aft port at ~10:25am, followed by Soyuz TMA-9 ingress at ~10:45am, cleaning of hatch seals between Soyuz & SM, RO-PrK hatch closing at ~11:00am, and one hour leak checking. *[Thrusters re-enabled at 12:55pm.]*

While locked out in TMA-9, LA, Misha and Thomas donned their Sokol spacesuits, conducted Soyuz checkout operations and had their lunch break.

For the relocation, ISS attitude control authority was handed over to RS motion control at 2:00pm. After relocation, control returns to US momentum management at ~4:40pm.

Opening of hatches to the USOS (Node, Lab, Airlock) is expected to start at ~6:25pm and Station OpsLAN restoration should be accomplished by ~8:55pm.

TMA-9 deactivation begins at about 7:35pm. After reconfiguring station comm to nominal mode, the crew will reactivate all station systems that had been switched to autonomous (unmanned) configuration. *[Backout (reverse order) activation, generally requiring the crew only for monitoring, involves the PPS power system, PSS C&W panels in SM, FGB and DC1, DSD pressure alarm sensor, Central Post BVS computer/control systems (Wiener laptop, printer, InPU displays), ventilation systems and air ducts in SM, DC1 and FGB, SM ASU toilet facilities, time clock, Vozdukh CO2 scrubber, SKV air conditioner, SRVK-2M condensate water supply system & processor, SOTR thermal control system, SOP food systems, STTS onboard communications links, Pille radiation dosimeters, TVIS treadmill, etc.]*

As part of RS post-docking activities, the crew will also set up their spacesuits and gloves for drying.

Before turning in tonight at ~11:10pm, FE-2 Reiter will perform the daily routine maintenance of the SM's environment control & life support system (SOZh), including its toilet system (ASU).

Due to the crowded timeline, requiring meticulous attention to detail, there were no physical exercise sessions scheduled for the crew.

Update on Control Moment Gyroscope 3: CMG-3 is off. Its shutdown was commanded this morning at 1:28am EDT when vibration spikes of 0.426 g were

observed after it had been running at a reduced 6269 RPM for ~5 hours. During spindown there were four instances where vibration spikes reached 1.0 g. Engineers are discussing further plans for CMG-3. *[CMGs 1, 2, and 4 are functioning nominally, and there is no immediate impact to ISS attitude control. There are possible attitude control implications to future mated missions if CMG-3 remains shut down.]*

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From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Jesco von Puttkamer \(jvonputt@hq.nasa.gov\)](mailto:jvonputt@hq.nasa.gov);
CC:
Subject: ISS On-Orbit Status 10/09/06
Date: Monday, October 09, 2006 12:38:51 PM
Attachments:

ISS On-Orbit Status 10/09/06

All ISS systems continue to function nominally, except those noted previously or below. *Light-duty day in preparation for the Soyuz relocation (heads-up see below). Columbus Day. Underway: Week 3 of Increment 14.*

Before breakfast, the FE-2 continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN by applying the experimental skin cream to the hand. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

For the Soyuz relocation tomorrow, the crew conducted a review of the flight procedures and completed a 3-hr. training drill for the mission, supported by ground specialists via tagup on S-band/VHF-audio. *[The OBT (on-board training) included Soyuz procedures and data analysis for ascent/descent, orbital flight and relocation as contained in RODF (Russian Operations Data File) books, tag-up with instructor, and OBT simulator work.]*

FE-2 Reiter continued the current round of the monthly preventive maintenance of RS (Russian Segment) ventilation systems in the FGB (*Funktsionalnyi-Grusovoi Blok*), cleaning the detachable VT7 fan screen guards (grilles) of the Thermal Control System (SOTR)'s gas-liquid heat exchangers (GZhT4), afterwards also the screens of the TsV1 & TsV2 fans.

CDR Lopez-Alegria supported the ground in deactivating the CDRA (Carbon Dioxide Removal Assembly) for tomorrow's crew egress from the station.

Reiter prepared cabin systems for the isolation of the RS from the U.S. segment (USOS) by transferring SODF (Systems Operations Data File) items, a Lab A31p

PCS (Portable Computer System) laptop, and standard medical kits from the USOS to the FGB.

The FE-2 also configured two Sony PD100 camcorders in the Lab & Node for situational awareness during the unmanned period.

Working from the Russian discretionary task list, FE-1 Mikhail Tyurin completed the periodic collection of readings on the MOSFET (metal oxide semiconductor field-effect transistor) radiation sensor reader/display of the Matryoshka-R anthropomorphic (human torso) "phantoms" located inside the station for sophisticated radiation studies, collecting radiation measurements every 15 minutes around the clock.

Reiter conducted the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables and the weekly inspection of the BRPK air/liquid condensate separator apparatus.

Thomas also worked on the newly upgraded IMS (Inventory Management System) to update/edit its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR), and VELO bike with bungee cord load trainer (FE-1, FE-2).

Afterwards Thomas transferred his, LA's and Misha's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM (Heart Rate Monitor) data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

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See also the website "Space Station Challenge" at

<http://voyager.cet.edu/iss>.

Heads-up on Soyuz TMA-9/13S Relocation:

- Crew sleep/wake cycle for Relocation: Tomorrow -- wake-up delayed by 2h 40m to 4:40am EDT; sleep time slipped 5h 30m to 11:10pm. On 10/11 -- work time 7:40am to 5:30pm. On 10/12 -- back to normal (2:00am to 5:30pm).
- Soyuz will be activated tomorrow morning at 8:20am.
- Soyuz/SM hatch closing -- 11:00am, followed by one-hour leak check. ISS remains unoccupied during relocation; is configured for unmanned ops.
- ISS maneuvers to LVLH undocking attitude at 2:05pm, goes Free Drift at 3:10pm.
- TMA-9 undock command -- 3:11pm; physical separation -- **~3:14pm**.
- Spacecraft (S/C) backs off SM aft end by about 25-30 m, performs stationkeeping.
- At ~3:20pm, S/C translates toward the USOS, rotating its heading by 90 deg angle in yaw and flying sideways "under" the ISS until stopping at second stationkeep point 25-30 m in front of the FGB nadir hatch.
- Local sunset -- 3:32pm.
- During stationkeep, S/C rolls ("indexes") to align angularly with FGB docking mechanism; crew adapts visually to darkness (with floodlight), then starts Final Approach.
- Final Approach begins ~3:36pm, ends with docking at **~3:39pm**.
- In the unlikely event of aborted/waived docking, Progress 22P would be separated from the DC-1 port to make room for Soyuz contingency docking.
- Soyuz/FGB docking hooks closed ~3:59pm (after possible structural dynamics have damped out).
- After docking, there will again be a 1-hr. leak check.
- Local sunrise -- 4:04pm.
- Hatch opening to FGB ~5:30pm, followed by QD (quick disconnect) clamps installation (to rigidize the interface), FGB ingress, activation of manual control assets in the RS (laptops, control panels), etc.
- After S/C deactivation, crew will reconfigure station comm to nominal mode, reopen hatches to USOS (Node & Lab) and reconfigure the station's OpsLAN (Operations Local Area Network).
- During the flight, three ETVCG (External TV Camera Group) cameras cover external views of the ISS, especially the new port P4 SAW (Solar Array Wing) tip and its motion for subsequent photogrammetric evaluation of

structural dynamics, such as actual damping (as opposed to math model values), and fundamental bending frequencies. Using the imagery from two cameras, structural effects can be analyzed in four dimensions (time + 3 axes).

Significant Events Ahead *(all dates Eastern and subject to change):*

10/10/06 -- Soyuz TMA-9/13S relocation (from SM aft to FGB nadir, undock 3:11pm14pm; redock 3:38pm39pm; on NASA TV from 2:45pm)
10/23/06 -- Progress M-58/23P launch
10/26/06 -- Progress M-58/23P docking (SM aft port; on NASA TV)
11/22/06 -- Russian EVA-17
12/07/06 -- STS-116/12A.1 launch
12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss
12/19/06 -- Progress M-57/22P undocking (DC1) & reentry
12/20/06 -- Progress M-59/24P launch
12/22/06 -- Progress M-59/24P docking (DC1)
01/22/07 -- US EVA-6
01/26/07 -- US EVA-7
01/31/07 -- US EVA-8
02/06/07 -- Progress M-59/24P undocking (DC1) & reentry
02/07/07 -- Progress M-60/25P launch
02/09/07 -- Progress M-60/25P docking (DC1)
02/22/07 -- STS-117/13A launch – S3/S4 trusses
02/24-03/03/07 -- STS-117/13A docked mission w/ISS (earliest)
3/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry
03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)
03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)
03/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)
??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
06/11/07 -- STS-118/13A.1

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Jesco von Puttkamer \(jvonputt@hq.nasa.gov\)](mailto:jvonputt@hq.nasa.gov);
CC:
Subject: ISS On-Orbit Status 10/08/06
Date: Sunday, October 08, 2006 1:58:25 PM
Attachments:

ISS On-Orbit Status 10/08/06

All ISS systems continue to function nominally, except those noted previously or below. *Sunday -- off-duty day for CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Thomas Reiter, except for housekeeping and voluntary work. Ahead: Week 3 of Increment 14.*

Before breakfast, the FE-2 continued the daily ESA/Astrolab LDM (Long Duration Mission) experiment SKIN by applying the experimental skin cream to the hand. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit.]*

The CDR conducted the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the Service Module (SM), including the ASU toilet facilities systems/replaceables and weekly collection of the toilet flush (SP) counter and water supply (SVO) readings for calldown to TsUP/ Moscow.

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR, FE-2), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR), and VELO bike with bungee cord load trainer (FE-1).

Lopez-Alegria and Reiter had their weekly PFCs (private family conferences) via S-band/audio and Ku-band/MS-NetMeeting application (which displays the uplinked ground video on a laptop, currently SSC-8 in the Lab at portside), LA at 8:35am EDT, Thomas at 10:20am.

Cabin atmosphere total pressure continues being maintained by refreshes with

oxygen from the external U.S. Airlock HPGT (high-pressure gas tank) storage, executed through the Lab PCA (Pressure Control Assembly) by remote command via S-band.

No CEO (Crew Earth Observation) photo targets uplinked today.

To date, over 250,000 of CEO images have been taken in the first six years of the ISS, about one third of the total number of images taken from orbit by astronauts.

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this “Gateway” site);

<http://earthobservatory.nasa.gov>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

Heads-up on Soyuz TMA-9/13S Relocation:

- Tomorrow, 10/9, crew undertakes the standard Soyuz relocation training/drill.
- For Relocation, crew sleep/wake cycle changes: On 10/10 -- wake-up delayed by 2h 40m to 4:40am EDT; sleep time delayed 5h 30m to 11:10pm. 10/11 -- day time 7:40am to 5:30pm. 10/12 -- back to normal (2:00am to 5:30pm).
- On Relocation Day (Tuesday), Soyuz spacecraft (S/C) activation at ~8:20am. ISS remains unoccupied during relocation; is configured for unmanned ops.
- Soyuz/SM hatch closing -- 11:00am, followed by one-hour leak check.
- ISS maneuvers to LVLH undocking attitude at 2:05pm, goes Free Drift at 3:10pm.
- TMA-9 undock command -- 3:11pm; physical separation -- **~3:14pm**.
- S/C backs off SM aft end by about 25-30 m, performs stationkeeping.
- At ~3:20pm, S/C rotates heading by 90 deg angle in yaw and translates toward the USOS, flying sideways “under” the ISS until stopping at second stationkeep point 25-30 m in front of the FGB nadir hatch.
- Local sunset -- 3:32pm.
- During stationkeep, S/C rolls (“indexes”) to align angularly with FGB docking mechanism; crew adapts visually to darkness (with floodlight), then starts Final Approach.
- Final Approach begins ~3:36pm, ends with Docking at about **3:39pm**.
- In the unlikely case of aborted/waived docking, Progress 22P would be

- separated from the DC-1 port to make room for Soyuz contingency docking.
- Soyuz/FGB docking hooks closed ~3:59pm (after residual structural dynamics have damped out).
 - After docking, there will again be a 1-hr. leak check.
 - Local sunrise -- 4:04pm.
 - Hatch opening to FGB ~5:30pm, followed by QD (quick disconnect) clamps installation (to rigidize the interface), FGB ingress, activation of manual control assets in the RS (laptops, control panels), etc.
 - After S/C deactivation, crew will reconfigure station comm to nominal mode, reopen hatches to USOS (Node & Lab) and reconfigure the station's OpsLAN (Operations Local Area Network).
 - During the flight, three ETVCG (External TV Camera Group) cameras cover external views of the ISS, especially the new port P4 SAW (Solar Array Wing) tip and its motion for subsequent photogrammetric evaluation of structural dynamics, such as actual damping (as opposed to math model values), and fundamental bending frequencies. Using the imagery from two cameras, structural effects can be analyzed in four dimensions (time + 3 axes).

ISS Orbit (*as of this morning, 106:5445am EDT [= epoch]*):

Mean altitude -- 339.71 km

Apogee height -- 348.3 km

Perigee height -- 331.14 km

Period -- 91.334 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.00128272938

Solar Beta Angle -- 312.25 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.776

Mean altitude loss in last 24 hours -- 16053 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 4510555

Significant Events Ahead (*all dates Eastern and subject to change*):

10/10/06 -- Soyuz TMA-9/13S relocation (from SM aft to FGB nadir, undock 3:11pm14pm; redock 3:38pm39pm; on NASA TV from 2:45pm)

10/23/06 -- Progress M-58/23P launch

10/26/06 -- Progress M-58/23P docking (SM aft port; on NASA TV)

11/22/06 -- Russian EVA-17

12/07/06 -- STS-116/12A.1 launch

12/09-16/06 -- STS-116/12A.1 docked mission w/ISS -- P5 truss

12/19/06 -- Progress M-57/22P undocking (DC1) & reentry

12/20/06 -- Progress M-59/24P launch

12/22/06 -- Progress M-59/24P docking (DC1)
01/22/07 -- US EVA-6
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??/??/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)
06/11/07 -- STS-118/13A.1

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Jesco von Puttkamer \(jvonputt@hq.nasa.gov\)](mailto:jvonputt@hq.nasa.gov);
CC:
Subject: ISS On-Orbit Status 10/07/06
Date: Sunday, October 08, 2006 12:28:46 PM
Attachments: [image001.jpg](#)

ISS On-Orbit Status 10/07/06

All ISS systems continue to function nominally, except those noted previously or below. *Saturday – half-day off for the Expedition 14 crew CDR Michael Lopez-Alegria, FE-1 Mikhail Tyurin and FE-2 Thomas Reiter.*

Before breakfast, the FE-2 continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN by doing another daily application of the experimental cream to the skin of his arm. *[Objective of SKIN is to characterize different parameters of human skin in weightlessness inside the ISS, comparing results to already-known effects on the skin of long duration stays in orbit. The noninvasive medical equipment used by the experiment are the Tewameter (from TEWL = transepidermal water loss, one of the most important biophysical parameters for evaluating the efficiency of the human skin water barrier), the Corneometer (to accurately determine the hydration level of the skin surface) and the VisioScan which takes direct measurements of the skin topography (structure & level of dryness) with a special UV-A (Ultraviolet A) light video camera with high resolution.]*

The crew completed the regular weekly three-hour task of thorough station cleaning, wearing protective garment. *["Uborka", normally done every Saturday, includes removal of food waste products, cleaning of compartments with vacuum cleaner, damp cleaning of the Service Module (SM) dining table, other frequently touched surfaces and surfaces where trash is collected, as well as the FE's sleep station with "Fungistat" disinfectant wipes; also, fan screens and grilles are cleaned to avoid temperature rises. Special cleaning is also done every 90 days on the HEPA (high-efficiency particulate air) bacteria filters in the Lab.]*

FE-1 Tyurin conducted the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the Service Module (SM), including the ASU toilet facilities systems/replaceables.

Tyurin had two more hours set aside for preparing the FGB for the Soyuz translation next Tuesday (10/10) from the SM aft port to the FGB nadir port. *[During the brief flight of 12S with the station crew, all hatches in the ISS will be closed and systems configured to assure unmanned survivability even in the unlikely event of unsuccessful redocking. A number of items needed to be transferred to the FGB to be available after crew ingress; from the USOS (U.S. segment), this involved an A31p PCS (Portable Computer System) laptop, specific hardcopy ODF (Operations Data File) procedures books, CCPK (Crew Contamination Protection Kit), AMPs (Ambulatory Medical Packs) and ALSPs (Advanced Life Support Packs).]*

CDR Lopez-Alegria performed the regular weekly reboot of the PCS A31p laptops.

At ~8:15am, the FE-1 had his PFC (Private Family Conference) via S-band/audio and Ku-band/MS-NetMeeting application which displays the uplinked ground video on a laptop (currently SSC8/Station Support Computer #8, located in the Lab at portside).

At ~9:00am EDT, the crew engaged in their regular weekly planning conference (WPC) with the ground, discussing next week's "Look-Ahead Plan" (prepared jointly by MCC-H and TsUP/Moscow timeline planners), via S-band/audio, reviewing upcoming activities and any concerns about future on-orbit events.

All crewmembers worked out in their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the TVIS treadmill (CDR, FE-1, FE-2), RED resistive exercise device (CDR, FE-2) and VELO bike with bungee cord load trainer (FE-1). *[TVIS running speed limit for Exp-14 is set at 10 mph/16.1 km/h.]*

Afterwards, Thomas transferred his, Misha's and LA's exercise data files to the MEC (Medical Equipment Computer) for downlink, as well as the daily wristband HRM data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

LA was lauded by the ground on yesterday's comprehensive inventory & stowage audit of personal crew provisions, and Thomas received kudos for his work with PFE/OUM (Periodic Fitness Evaluation with Oxygen Uptake Measurement) and the troubleshooting of the ALTEA (Anomalous Long-Term Effects on Astronauts) payload in its CNSM (Central Nervous System Monitoring) mode. *[Thanks to his efforts, the ground determined that ALTEA requires either a new PCMCIA memory card or new fiber optics; to be decided after examination of log files to be downlinked next week.]*

Update on CMG-3 Update: More tests on Control Moment Gyroscope 3 were conducted yesterday, consisting of rotating the inner & outer gimbals at different speeds. Since then, not as many vibration spikes were observed on CMG-3 as before. To gather more data, another set of tests will be performed on Monday (10/9), during which the CMG-3 wheel will be allowed to coast while the inner & outer gimbals are rotated.

Weekly Science Update (*Expedition Fourteen -- 2nd*):

CULT (Cultural Factors Questionnaire): Ongoing.

CARD (Latent Virus Shedding during Spaceflight, ESA): Planned.

NOA (Nitric Oxide Analyzer): Seventh session for Thomas Reiter performed nominally on 10/6.

EMCS (European Modular Cultivation System, ESA): EMCS ops completed for Increment 13 with some forward work for Increment 14.

MTR-2 (Russian radiation measurements): Passive dosimeters measurements in DC1 "PIRS".

ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS): The last activity occurred on 10/6. The memory card was exchanged, and dosimeters were relocated between protective panels.

TROPI (Study of Novel Sensory Mechanism in Root Phototropism): Planned for Increment 14.

RC (Refrigerated Centrifuge): Planned.

GASMAP (Human Research Facility/Gas Analyzer System for Metabolic Analysis Physiology): Planned

RS (Renal Stone): Planned.

Nutrition: CDR Lopez-Alegria performed the first of eight Nutrition sessions, collecting a 24 hour urine pool and blood samples.

CFE (Capillary Flow Experiment): Complete.

IMMUNO (Saliva Sampling): Complete.

SAMPLE: All *SAMPLE* samples have been downloaded on 12S and handed-over to scientists.

BASE: Complete.

LEUKIN: Experiment performed in several steps by Thomas Reiter on 9/20 and currently under detailed assessment (esp. for last total incubation time of LEU-ACT-2). Experiment hardware has been retrieved as early items from Soyuz 12S.

LBP (Lower Back Pain): Sessions were conducted with Anousheh Ansari on a daily basis between 9/18 and 9/28.

SLEEP: Planned.

YING (Yeast in No Gravity): Complete.

Swab (Characterization of Microorganisms & Allergens in Spacecraft): Completed for Increment 13. Samples returned on 12S. More planned.

PK-3 (Plasma Crystal 3): Second set of experiments with Thomas Reiter will be replanned from Week 5 to Week 4 (starting 10/16, ending 10/20) (To be confirmed).

ETD (Eye Tracking Device): Fifth session for Thomas Reiter has been performed nominally on 10/6.

PFS (Pulmonary Function System, upgrade of existing system): Complete.

BCAT-3 (Binary Colloidal Alloy Test-3): Planned

PFMI (Pore Formation & Migration Investigation): Complete.

POEMS (Passive Observatories for Experimental Microbial Systems in Micro-G): Fourth (first for Inc14) canister insertion performed last week.

DAFT (Dust & Aerosol Measurement Feasibility Test): Planned.

CBOSS (Cellular Biotechnology Support Systems): Complete.

MISSE (Materials ISS Experiment): Ongoing.

InSPACE (Investigating the Structure of Paramagnetic Aggregates from Colloidal Emulsions): Complete.

ALTEA (Anomalous Long Term Effects in Astronauts' Central Nervous System):
Continued into the Increment 14.

SPHERES (Synchronized Position Hold, Engage, Reorient, Experimental Satellite):
Planned.

Earth Knowledge Acquired by Middle School Students (EarthKAM): Planned.

Crew Earth Observations (CEO): CEO operations were initiated again with the daily target list for 10/3. Late on 10/5, the ground received the first 83 CEO images that the crew downlinked and was “pleased to find your efforts on three of our target requests: (1) Lake Nasser, Toshka Lakes, Egypt; (2) Red River Basin, TX; and (3) Puerto Rico. Our preliminary assessment is that your image quality is excellent. We will be asking for more photos of these targets as time and weather permits. We will also be providing you additional feedback on your technique and completion of target requirements. Thanks for your enthusiastic start on our payload!”

Today's CEO photo targets, from the Lab nadir/science window, were **Kingman Reef, Hawaiian Island chain** (*scientists lack basic data about locations, spatial extent and health of many of the world's coral reefs. Astronaut photographs can be used as primary data for maps of the locations of reef pinnacles [tops of reefs visible at and just below the ocean surface] and as supplemental data for use with other satellite images, especially when it is important to distinguish small clouds from reef structures. Another advantage of astronaut photography is that the crew can recognize and take imagery when cloud cover is minimal. The Line Islands, of which Kingman Reef and Palmyra Atoll are a part of, comprise a lengthy and loose group of low-lying, extremely remote, coral islands, atolls and reefs straddling the equator in the central Pacific Ocean*), **Palmyra Atoll, Central Pacific** (*Palmyra Atoll is 4.6 square miles and is a part of the northern Line Islands. It consists of an extensive reef and two shallow lagoons. Crew concentrated on imagery of the reef structures*), and **Coral Reefs, American Samoa** (*crew concentrated their imagery on these reef structures*).



Population 4, elevation 6 feet

To date, over 250,000 of CEO images have been taken in the first six years of the ISS, about one third of the total number of images taken from orbit by astronauts.

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

See also the website "Space Station Challenge" at

<http://voyager.cet.edu/iss>.

ISS Orbit (as of this morning, 76:4945am EDT [= epoch]):

Mean altitude -- 339.91 km

Apogee height -- 348.6 km

Perigee height -- 331.24 km

Period -- 91.334 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0016892938

Solar Beta Angle -- 272.65 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.776

Mean altitude loss in last 24 hours -- 12053 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 4508755

Significant Events Ahead (all dates Eastern and subject to change):

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06/11/07 -- STS-118/13A.1

From: [vonPuttkamer, Jesco H. \(HQ-CJ000\)](#)
To: [Jesco von Puttkamer \(jvonputt@hq.nasa.gov\)](mailto:jvonputt@hq.nasa.gov);
CC:
Subject: ISS On-Orbit Status 10/06/06
Date: Friday, October 06, 2006 3:00:55 PM
Attachments:

ISS On-Orbit Status 10/06/06

All ISS systems continue to function nominally, except those noted previously or below.

In preparation for the Soyuz TMA-9 (13S) relocation on 10/10, Flight Engineer Mikhail Tyurin supported a ground-commanded checkout of the Soyuz motion control system (SUD, Mode 2/"Docked") which included pressurization of the Combined Propulsion System (KDU) section 2 and tank 2, a test of the pilot's translational hand controller (RUD), and a hot firing of the DPO braking thrusters. KDU maneuver thrusters were not fired. *[For the test, station attitude was handed over to Russian thruster control at 12:45pm EST, commanded to free drift, then back to LVLH XVV (Local Vertical Local Horizontal/x-axis in velocity vector) attitude. The one-minute firing started on Daily Orbit 14 at 12:55pm. Attitude control was later (1:20pm) returned to the U.S. segment (USOS).]*

After setting up the video equipment for taping his subsequent MedOps activities, CDR Lopez-Alegria, assisted by FE-1 Tyurin, undertook his first general U.S. PFE (Periodic Fitness Evaluation), a monthly 1.5-hr. procedure to check up on blood pressure and electrocardiogram (ECG) during programmed exercise on the CEVIS (Cycle Ergometer with Vibration Isolation) in the Lab. Readings were taken with the BP/ECG (blood pressure/electrocardiograph) and the HRM (heart rate monitor) watch with its radio transmitter. *[BP/ECG provides automated noninvasive systolic and diastolic blood pressure measurements while also monitoring and displaying accurate heart rates on a continual basis at rest and during exercise.]*

In conjunction with the standard PFE, Mike LA also completed a more advanced fitness check using the relatively new (3 months) OUM (Oxygen Uptake Measurement) equipment on the HRF-2 (Human Research Facility 2) rack to obtain measurements according to protocol, with Thomas Reiter acting as OUM-PFE operator. Afterwards, LA restowed the video gear. *[Later in the day, the evaluation*

protocol was updated, the gear deactivated and stored and the OUM-PFE laptop powered down.]

LA and Misha conducted the periodic standard tests and checkouts on the RSP (Respiratory Support Pack) and the CMRS (Crew Medical Restraint System). *[The RSP is designed to “breathe” for an incapacitated crewmember in the event of a respiratory health event on board ISS. The ironing-board-like CHeCS (Crew Health Care Systems) CMRS allows strapping down a patient with a harness for medical attention by the CMO (Crew Medical Officer). CMRS can be secured to the ISS structure within two minutes to provide a patient restraint surface for performing emergency medical procedures, such as during ACLS (Advanced Cardiac Life Support). It can also be used to transport a patient between the station and the Orbiter middeck when the Shuttle is docked. It isolates the crew and equipment electrically during defibrillations and pacing electrical discharges, accommodates the patient in the supine zero-G positions, provides cervical spine stabilization and, for a three-person crew, can also restrain two CMOs (crew medical officers) during their delivery of medical care.]*

FE-2 Reiter continued the ESA/Astrolab LDM (Long Duration Mission) experiment SKIN, initiated yesterday, by doing another daily application of the experimental cream to the skin of his arm. *[Background, see Status 10/5.]*

Reiter set up for his seventh (of 13 planned) biweekly NOA/Nitric Oxide Analyzer session and undertook the procedure, later downlinking the measurements from the RSE1 laptop to the ground via the BSR-TM telemetry channel. *[Purpose of the ESA experiment ESANO1, consisting of the “Platon” analyzer and its power supply, is to monitor expired nitric oxide (NO) in the subject's exhaled air to detect signs of airway inflammation and indications of venous gas emboli (bubbles) that may be caused by inhalation of pollutants in the closed environment of the ISS cabin and increased risk of decompression sickness.]*

Tyurin had an hour reserved for preparing Soyuz TMA-9 for next week's relocation by transferring remaining cargo from the spacecraft to the ISS, with IMS (Inventory Management System) database logging.

The two Flight Engineers joined forces on the LDM Astrolab educational experiment DVD-4 Demo, with Thomas focusing on robotic demonstrations (ROBoT) and Mikhail filming footage that will be used to produce a DVD lesson for use by teachers and their students aged 12-18 years across ESA member states. *[DVD-4 continues a pedagogical series of lessons initiated on previous ESA missions.]*

The FE-2 worked on the ESA/RSC-Energia experiment ALTCRISS (Alteino Long Term monitoring of Cosmic Rays on the ISS), ascertaining the size of the recorded

data on the ACT spectrometer's PCMCIA memory card by temporarily removing it and inserting it into the RSE1 laptop for "reading", then changing out the card. *[ALTCRISS uses the ACT spectrometer employed by VC8 guest cosmonaut Roberto Vittori last year in the DC1 for the Italian LAZIO (Low Altitude Zone/Ionization Observatory) experiment.]*

Thomas also had an hour scheduled for troubleshooting the ALTEA (Anomalous Long-Term Effects on Astronauts) payload in its CNSM (Central Nervous System Monitoring) mode, for which he had loaded reconfigured software to the ELC4 (EXPRESS Rack 4 laptop) on 9/27. *[Purpose of ALTEA is to define and measure descriptors for the electrophysiological brain functioning and to follow their dynamics, correlating it with space environments. This involves CNSM measuring sessions by a crewmember wearing a helmet for a 32-channel EEG system, plus long-term unmanned real-time particle flux dosimetry (DOSI mode) inside the ISS using six particle detectors (originally introduced on Mir). The planned CNSM "helmet sessions" could not be performed as yet due to a data transfer problem with the previous software. ALTEA has to date operated only in its unmanned DOSI mode.]*

Afterwards, Reiter cleaned and disinfected used MELFI (Minus-Eighty Laboratory Freezer for ISS) facility dewars after they had enough time to reach ambient temperature after powerdown.

LA performed the periodic atmospheric status check for ppO₂ (Partial Pressure Oxygen) and ppCO₂ (pp Carbon Dioxide), taken readings of the CSA-CP (Compound Specific Analyzer-Combustion Products) datalogger and using the CSA-O₂ (Compound Specific Analyzer-Oxygen Sensor) and CDMK (CO₂ Monitoring Kit). *[CSA-CP measurements were gathered at the SM Central Post, CSA-O₂ (#1042, #1063) in the Lab, and CDMK (#1009) in SM and Lab.]*

The FE-1 conducted the routine daily maintenance of the SOZh (Environment Control & Life Support System, ECLSS) system in the SM, including the ASU toilet facilities systems/replaceables and the weekly inspection of the BRPK air/liquid condensate separator apparatus.

Mikhail also worked on the newly upgraded IMS to update/edit its standard "delta file", including locations, for the regular weekly automated export/import to its three databases on the ground (Houston, Moscow, Baikonur).

The CDR had two hours reserved for performing a comprehensive inventory & stowage audit of personal crew provisions.

Thomas brought the ESA experiment CULT up to date by filling out its “cultural” questionnaire on the RSE1 laptop. *[CULT is a study conducted currently by Russia for ESA. The multi-Increment investigation, which eventually will involve 12 subjects, including Thomas Reiter, is dedicated to the study of cultural aspects and different leadership styles of on-board crews as a function of mission duration, including interactions within multinational crews. Results from this experiment may provide valuable recommendations on how to interact with future multinational crews. The questionnaire is contained on a PCMCIA memory card, to be used for all subjects and sessions.]*

Mike LA set up an ITCS LTL (Internal Thermal Control System/Low Temperature Loop) coolant jumper connection in preparation for the upcoming CDRA (Carbon Dioxide Removal Assembly) activation.

Later, the CDR performed the regular bi-monthly reboot of the OCA (Orbit Communications Adapter) comm router.

As all new station crews, LA, Misha and Thomas had one hour set aside on today’s schedule for ISS familiarization and adaptation, to help in adjusting to their new surroundings and activities. *[This unstructured and discretionary session has become a valuable standard requirement for new station occupants for the first two weeks.]*

All crewmembers completed their regular 2.5-hr. physical exercise program (about half of which is used for setup & post-exercise personal hygiene) on the CEVIS cycle ergometer (CDR), TVIS treadmill (FE-1, FE-2), RED resistive exerciser (CDR), and VELO bike with bungee cord load trainer (FE-1, FE-2).

Afterwards Mikhail transferred his, LA’s and Thomas’ exercise data files to the MEC for downlink, as well as the daily wristband HRM data of the workouts on RED, followed by their erasure on the HRM storage medium (done six times a week).

At ~4:40am EDT, the crew held the regular (nominally weekly) tagup with the Russian Flight Control Team (GOGU), including Shift Flight Director (SRP), at TsUP via S-band/audio, phone-patched from Houston and Moscow.

At ~7:20am, Tyurin linked up with TsUP stowage specialists to conduct the weekly IMS tagup, discussing open issues concerning transfer details, stowage locations and bar code identifications for the IMS (Inventory Management System) databases via S-band. *[Issues discussed today involved operational specifics of the new IMS version on board, 22P unloading and transfers, amount and storage location of accumulated trash, etc.]*

At ~4:05pm, the crew is scheduled for their regular weekly tagup with the Lead Flight Director at MCC-Houston.

Early this morning, starting at 2:00am and running for seven hours, MCC-Houston and its Moscow support group (HSG) conducted another BCC (Backup Control Center) dry run in test mode, with no involvement of the ISS crew or vehicle.

[Purpose of this periodic exercise is to demonstrate BCC functionality under Russian assets while providing proficiency training for HSG personnel at the HSR (Houston Support Room) and TsUP-Moscow specialists. The ISS EMCC (Emergency Mission Control Center), located in Russia, comprises TsUP/Moscow as the Lead Control Center, coupled with HSR at TsUP. The BCC facility provides a command and control capability from TsUP if the EMCC must be activated. This is the case in situations that render MCC-Houston unable to provide telemetry, voice, and command capability for extended periods. EMCC is also used when the threat of severe weather results in evacuation of the MCC-H building for extended periods. In such an emergency, both Russian servers (CMD/command & TM/telemetry) are transitioned from MCC-H connectivity to BCC configuration, after which only the BCC can connect to the CMD and TM ports. An actual contingency requiring switchover to the BCC occurred on 10/2/2002 when Hurricane Lili forced MCC-H to shut down at 4:00am EDT, and also last year during the Hurricane Katrina emergency.]

The Russian solar array efficiency test was completed successfully yesterday in X-POP attitude, consuming 48.1 kg props.

Update on CMG-3: Control Moment Gyroscope 3 remains out of the attitude control steering loop due to elevated vibrations observed on 9/29. Tests on CMG-3 bearing dynamics were performed last night and this morning, by rotating the inner and outer gimbals at different speeds. No vibration spikes or any discrete steps in SMCC (Spin Motor Commanded Current) were observed during these tests. Forward plan is to return CMG-3 to the steering function next Tuesday (10/10) after Soyuz relocation for additional data gathering.

Update on ISS Atmosphere: Due to the recent (10/4) failure of an Elektron control panel, which blew a fuse, the scheduled troubleshooting could not be completed. Other potential troublespots are a valve solenoid and the BSSK Command & Signal Matching Unit. Necessary replacement hardware would be delivered on 23P, at which time Elektron troubleshooting will continue. Until then, ppO₂ is maintained with oxygen represses from US Airlock HPGT (High Pressure Gas Tank) storage. Vozdukh is operating nominally in manual mode 5, and ppCO₂ is stable at an average value of 5.18 mmHg.

Update on Soyuz TMA-9 relocation: Soyuz activation on 10/10 will be at 8:20am EDT. Soyuz/SM hatches closing comes at 11:00am, followed by leak check. ISS will maneuver to LVLH undocking attitude at 2:05pm, later to free drift at 3:10pm. Soyuz 13S undocking (physical separation) is then scheduled for **3:14pm**. The spacecraft will back off the SM aft end by about 25-30 m, perform stationkeeping until about 3:20pm, then rotate in yaw by 90 deg and translate forward, flying laterally, "under" the ISS, until reaching the second stationkeeping point 25-30 m in front of the FGB nadir hatch. Docking will then follow at about **3:39pm** (should docking have to be aborted, Progress 22P would be separated from the DC-1 port to make room for Soyuz contingency docking). After docking ops, there will again be a 1-hr. leak check. Hatches to the FGB will be opened at ~1:30pm, followed by QD (quick disconnect) clamps installation (to rigidize the interface), FGB ingress, activation of manual control assets in the RS (laptops, control panels), etc. After 13S deactivation, the crew will reconfigure station comm to nominal mode, reopen hatches to the USOS (Node & Lab) and reconfigure the station's OpsLAN (Operations Local Area Network). During the flight, three ETVCG (External TV Camera Group) cameras will cover external views of the ISS, especially the new P4 port SAW (Solar Array Wing) tip and its motion for subsequent photogrammetric evaluation of structural dynamics, such as actual damping (as opposed to math model values), and fundamental bending frequencies. Using the imagery from two cameras, structural effects can be analyzed in four dimensions (time + 3 axes).

Today's CEO (Crew Earth Observations) photo target, from the Lab nadir/science window, was **High Central Andean Glaciers** (*the glaciers of the High Central Andes are smaller than their counterparts in Patagonia and it is this smaller size that apparently is causing dramatic change. Some scientists believe that mass imbalance could cause these glaciers to disappear in the next decade. Their size coupled with their location makes this a challenging target. Looking to the north of Lake Titicaca for these small glaciers. The weather in this region looks better than usual so clouds should not have been a problem*).

To date, over 250,000 of CEO images have been taken in the first six years of the ISS, about one third of the total number of images taken from orbit by astronauts.

CEO photography can be viewed and studied at the websites:

<http://exploration.nasa.gov/programs/station/CEO.html>

<http://eol.jsc.nasa.gov> (about 700,000 NASA digital photographs of Earth are downloaded by the public each month from this "Gateway" site);

<http://earthobservatory.nasa.gov>

<http://earthobservatory.nasa.gov/Study/AstronautPhotography>

See also the website "Space Station Challenge" at

<http://voyager.cet.edu/iss.>

ISS Orbit (*as of this morning, 7:26am EDT [= epoch]*):

Mean altitude -- 340.0 km

Apogee height -- 348.8 km

Perigee height -- 331.2 km

Period -- 91.33 min.

Inclination (to Equator) -- 51.64 deg

Eccentricity -- 0.0013112

Solar Beta Angle -- 23.8 deg (magnitude increasing)

Orbits per 24-hr. day -- 15.77

Mean altitude loss in last 24 hours -- 91 m

Revolutions since FGB/Zarya launch (Nov. 98) -- 45071

Significant Events Ahead (*all dates Eastern and subject to change*):

10/10/06 -- Soyuz TMA-9/13S relocation (from SM aft to FGB nadir, undock 3:14pm; redock 3:39pm; on NASA TV from 2:45pm)

10/23/06 -- Progress M-58/23P launch

10/26/06 -- Progress M-58/23P docking (SM aft port; on NASA TV)

11/22/06 -- Russian EVA-17

12/07/06 -- STS-116/12A.1 launch

12/09-16/06 -- STS-116/12A.1 docked mission w/ISS – P5 truss

12/19/06 -- Progress M-57/22P undocking (DC1) & reentry

12/20/06 -- Progress M-59/24P launch

12/22/06 -- Progress M-59/24P docking (DC1)

01/22/07 -- US EVA-6

01/26/07 -- US EVA-7

01/31/07 -- US EVA-8

02/06/07 -- Progress M-59/24P undocking (DC1) & reentry

02/07/07 -- Progress M-60/25P launch

02/09/07 -- Progress M-60/25P docking (DC1)

02/22/07 -- STS-117/13A launch – S3/S4 trusses

02/24-03/03/07 -- STS-117/13A docked mission w/ISS (earliest)

3/08/07 -- Progress M-58/23P undocking (SM aft port) & reentry

03/09/07 -- Soyuz TMA-10/14S launch (Expedition 15 + VC12)

03/11/07 -- Soyuz TMA-10/14S docking (SM aft port)

03/19/07 -- Soyuz TMA-9/13S undocking (FGB nadir port)

??/?/?/07 -- Soyuz TMA-10/14S relocation (SM aft port to FGB nadir port)

06/11/07 -- STS-118/13A.1