

# International Space Station

## [ MISSION SUMMARY ]

**EXPEDITION 33** begins Sept. 17 and is scheduled to end Nov. 12. The next expedition aboard the International Space Station will be action-packed as astronauts welcome the first commercial resupply mission to the orbiting outpost by SpaceX and perform a variety of scientific experiments, including muscle atrophy research.

### THE CREW:

Soyuz TMA-05M • Launch: July 14, 2012 • Landing: Nov. 12, 2012



**Sunita Williams – Commander (NASA)**  
(Suh-NEE-tuh Williams)

- **Born:** Euclid, Ohio, considers Needham, Mass., home
- **Interests:** Running, snowboarding, swimming, biking and windsurfing
- **Spaceflights:** Exps. 14/15, 32/33
- **Twitter:** @Astro\_Suni

Soyuz TMA-06M • Launch: Oct. 23, 2012 • Landing: March 19, 2013



**Kevin Ford – Flight Engineer (NASA)**

- **Born:** Portland, Ind., considers Montpelier, Ind., home
- **Interests:** Football (favorite team is Notre Dame)
- **Spaceflights:** STS-128, Exp. 33/34



**Akihiko Hoshide – Flight Engineer (JAXA)**  
(Ah-kee-hee-ko HO-shee-day)

- **Born:** Tokyo, Japan
- **Interests:** Flying, rugby, football, swimming, snow skiing and traveling
- **Spaceflights:** STS-124, Exp. 32/33
- **Twitter:** @Aki\_Hoshide



**Oleg Novitskiy – Flight Engineer (Roscosmos)**  
(OH-leg NO-vit-skee)

- **Born:** Belarus, Russia
- **Interests:** Football, hunting, fishing and reading
- **Spaceflights:** Exp. 33/34 will be his first mission



**Yuri Malenchenko – Flight Engineer (Roscosmos)**  
(YU-ree Muh-LEN-chen-ko)

- **Born:** Svetlovodsk, Ukraine
- **Spaceflights:** MIR OE-16, STS-106, Exps. 7, 16, 32/33



**Evgeny Tarelkin – Flight Engineer (Roscosmos)**  
(Ev-GEN-nee Tuh-REL-ken)

- **Born:** Pervomaisky, Russia
- **Interests:** Skydiving
- **Spaceflights:** Exp. 33/34 will be his first mission

### THE SCIENCE:

## New Discoveries on the Horizon

**Expedition 33** will continue to expand the scope of research aboard the space station, taking advantage of its unique microgravity environment. Experiments will include testing radiation levels on the orbiting outpost and how microgravity affects the spinal cord. The International Space Station Agricultural Camera will investigate dynamic processes on Earth, like melting glaciers, and seasonal changes and human impacts on the ecosystem. Expedition 33 crew members will perform more experiments that cover human research, biological and physical sciences, technology development, Earth observations and education.

## ■ Spinal Ultrasound (US National Lab)

This experiment investigates how microgravity affects the spinal cords of crew members. Sonographic Astronaut Vertebral Examination (Spinal Ultrasound) aims to use ground- and space-based studies to better understand spinal changes during and after spaceflight. Ground-based pre- and post-flight MRI and high fidelity ultrasound, combined with in-flight ultrasound, will be used to illustrate and assign a mission health risk to microgravity-associated spinal changes for back pain and potential injury. This experiment will determine the accuracy of the ultrasound in analyzing the composition of the vertebrae and develop methodologies to alleviate potential health issues of crew members.

## ■ SCAN Testbed (NASA)

This experiment tests software used by ground mission planners to alter communication radios in orbit. Assessments will be made to test the ability to change the way radios communicate with ground controllers and whether or not there is an increase in data return.



*SCAN Testbed hardware overview*

## ■ Crew Earth Observations (NASA)

This experiment uses the space station crew to photograph natural and human-made events on Earth. The photographs record changes to the planet's surface over time, along with dynamic events such as floods, fires and volcanic eruptions.

## ■ Monitoring Crew Member Immune Function (NASA)

This experiment assesses the adverse effects of spaceflight on the human immune system. Researchers collect and analyze blood, urine and saliva samples from crew members before, during and after spaceflight to monitor changes in the immune system.

## ■ Integrated Resistance and Aerobic Training Study-Sprint (US National Lab)

This experiment evaluates the use of high-intensity, low-volume exercise training to minimize loss of muscle, bone and cardiovascular function in space station crew members during long-duration missions.

*NASA astronaut Mike Fossum, Expedition 29 commander, performs a SPRINT leg muscle self scan in the Columbus laboratory of the International Space Station.*

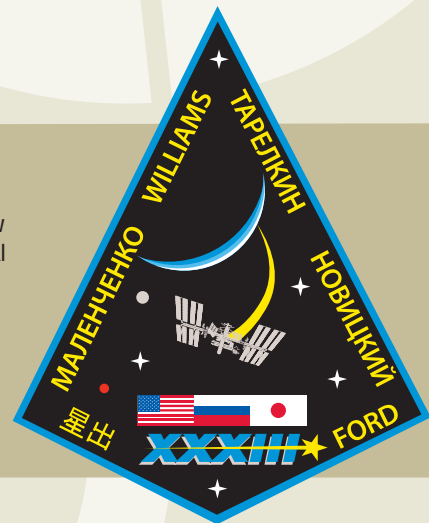


## ■ Tech Ed Satellite (NASA)

This experiment evaluates the functionality of the Iridium and Orbcomm in-orbit satellite phone networks. The in-orbit satellite phone systems will be examined through the use of a small CubeSat spacecraft launched from the Japanese Experiment Module-Small Satellite Orbital Deployer. Data from the experiment will be used to simplify infrastructure for future spacecraft phone system design and development.

## THE MISSION PATCH:

The Expedition 33 patch depicts the International Space Station orbiting Earth and heading into the future. The national flags of the United States, Russia, and Japan represent the crew of Expedition 33. The five white stars represent the partners participating in the International Space Station Program: NASA, Canadian Space Agency, European Space Agency, Japan Aerospace Exploration Agency, and Russian Federal Space Agency.



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