THE AEROSPACE CORPORATION

annual report 2006

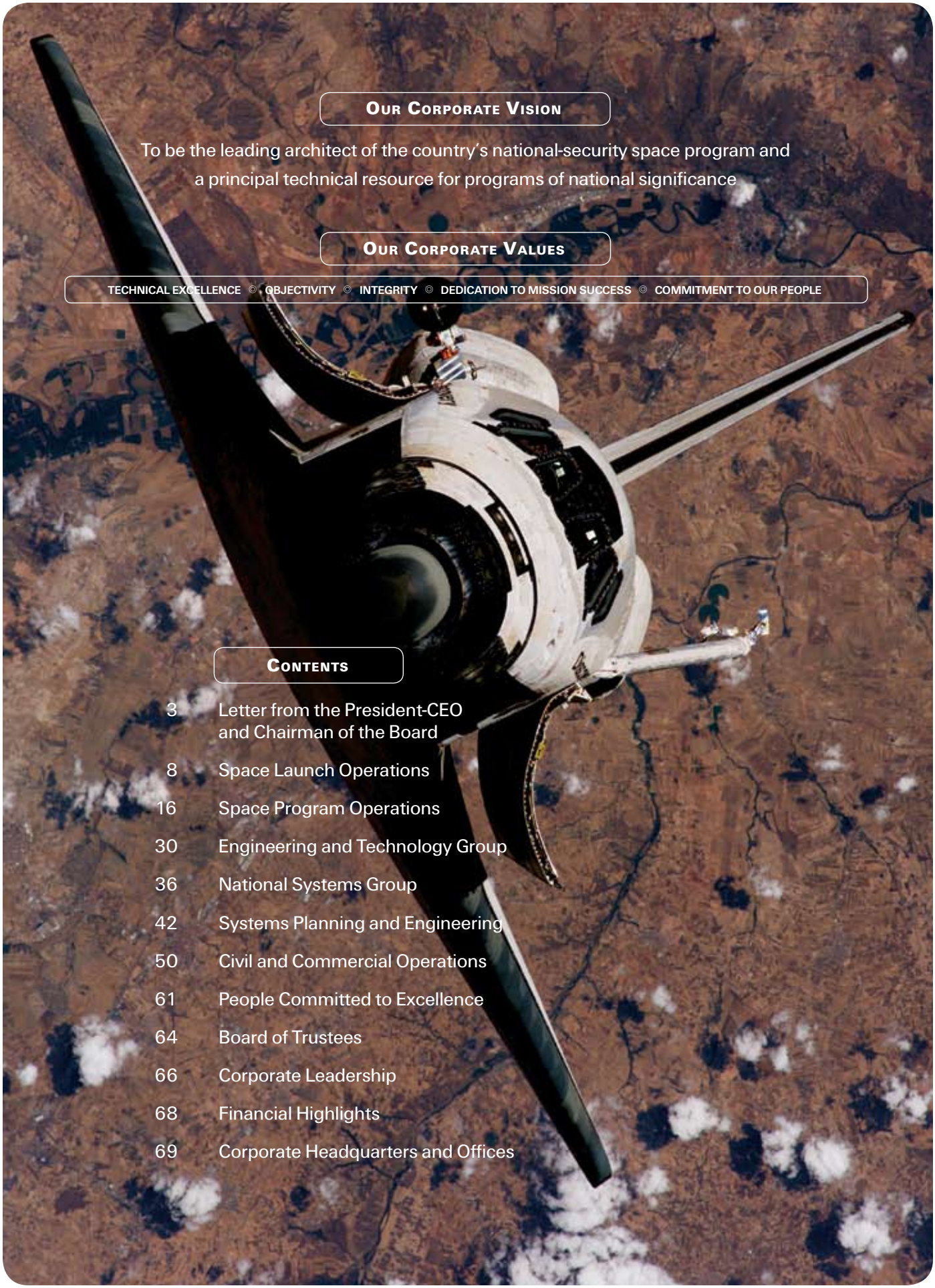
Corporate Profile

The Aerospace Corporation is a private, nonprofit corporation that has operated a federally funded research and development center (FFRDC) for the United States Air Force since 1960, providing objective technical analyses and assessments for space programs that serve the national interest. As the FFRDC for national-security space, Aerospace supports long-term planning as well as the immediate needs of the nation's military and reconnaissance space programs. Aerospace involvement in concept, design, acquisition, development, deployment, and operation reduces costs and risks and increases the probability of mission success.

FFRDCs

FFRDCs are unique nonprofit entities sponsored and funded by the government to meet specific long-term needs that cannot be met by any single government organization. FFRDCs typically assist government agencies with scientific research and analysis, systems development, and systems acquisition. They bring together the expertise and outlook of government, industry, and academia to solve complex technical problems. FFRDCs operate as strategic partners with their sponsoring government agencies to ensure the highest levels of objectivity and technical excellence.

COVER: LOCKHEED MARTIN MISSILES AND SPACE



Our Corporate Vision

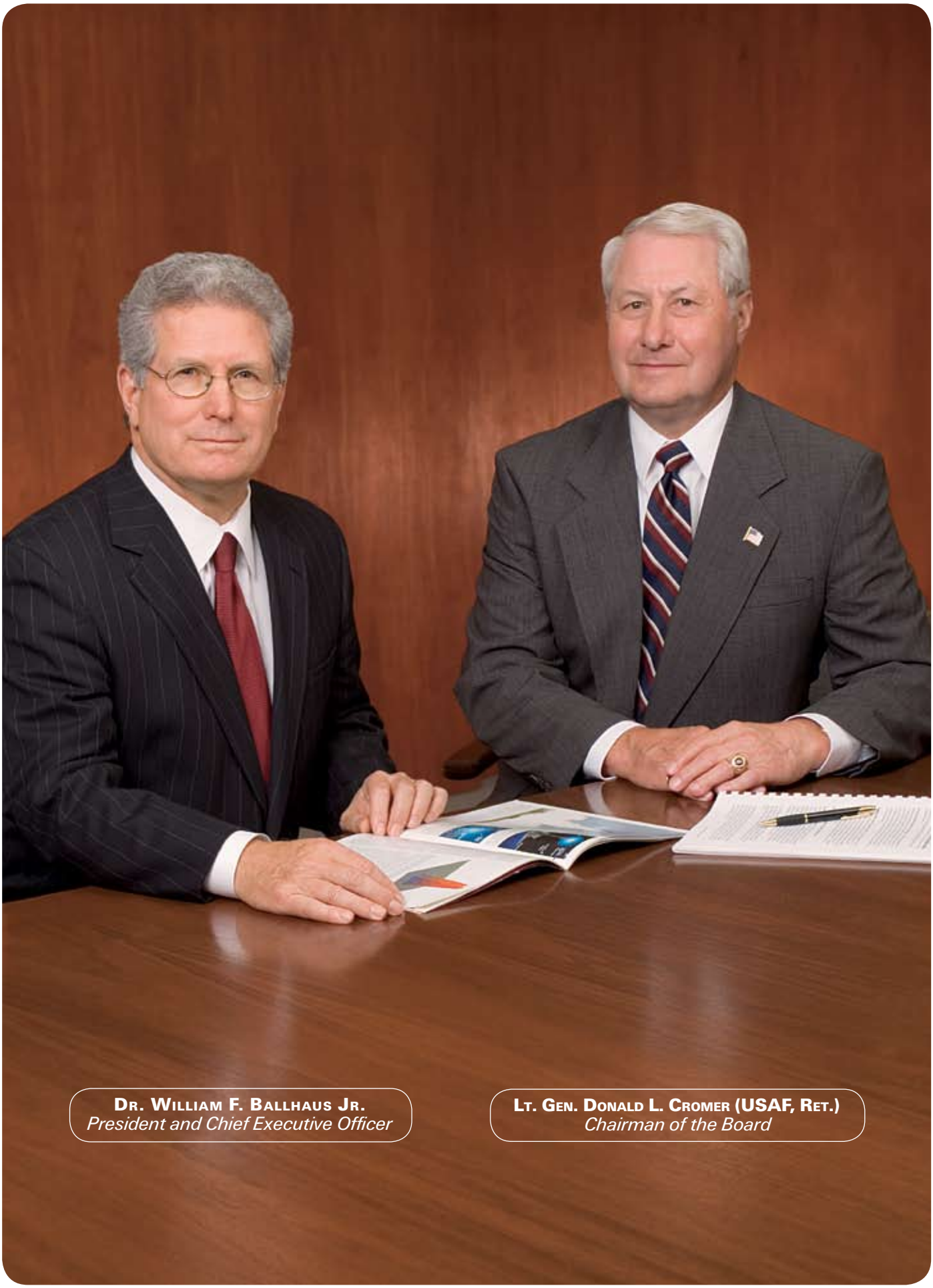
To be the leading architect of the country's national-security space program and a principal technical resource for programs of national significance

Our Corporate Values

TECHNICAL EXCELLENCE ◎ OBJECTIVITY ◎ INTEGRITY ◎ DEDICATION TO MISSION SUCCESS ◎ COMMITMENT TO OUR PEOPLE

Contents

NASA



Dr. William F. Ballhaus Jr.
President and Chief Executive Officer

Lt. Gen. Donald L. Cromer (USAF, Ret.)
Chairman of the Board

PROVIDING VALUE—SHARPENING THE FOCUS ON MISSION SUCCESS

The Aerospace Corporation worked closely with its principal customers—the U.S. Air Force Space and Missile Systems Center (SMC) and the National Reconnaissance Office (NRO)—to improve confidence in both space-system quality and in meeting program commitments. Helping to bring current programs to the highest possible levels of operability and reliability while helping to develop the next generation of space systems has been central to our efforts. There is substantial evidence of improvement that shows our customers are turning the corner on getting troublesome programs on track.

Revitalizing Mission Assurance Processes

Aerospace has taken a leadership role, beginning internally, in revitalizing mission-assurance processes within the acquisition community. This has been central to the sustainment of a 100-percent success rate on operational national-security space missions, for which we are accountable for mission success, including the successful launch in October 2005 of the last Titan IV in the government's inventory. Our Aerospace technical team was integral to the success of this historic mission, providing launch-readiness verification and identifying and overcoming a number of potential threats to the launch for the NRO.

We were also integral to the successful launch, in June 2006, of the first Delta IV/NRO mission from Vandenberg Air Force Base, among other accomplishments. As of this writing, the number of consecutive successes for operational national-security launches since the failures of the late 1990s is 49, a record number.

For the Missile Defense Agency, our recommendations that a more structured and rigorous approach to mission-assurance processes be followed has helped improve consistency and success in test efforts. And for the NRO, we led a major ground software study that identified a commonality of problems with seven programs and made recommendations to improve software contracting and acquisition practices, program risk management, and management processes and controls.

We continued to lead the Space Quality Improvement Council, which is sponsored by the five key government agencies involved in space programs and includes 11 corporate members representing the major space contractors. The council has been a catalyst

for process improvements, which include the reintroduction of selected standards and specifications, better handling of problematic electronic parts, improved supplier management, and other measures that will promote more effective acquisition programs.

Improving Satellite Readiness

A key area of focus for us has been helping to prepare several new satellites for launch. Aerospace made special contributions to specific missions that resulted in recovery from anomalies and improved implementation of mission objectives.

- SBIRS HEO and GEO. We provided comprehensive support to integration testing, failure review boards, and software qualification efforts that contributed to the successful space deployment of the Space Based Infrared System (SBIRS) program's first highly elliptical orbit (HEO) payload. We also provided around-the-clock support to the early orbit test sequence at the mission control segment backup facility and at contractor locations. At the same time, we maintained focus on the execution of the SBIRS geosynchronous Earth orbit (GEO) element, directly supporting the successful initial thermal vacuum test of the GEO 1 payload, the first ambient functional test of the spacecraft bus, the delivery of key flight and ground software products, and vastly improved schedule and metric tracking. Aerospace also supported an array of Nunn-McCurdy breach recovery activities that resulted in a more realistic program plan. The successes with both HEO and GEO elements this year demonstrate significant improvement over past years and show that the SBIRS team is better able to execute a plan, meet delivery dates, and successfully implement rigorous mission assurance practices.
- AEHF. We worked closely with government and contractor teams to maintain an effective technical baseline to ensure the success of the Advanced Extremely High Frequency (AEHF) program, which will represent a ten-fold improvement in protected communication capacity over the Milstar system. We were involved in tiger teams, focused investigations, and independent testing and analysis to evaluate contractor findings. And, we are supporting nearly every aspect of efforts leading to a scheduled launch date in April 2008.
- WGS. Aerospace has been integral to the development of the Wideband Global SATCOM (WGS) program and continued to support integration and system-level testing of the first three spacecraft. One of our key roles was employing an extensive array of analytic and test tools to characterize and assess anomalies during testing. We also provided technical support and leadership during contract negotiations.

- GPS. We played a central role in the sustainment efforts for the constellation of Global Positioning System (GPS) satellites on orbit and in the development of new satellites that will bring more robust capabilities to the system, which is being increasingly relied upon for precise navigation capabilities. Since late 2005, three satellites that will provide new and improved navigation signals to military and civilian users have been launched. Our analyses this year also provided the technical foundation for a Defense Department decision on the number of satellites needed in the GPS constellation for improved performance in realistic ground environments. And this year there are 30 operational satellites on orbit for the first time ever.

Formulating Programs

Aerospace performed several studies that were central to the formulation and redefinition of space systems. These included:

- An engineering study of alternatives to SBIRS, which supported the creation of the Alternative Infrared Satellite System (AIRSS). Our studies were instrumental in shaping the course for infrared programs.
- For NASA, a first-stage engine trade study for the moon mission's Cargo Launch Vehicle that showed switching to Delta IV RS-68 engines would increase performance and decrease costs. The engine switch could save NASA up to $4 billion through 2020.
- Space Radar studies resulted in a change in approach to the program and helped to develop consensus in the military and intelligence communities.
- GPS studies that led to a decision to stop pursuing the three-plane option for GPS III. We were also instrumental in defining a strategy for delivering GPS III capabilities incrementally.
- An examination of risks and options in the development of an acquisition strategy for the Transformational Satellite Communications System (TSAT). We played a major role in advancing the maturation of TSAT system requirements and conducted numerous trade studies in helping to define technical requirements for the system, scheduled for first launch in 2015.

Civil and Commercial Work

We worked extensively with NASA and the Jet Propulsion Laboratory (JPL) this year, as well as with the National Oceanic and Atmospheric Administration (NOAA), the Federal

Bureau of Investigation (FBI), the National Institute of Justice, and other agencies and organizations. This support included:

- Leading architecture and system engineering activities for the short-term Lunar Relay Satellite study at NASA Goddard Space Flight Center
- Participating in instrument review boards and hardware reliability analyses and performing risk management for JPL's 2009 Mars Science Laboratory
- Performing foam debris analyses to assist NASA's Johnson Space Center in making informed space shuttle flight decisions
- Evaluating the costs and logistics of environmental test chamber options for NASA's James Webb Space Telescope project and major elements of the Constellation program
- Providing extensive support to NOAA's next-generation geostationary and polar environmental satellites—GOES-R and the National Polar-orbiting Operational Environmental Satellite System (NPOESS)
- Providing technical support to the FBI for acquisition of the Sentinel file management program
- Supporting a national standard that will help local law enforcement agencies purchase effective digital video recording systems for use in patrol cars

Performance

We are pleased to report that Aerospace—established in 1960—received the highest grades for performance ever given to us by SMC and the NRO. In addition, NASA, NOAA, and other organizations recognized the company for performing important assessments and making recommendations on key civil and commercial programs.

Looking Forward

We are embarking on the largest facilities improvement program in our history. A new headquarters building is planned for our main offices in El Segundo, California. It will meet government earthquake codes and provide modern offices for staff members when it opens in 2009. A new parking structure at our El Segundo campus is also being built. When it is completed, in February 2007, construction of the new headquarters building will begin. Meanwhile, about 375 of our employees have moved to SMC's new offices at the Schriever Space Complex, across the street from our headquarters, so that they can continue working directly with our Air Force customer. Employees at our Colorado

Springs office are expected to move into a new facility at the city's airport park development in March 2008.

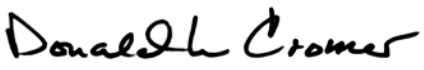
We are also strengthening our institution by developing a workforce for the future through recruitment and professional development initiatives. We have set goals to achieve a balance between highly experienced staff members and newly hired personnel. We have established "learning targets" for each employee, challenging them to increase their knowledge by participating yearly in at least 40 hours of space-education activities and encouraging advanced degree commitments, especially in our core competencies, such as systems engineering. We are also increasing the number of technical reports we produce to make important studies more widely accessible, thus increasing the value of our work. In addition, we are aggressively working to meet diversity goals that support our business objectives.

Containing cost growth and developing long-term plans to strengthen the institution financially and operationally are central to our corporate planning initiatives. Improving value to our customers and enhancing the value of our workforce are key components of our vision for the future. We continue to invest in research, capital equipment, software and facilities, and to enhance our capabilities in information technology to help us deliver our technical expertise "From Anywhere to Anywhere," ensuring that our customers get, on demand, the best technical advice the company can offer.

New Board Members

We have welcomed four new members to our board of trustees: businesswoman Barbara M. Barrett, retired banking executive Rufus A. Fulton Jr., former Air Force official Nelson F. Gibbs, and former CIA official John E. McLaughlin. In addition, attorney Jeffrey H. Smith, who previously served on the board, has been re-elected. We are privileged to be able to work with these distinguished business and public-service leaders as we address the complex issues facing national-security space programs in 2007.

Dr. William F. Ballhaus Jr.
President and Chief Executive Officer



Lt. Gen. Donald L. Cromer (USAF, Ret.)
Chairman of the Board

Space Launch Operations

SLO

Space Launch Operations (SLO) is dedicated to achieving 100-percent mission success on all space launches of our Air Force and National Reconnaissance Office (NRO) customers. SLO is responsible for conducting the Aerospace independent launch readiness verification process for legacy and evolved expendable launch vehicle (EELV) launches. Our launch readiness verification is the industry benchmark for launch assurance and provides the primary input to the government's mission assurance process. The results are captured in the Launch Readiness Verification Letter for each mission. SLO also focuses on lessons learned, data, and best practices sharing among launch programs. In addition, SLO provided independent risk assessments to NASA on its expendable launch vehicle (ELV) missions, technical support to NASA's space shuttle return-to-flight activities, and technical expertise to the Launch and Test Range and Air Force Satellite Control Network programs.

Major accomplishments of fiscal 2006 include: successfully launching the final Titan vehicle from Vandenberg Air Force Base (VAFB), the first Delta IV/NRO mission from VAFB, the Delta II/MiTEx mission, the Delta IV/GOES-N mission, the Atlas V/New Horizons mission, and the Delta II/GPS IIR-15 (M) mission. SLO also completed selected analyses in support of NASA's STS-121 mission.

The Aerospace Corporation's readiness verification product is the industry benchmark for launch assurance and provides the primary input to the government's mission assurance process.

LOCKHEED MARTIN MISSILES AND SPACE

LOCKHEED MARTIN MISSILES AND SPACE

The Aerospace Corporation's extensive Atlas V experience will enable our launch verification for the inaugural DoD launch of STP-1.

Atlas V

Aerospace support to the Atlas V element of the evolved expendable launch vehicle (EELV) program continued to be noteworthy throughout 2006. In addition to continued development of our independent tools, models, simulations, and capabilities, Aerospace monitored the two non-DoD Atlas V launches of the past year. NASA's Pluto New Horizons mission was successfully launched January 19, 2006, and the commercial Astra 1KR spacecraft was successfully launched April 20, 2006. We closely collaborated with the launch contractor throughout our monitoring process. This included utilizing the company's Spacelift Telemetry Analysis and Reporting System (STARS) as well as providing on-console support at Cape Canaveral Air Force Station (CCAFS). Prior to the Pluto launch, critical issues associated with the qualification test failure of the fuel (RP-1) tank and the use of an incorrect material in the solid rocket boosters (SRBs) had to be resolved. The Aerospace Atlas V team and corporate engineering and analytical capabilities were crucial to the resolution of these fleet-wide impacts. Involvement to date provides us with excellent Atlas V insights to support our launch readiness verification for the inaugural DoD launch of STP-1 from CCAFS in early fiscal 2007, followed by the launches of WGS-1, NROL-28, and NROL-30 in the spring and summer of 2007.

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The DARPA MiTEx mission was aboard Delta II.

Delta II

Aerospace performed comprehensive launch verification in support of the DARPA mission aboard Delta II. The Micro-Satellite Technology Experiment (MiTEx) was successfully launched from CCAFS on June 21, 2006. The Aerospace efforts included resolution of several unique hardware issues, which arose in the months preceding launch. The flight termination batteries required redesign and requalification due to deficiencies discovered in the original qualification. The fleet of first-stage engine nozzles was discovered to have suspect welds and possible damage at a critical structural band around the nozzle. Finally, second-stage propellant flow meters were found to contain an incorrect material, which corrodes when exposed to oxidizer, causing binding and potential propellant flow restriction to the point of serious engine performance loss. Each of these technical issues required testing, analysis, and risk evaluation by Aerospace to develop recovery plans. Extensive engineering and laboratory analyses were performed to substantiate and supplement contractor efforts. Aerospace's dynamic modeling and structural analysis efforts, along with the laboratory inspection and test capabilities, provided critical data and information to support development of corrective actions for each of the issues. Our post-flight assessments

utilizing capabilities resident in STARS confirmed the flight worthiness of the hardware. All systems performed nominally and the resulting orbit at spacecraft separation had excellent accuracy.

Following the successful Delta II/MiTEx launch, Aerospace focused on supporting the Delta II/GPS IIR-15 (M), which was successfully launched on Sept. 25, 2006, from CCAFS.

Aerospace is now focusing on the launch verification activities for the next Delta II GPS mission and the NROL-21 mission, scheduled for the coming fiscal year. The Delta II/NROL-21 mission poses a variety of unique challenges, including being the inaugural NRO Delta II mission, a rare DoD Delta II launch from NASA's SLC-2W at Vandenberg Air Force Base (VAFB), and a unique launch vehicle configuration, which is slightly different from the standard Global Positioning System (GPS) configuration.

Delta IV

Aerospace was instrumental in another milestone in spaceflight history, accomplished by the Delta IV element of EELV. On June 27, 2006, the NROL-22 mission was successfully launched from VAFB. This launch was characterized by numerous first-time accomplishments:

- First EELV launch from VAFB
- First NRO mission aboard EELV
- First DoD use of Delta IV with solid boosters
- First use of SLC-6 by a major launch system

The SLC-6 was originally built to support the Manned Orbiting Laboratory (MOL) program prior to its cancellation in the 1960s, and then anticipated space shuttle launches prior to the Challenger disaster. Aerospace played a critical role in ensuring readiness of both the launch facilities and launch vehicle. Most noteworthy for the vehicle was the resolution of the concern related to upper-stage slosh, which had caused initial launch attempts in October 2005 to be delayed. Aerospace also applied our independent tools and capabilities to resolve additional issues related to battery quality/capacity, slow-to-close liquid hydrogen fill/drain valve (FDV) on the upper stage, and strength concerns for joints, incorporating Dapco filler material in all major composite structural elements. Because the issues impacting the NROL-22 vehicle also affected NASA's GOES-N vehicle of the same configuration, Aerospace was able to support both customers with common risk assessments and corrective actions. Aerospace worked closely with the NASA customer and provided both STARS support and on-console support at CCAFS for the successful launch of GOES-N on May 24, 2006.

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Aerospace was instrumental in making space flight history with Delta IV.

The Delta IV team now turns its attention to upcoming launches of DMSP-17, DSP-23, and NROL-26 in fiscal 2007. The final DSP satellite and the NRO mission will be launched by the three-body Heavy configuration from CCAFS.

Space Launch Projects

Space Launch Projects, within the Launch Systems Division (LSD) of SLO, is responsible for a wide range of technical tasks associated with advanced launch system development and various analyses, including mission assurance, for civil launch campaigns. Other recent tasks include: the analysis of space launch commercialization and policy issues; modeling of space shuttle launch system hazards; development and coordination of new airborne imagery systems to improve launch monitoring; application of historical test criteria in support of NASA's new launch systems for exploration; preliminary design and system sizing for follow-on EELV launch systems; plus the assessment of national rocket test facilities in terms of capabilities and anticipated demand.

Three projects worth special note are our support to: the NOAA/NASA GOES-N launch mission assurance; the WB-57 aircraft airborne imagery supporting NASA's shuttle return-to-flight activities; and the support we provide to NASA Kennedy Space Center's (KSC) safety and mission assurance work as technical advisors, including participation in mission risk assessments for all NASA expendable launches.

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NASA has elected to continue to use Aerospace's support for the launch of GOES-O and GOES-P.

Mission Assurance for the NOAA/NASA GOES-N Launch

The National Oceanic and Atmospheric Administration's (NOAA's) Geostationary Operational Environmental Satellite (GOES-N) was successfully placed in the desired transfer orbit May 24 by a Delta IV launch vehicle from CCAFS. The GOES constellation provides continuous monitoring of meteorological conditions in the Western Hemisphere. For nearly two years, Aerospace provided critical launch services assistance for the GOES-N project to NASA's Goddard Space Flight Center. Goddard managed the project for NOAA. The LSD had project leadership responsibilities for this effort. LSD staff was the primary interface for support to GOES-N, with LSD drawing upon other SLO divisions and the Engineering and Technology Group (ETG) for significant GOES-N support. Aerospace supported all major launch system reviews for GOES-N, including contractor and NASA management reviews. Aerospace staff at the Eastern Range led the on-site monitoring of the launch vehicle processing effort. Aerospace tracked all major launch system risks and provided NASA with a risk assessment for the launch. NASA has elected to continue to use Aerospace's support for the launch of GOES-O and GOES-P.

The WB-57F Ascent Video Experiment

The WB-57F Ascent Video Experiment (WAVE) is a NASA project to provide video imagery of space shuttle launch and reentry imagery from a variety of airborne sensors, primarily the NASA high-altitude WB-57F aircraft. Aerospace provides the WB-57F Program (NASA/JSC) with overall management, mission planning, and engineering support for the WAVE project. WAVE's second and third operational missions were this year's launch of the Pluto New Horizons spacecraft on an Atlas V and the launch of Space Shuttle Discovery on STS-121 on July 4. During both launches, the WAVE sensor successfully obtained video of the launch vehicle from liftoff to five minutes after launch. Aerospace also planned and coordinated NASA's multiaircraft effort to use airborne sensor data to better understand the aerodynamic heating of the space shuttle during its return to Earth. Three aircraft, the HALO II Gulfstream, the Cast Glance P-3, and the WAVE WB-57F, were all positioned over the Gulf of Mexico as Discovery passed overhead, and measured changes in the heating patterns on the shuttle during critical phases of the entry. The WAVE system has been undergoing continuous modification and hardware retrofits to improve the quality of the video and the overall utility of the sensor.

NASA KSC Safety and Mission Assurance Activities

Space Launch Projects (SLP) personnel continue into their fourth year of launch vehicle independent assessment activities in support of NASA's Safety and Mission Assurance (S&MA) Directorate. This work involves participation at significant reviews and technical interchanges as well as review and assessment of documentation and analyses. Personnel from other portions of SLO and ETG also support this effort as needed. This work includes NASA launches on the Pegasus, Atlas, and Delta vehicle families. Over this past year, SLP personnel led the Aerospace effort to support the S&MA Directorate in the successful launch of the Pluto New Horizons (PNH) Mission and CALIPSO/Cloudsat Mission. The PNH Mission launched on a hybrid Atlas V launch vehicle that used a Boeing Delta II upper stage. The spacecraft is powered by a radioisotope thermoelectric generator (RTG) containing 24 pounds mass (lbm) of plutonium. Aerospace assisted S&MA in assessing the risks of several launch vehicle hardware concerns affecting the PNH mission. Two of the most significant were the RP-1 tank qualification anomaly and an anomaly that occurred in the process of building an Atlas solid rocket booster motor case. Aerospace provided detailed technical assessments related to both these anomalies. We conducted unique modeling analysis to help

NASA

Space Shuttle Discovery during STS-114 launch obtained by NASA WAVE high definition video camera.

NASA

Space Shuttle Discovery during STS-121 entry obtained by Navy Cast Glance infrared sensor.

improve the design of the tank for future missions. The PNH spacecraft was successfully launched on Jan. 19, 2006, and is on its way to the outer parts of our solar system.

Launch and Satellite Control Division

Current satellite training systems for command and control are developed to meet the unique needs of each program. Aerospace is examining the development of a standard training program that would allow students to view and interact with satellite display systems that can be modified to meet unique training requirements. Developing a common training environment for satellite programs will collectively reduce acquisition schedules and costs. Aerospace is working with potential vendors of a new training system, and examining various products and capabilities, to develop future procurement options.

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Core electronics enabling automated operations within a small footprint.

Spacelift Range – Launch and Satellite Control Division

Aerospace provides systems engineering, acquisition support, and integration services to the Air Force for the modernization and sustainment of the Launch and Test Range System (LTRS). LTRS is an infrastructure program whose products are in all phases of the acquisition life cycle. The major emphasis this fiscal year was on completion and activation of the new Western Range Operations Control Center (WROCC) at VAFB. Due to the challenges with the ongoing sustainment of the aging legacy control center, the WROCC must be activated to ensure continued access to space. Aerospace was instrumental in assisting the Air Force in delivering six of the seven centers within the WROCC in time to support the launch of a Minuteman III missile on July 20, 2006. The only remaining center within the WROCC to be activated is the Missile Flight Control Center.

Aerospace was instrumental in assisting the Air Force with the activation of the Western Range Operations Control Center (WROCC) at Vandenberg Air Force Base.

Major accomplishments in fiscal 2006 include: systems engineering, integration, and development activities for WROCC activation; security vulnerability risk assessments for the planning and scheduling system; acquisition replanning and design review support for the Instrumentation Modernization project; and development evaluations for the radar open system architecture project.

Aerospace provided critical contributions toward successfully achieving the next phase of the development project of the Air Force Satellite Control Network (AFSCN).

Air Force Satellite Control Network - Satellite Control and Network Systems Group

Aerospace provides systems engineering and integration services to the Satellite Control and Network Systems Group for the modernization and sustainment of the Air Force Satellite Control Network (AFSCN). These services include providing risk-mitigation actions for program executability, resolving design and test issues, developing independent executability assessments, and planning new technology initiatives. Major accomplishments in fiscal 2006 include the successful resolution of system test problems on: the Antedo antenna system that will replace aging antennas at two remote tracking stations; orbital analysis subsystem follow-on that will generate satellite orbital information on visibility, look angles, and radio-frequency interference for scheduling satellite contacts and support; staggered quadrature phased-shift keying system that will demodulate telemetry from space-based infrared system satellites for early on-orbit testing and operations; and remote tracking station block change antenna system that will provide responsive, dual-band capability for tracking, telemetry, and commanding at all AFSCN remote tracking stations. In all cases, Aerospace's contributions were critical to successfully achieving the next phase of the development project.

LOCKHEED MARTIN MISSILES AND SPACE

Space Program Operations

spo

Space Program Operations (SPO) assists the Air Force Space and Missile Systems Center (SMC) in the conception, design acquisition, and operations of Air Force Space Systems. SMC utilizes Aerospace's extensive expertise in all these areas as it pursues the goal of becoming the DoD leader in acquisition success. SPO provides the critical skills necessary to assure 100-percent mission success through the mission assurance focus, technical reviews, and system engineering processes as space programs are architected, acquired, and fielded. Emphasis through all phases of the life cycle for systems is on effectiveness for the operational end users. The following highlights will give samples of the unique and valuable service SPO provides SMC in their pursuit of value of military space.

Aerospace successfully demonstrated proof-of-concept transmission of Defense Meteorological Satellite Program (DMSP) stored mission data in 2006. The two concept demonstrations, transmitting from McMurdo, Antarctica, to CONUS, validated significant reduction in stored mission data latency to strategic weather forecasting centers.

Aerospace provided important technical and on-orbit support for the launch of a Defense Meteorological Satellite Program (DMSP) satellite in November 2006. ► ► ► ► ►

TECHNICAL EXCELLENCE ◎ OBJECTIVITY ◎ INTEGRITY ◎ DEDICATION TO MISSION SUCCESS ◎ COMMITMENT TO OUR PEOPLE

LOCKHEED MARTIN CORPORATION

Aerospace is actively involved in all aspects of the Advanced Extremely High Frequency (AEHF) Program, which will significantly increase the nation's communication capacity when it eventually succeeds Milstar.

Advanced Extremely High Frequency (AEHF) Program

The AEHF program will succeed Milstar as this nation's core, protected communication system for strategic and tactical missions mitigating a broad spectrum of natural and manmade threats. AEHF represents a ten-fold improvement in communication capacity as well as significant improvements to coverage access enabled by first-flight uplink and downlink phased arrays. Aerospace is integrally involved in all aspects of the program, working with government and contractor teams to maintain an effective technical baseline to ensure mission success.

In fiscal 2006, the program maintained the April 2008 launch date despite many challenges in first-item unit production across the spacecraft and payload areas. Aerospace was involved with the contractor team in a wide array of tiger teams, focused investigations, and independent testing and analysis to support contractor findings. Examples include defining a risk-reduction test program for the next-generation FPGA used in the digital transponder unit, hosting contractor tests designed to mitigate risk associated with electrostatic discharge events on solar arrays in Aerospace specialized laboratory facilities, performing a detailed schedule analysis that aids program execution evaluation, and maintaining regular, on-site monitoring of activities at Stennis Space Center. Aerospace has been intimately involved in early risk-reduction testing between the payload and the spacecraft, and across new spacecraft interfaces to lower the probability of occurrence of key interface problems later, during the program's critical path, single-line production flow.

Milstar Program

The Milstar system serves as the nation's core, protected communication system for strategic and tactical missions mitigating a broad spectrum of natural and manmade threats. The five-ball constellation consists of two Milstar I satellites (low-data-rate) and three Milstar II satellites (low- and medium-data rate). The constellation continues its excellent performance meeting global, worldwide warfighter requirements. The two Milstar I satellites have exceeded their design lives. The longevity and performance of the Milstar constellation have become more critical in recent events, given the reduced size of the AEHF constellation from five satellites to three and the delays to the Transformational Satellite Communications System. Aerospace has provided general systems engineering and integration (GSE&I) support for Milstar to the government since the program's initiation. While support for Milstar is gearing down, Aerospace maintains a vigilant team in supporting systems sustainment and mission operations. This includes a strong emphasis on ensuring Milstar and AEHF intersystem capability.

Transformational Satellite Communications System (TSAT) Program

The TSAT program will provide Internet Protocol-based connectivity to terrestrial and airborne DoD users of both fixed and deployed networks, while significantly improving throughput for users of strategic and protected communication services. A key new technology is optical communications, which will be used to provide high-data-rate support to space and airborne intelligence, surveillance, and reconnaissance (ISR) users, and for intersatellite crosslinks, which will enable high-data interoperability between the supported networks. The first TSAT launch is planned for 2015.

In fiscal 2006, the integrated Aerospace/MITRE FFRDC team played a significant role in the continuing maturation of TSAT system requirements, helping to finalize an affordable baseline, supporting AFSPC to update the TSAT Capability Description Document, and in releasing three major technical requirement documents (TRDs) updates at the system and segment levels. Aerospace conducted many technical trades and detailed analyses to support these requirements products. Aerospace proposed a range of packet-in-scintillation approaches to mitigate circuit deficiencies and support new network-centric STRATCOM CONOPS, and the Engineering and Technology Group (ETG) provided detailed performance assessments of the various options. Aerospace proposed and assessed system configuration changes (such as radio frequency (RF) and optical coverages, and RF crosslink options) as part of the User Forum Cost as an Independent Variable trades, producing costed CDC design updates and many Dynamic Analysis Support Tool loadings and other ETG performance analyses. Aerospace explored the impacts across segments of adding direct Space Radar communication support to TSAT and provided Dynast loading assessments of impacts.

The Aerospace/MITRE team played a significant role in the maturation of Transformational Satellite Communications System (TSAT) system requirements.

The Aerospace space segment team also played a major role in developing an implementation for a block acquisition approach directed by the Quadrennial Defense Review in fall 2005. They worked closely with both space segment contractor teams, guiding them in the development of their Block I and Block II design baselines, as well as in adjudicating their recommendations for Block I and Block II requirements allocations. The team utilized these inputs, along with independent Aerospace technical work, to help define the requirements allocation between Blocks I and II at the system level and for all three segments.

Aerospace continued to provide technical guidance for the ongoing space segment system definition contracts, including major technology

risk-reduction demonstrations for the digital processor and laser communications payload. Aerospace played a major role in planning, executing, and evaluating these demonstrations. Our team conducted independent analyses, tests, and assessments of various implementations, including important high-power laser diode life tests in our laboratories.

The Aerospace TSAT Mission Operations Segment (TMOS) team worked with the government and contractor to plan and execute a segment requirements review for TMOS in April. We have played a lead role in reviewing and guiding revisions to key TMOS contract document deliveries, including the software development plan, the TSAT network architecture, and numerous requirements and interface control documents. The team has also been a leading technical contributor to the development of network standards across the Global Information Grid.

3RD SPACE OPERATIONS SQUADRON (AFSPC)

The Command and Control System – Consolidated (CCS-C) Program was certified as the System of Record for Milstar operation on October 19, 2005.

Command and Control System – Consolidated (CCS-C) Program

Air Force development evaluation of the Milstar CCS-C capability was completed in early October 2005, and AFSPC/A3 certified CCS-C as the System of Record for Milstar operation on Oct. 19, 2005. This action completed the CCS-C threshold requirement to move the DSCS and Milstar programs off the legacy command and control system.

Development of command procedures and database updates for the Wideband Global SATCOM components is continuing to support a launch no earlier than April 2007. All platform and payload contingency procedures are scheduled to be completed in summer 2007, prior to handover of operations from the Boeing Company to 50th Space Wing. Development of the AEHF software components was completed in August 2006.

Defense Satellite Communications System (DSCS) Program

In fiscal 2006, DSCS achieved recognition for innovation in mission-life-extension activities. Uncertainty in end-of-life fuel estimation led to the development by Aerospace of a fuel estimation technique that substantially improves the accuracy and confidence in fuel estimates for all DSCS satellites. As a result, the DSCS program office was selected to represent SMC in the Air Force Chief of Staff Team Excellence Award competition for its contributions to mission-life extension of DSCS on-orbit assets at a national symposium in Washington, D.C., at the end of September 2006. Aerospace continues to provide key expertise in propulsion analysis, fuel estimation, orbital control, attitude control, flight software analysis and test, payload operations, and general orbital operations to the Air Force at Schriever and Peterson Air Force Bases.

Aerospace continued to provide key expertise to assist the Air Force in the operations of the Defense Satellite Communications System (DSCS).

Wideband Global SATCOM (WGS) Program

Integration and system-level testing of the first three (Block I) WGS spacecraft continued throughout fiscal 2006. The first flight vehicle, SV1, completed system thermal-vacuum acceptance testing with a small number of problems for this complex, first-time test. Following the test, the vehicle appears to be in excellent condition with only one test-related anomaly. It's believed that the cause of this anomaly is understood, and further testing to isolate and repair the problem occurred in October 2006. Late in fiscal 2006, an issue involving cracked solder joints in the electrical power converters serving most of the Ka-band traveling wave tube amplifiers (TWTAs) was identified following failures during ambient testing of SV2 and SV3. Aerospace has been an integral part of the investigation, employing an extensive array of analytic and test tools to characterize, assess, and resolve the situation. The path forward is still under evaluation. WGS Block II was initiated in February 2006 with the issuance of a letter contract for procurement of long-lead materials and nonrecurring design engineering. The final fixed-price incentive fee contract was signed in September. Aerospace provided key technical support and leadership during the contract negotiations and spearheaded the effort to incorporate a substantially revitalized suite of specifications and standards to help bolster mission assurance. Aerospace is now deeply involved in the nonrecurring engineering effort to address parts obsolescence and Boeing 702 satellite production changes that have occurred since the Block I satellites were built. The Block II satellites will differ only slightly from the Block I vehicles by the incorporation of an improved capability to the support high-data-rate needs of elements of the airborne intelligence, surveillance, and reconnaissance (AISR) community.

THE BOEING COMPANY

Aerospace continued its assistance to the Wideband Global SATCOM (WGS) Program by performing integration and system-level testing of the first three (Block 1) WGS spacecraft.

SBIRS High

The Space-Based Infrared System (SBIRS) High is the next-generation follow-on to the Defense Support Program (DSP). DSP provides U.S. Strategic Command with a space-based surveillance system that provides early warning of strategic and tactical ballistic-missile attack. The SBIRS High program payloads delivered the highly elliptical orbit (HEO) ground software for system integration, completed three relay ground station (RGS) developments, and completed construction of a new Mission Control Segment-Backup facility for the mission control station. The program is currently integrating and testing the two geostationary orbit (GEO) space vehicles and developing the GEO ground software. Upon successful deployment of these space systems, SBIRS will provide improved missile warning, missile defense, battlespace characterization,

and technical intelligence products to the National Command Authority, combatant commanders, and the intelligence community. The principal focus areas of Aerospace personnel include integration and testing of the GEO 1 payload, including an initial thermal vacuum test, acoustic testing, and anomaly resolution efforts; the initial integration, trouble-shooting, and functional testing of the spacecraft bus; participating in software development planning, discrepancy report resolution, and test oversight; and planning and executing the first GEO space-to-ground compatibility test.

Aerospace led the HEO ground-testing activities, supported the MCS-B facility and RGS developments, provided technical analyses for numerous design reviews for the GEO portion of the ground program, recommended many metrics and process improvements that the contractor adopted, and provided estimates and support for program re-planning activities. In addition, Aerospace staff supported SMC's efforts leading to re-certification of the program following a Nunn-McCurdy breach, the associated replan, and responses to multiple action items and external reviews mandated by the Acquisition Decision Memorandum.

NPOESS PROGRAM OFFICE

Operations for the National Polar-orbiting Environmental Satellite System (NPOESS) will be conducted from this state-of-the-art facility.

National Polar-orbiting Operational Environmental Satellite System (NPOESS)

The National Polar-orbiting Operational Environmental Satellite System (NPOESS) is the follow-on system to DoD's DMSP and DOC's POES programs. The evolution from the current POES and DMSP programs to NPOESS will take place over the next five to nine years. When NPOESS reaches full operational capability, spacecraft in all three orbital planes will provide global coverage with a data refresh rate of approximately four to six hours and a data latency of less than 30 minutes. Using evolutionary sensors and a revolutionary ground system, NPOESS will transform the current mission from a weather system to a truly environmental satellite system. Aerospace is playing a key role in the development of the entire system, from algorithms to sensors to the ground system. Aerospace has worked closely with the tri-agency (DoD, DOC, and NASA) partners to define requirements and develop the systems to support them.

In the past year, problems with sensor developments resulted in overruns in cost and scheduled delays that triggered a Nunn-McCurdy breach. Aerospace supported the Nunn-McCurdy study that resulted in a restructured program that was certified to Congress by OSD AT&L on June 5. The NPOESS EXCOM established, and the Nunn- McCurdy action ratified, the formation of a new Environmental Satellite Program Executive Office (PEO). Aerospace has been asked to serve as the senior technical advisor

for the new PEO. Two of the sensors that were having trouble prior to the Nunn-McCurdy breach completed thermal vacuum and vibration tests this summer, a significant step forward for the program. Aerospace also played a key role in setting up operations for ground command and control systems at the new NOAA Satellite Operations Facility (NSOF). NSOF will eventually provide the ground control for NOAA Polar Program and NPOESS. In the interim, NSOF is providing control for POES, DMSP, and several scientific satellites.

The Aerospace Corporation was instrumental in establishing operations for ground command and control systems at the new NOAA Satellite Operations Facility (NSOF).

Space Superiority

Aerospace plays a key role in supporting the Air Force's Space Superiority Systems Wing, which develops, delivers, and sustains space control capabilities to ensure space superiority for the joint warfighter and the nation. Aerospace provides a wide range of expertise to the programs, including requirements analysis, ground and space system design, systems analysis, system and subsystem test and verification, and performance assessment.

There have been two key areas of strategic focus in the directorate in fiscal 2006. The first is working with the program office to build an integrated development plan for counterspace missions with particular emphasis on the area of space situational awareness. This mission area is receiving increasing attention as the criticality of our national-security space assets to the warfighter is recognized. The second thrust is to improve program execution. Aerospace has been instrumental in providing independent evaluations of programs to uncover existing or potential execution issues and recommending potential solutions to these issues.

Space Based Space Surveillance (SBSS)

The SBSS Program is a major program in the Air Force's Space Superiority Wing. It is an integrated space and ground system that will provide the capability to gather surveillance data on a large number of objects from space. This allows significantly improved timeliness and metric tracking accuracy for key portions of the objects tracked today by the Space Surveillance Network, which is limited by geometry and weather constraints. An Aerospace-led independent review team (IRT) of the program in late 2005 acknowledged that the fundamental approach of the program was valid but found a number of programmatic and technical risks that jeopardized successful program execution. Aerospace worked closely with Air Force counterparts to revamp the program organization, rework the program schedule, and balance selected space vehicle requirements. Aerospace also led a team that conducted a detailed review of the assembly, integration, and test (AI&T) effort and made

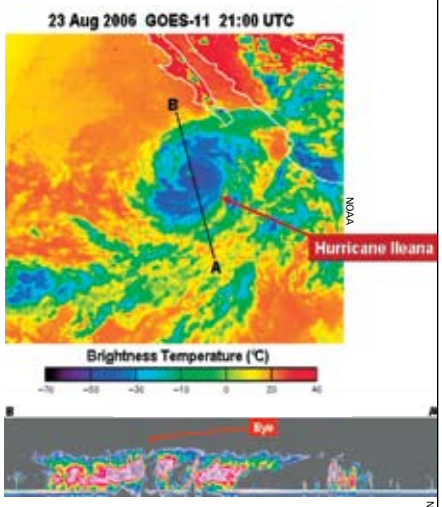
recommendations for adding early testing, which reduced overall assembly, integration, and test risks. A follow-up independent program assessment (IPA) was held at the end of fiscal 2006 and concluded that essentially all of the IRT recommendations had been or were being implemented. The review further found that there was a solid management team in place, with strong functional support and an executable technical plan. However, the IPA also found that additional funding would be required to execute this plan. The SBSS team has made significant progress and, by conducting a successful critical design review (CDR), has completed the system's detailed design. The initial Pathfinder spacecraft will be fabricated and integrated with the SBSS ground system during fiscal 2007 and 2008, with launch on a Minotaur IV currently projected for late 2008, pending resolution of the funding issue.

Space Development and Test Wing (SD&TW)

SD&TW at Kirtland Air Force Base (KAFB) in Albuquerque, N.M., supports two programs specializing in research and development (R&D) space missions. The DoD Space Test Program (STP) provides subsidized access to space for experiments approved by the DoD Space Experiments Review Board (SERB). In addition, the full range of mission support functions may also be provided on a cost-reimbursable basis for other payloads from across the DoD community. STP is also the single manager of DoD payloads flown on the NASA shuttle, International Space Station, and other human space flight missions. The Research, Development, Test and Evaluation Space and Missile Operations Program (RDSMO) provides flight operations for R&D satellites via a dedicated control center at KAFB as well as worldwide satellite communications support via deployable antennas. Both programs are executed by the SMC Space Development and Test Wing at KAFB.

CloudSat Mission Provides Unique Atmospheric Data

CloudSat launched on April 28, 2006, began gathering data with the cloud profiling radar May 20, and established formation in NASA's Afternoon Constellation (A-train) June 15. With flight operations provided via the DoD Space Test Program, Aerospace was instrumental in ensuring the readiness of the ground operations system and in the planning and evaluation of the maneuvers executed to place the vehicle in formation 10 to 15 seconds (75 to 113 km) ahead of CALIPSO and approximately one minute behind Aqua. This tight formation was required to permit simultaneous imaging of targets by both CloudSat and CALIPSO.



This cross-section of internal cloud structure shows vertical changes in temperature and water content as the instrument scans from B to A

Prior to launch, Aerospace provided critical support to three tiger teams formed by the Air Force to revalidate the CloudSat ground system following the discovery of problems during prelaunch rehearsals and testing. Aerospace identified multiple inconsistencies in processes, documentation, and test results that were subsequently resolved prior to launch. The efforts of these teams restored confidence in the ground system integrity and prevented a possible launch delay.

CloudSat performed 14 maneuvers between May 11 and June 15 to raise its orbit about 15 km, establish a position in a buffer zone between the Aqua and CALIPSO control boxes, offset its orbit plane, and drift into formation with CALIPSO. Aerospace applied flight safety techniques developed in support of earlier missions and worked closely with the Jet Propulsion Laboratory mission designers to plan the maneuvers in a manner that kept the satellites safely separated throughout the approach, even in the event of spacecraft anomalies. Aerospace then worked directly with the orbit analysts at the RSC to execute the plan, including adjustment of later maneuvers based upon the actual results of earlier ones.

As a result of these efforts, the Air Force Weather Agency, along with the Naval Research Laboratory, is receiving unique vertical cloud profiles that permit evaluation of new techniques to support the airborne warfighter.

STP-1 Prepares for Launch

Preparation intensified in the last quarter of fiscal 2006 as the DoD Space Test Program (STP) moved toward a December 2006 launch of one of the most challenging missions that STP has undertaken. The STP-1 mission involves the first demonstration of the EELV secondary payload adapter (ESPA) on the first DoD mission on an Atlas V 401 launch vehicle. This launch will act as a pathfinder for incorporating ESPA class payloads on future EELV flights.

Launching from Cape Canaveral Air Force Station, the STP-1 mission incorporates a dual-orbit, dual-inclination trajectory deploying multiple satellites in each of the two orbits. Aerospace provided oversight on the development of all interfaces between the satellites and the launch vehicle, integration and test of the integrated payload stack (IPS), and the development of one of the satellites, STPSat-1. Aerospace worked with the STPSat-1 satellite contractor to provide specialized expertise not available within the contractor's staff. The value added by Aerospace enhanced the satellite design and reduced risk to the program.

SMC/SPACE DEVELOPMENT & TEST WING

Aerospace staff worked with the Space Test Program (STP) Sat-1 satellite contractor to provide specialized expertise not available within the contractor's staff.

In preparation for this mission, a new low-shock separation system for ESPA-class payloads was qualified. Aerospace provided extensive technical expertise during anomaly resolution arising from this qualification testing of the separation system. Work on the IPS by Aerospace focused on ensuring that all six satellites and one mass simulator met the interface requirements and were therefore given an opportunity to operate on orbit.

Aerospace's Navy Space Systems Subdivision provides important support for two Navy satellite communications systems, the Operational UHF Follow-On (UFO) constellation and the Mobile User Objective System (MUOS).

LOCKHEED MARTIN CORPORATION

Navy Space Systems

Navy Ultra-High Frequency (UHF) Satellite Communications

Aerospace's Navy Space Systems Subdivision supports two Navy satellite communications programs. The operational UHF Follow-On (UFO) constellation provides tactical communication for Army, Navy, and Air Force mobile terminals, including Navy battle group, fleet broadcast, and Special Intelligence communications. Now that UFO acquisition is complete, Aerospace supports UFO operational reconfiguration activities to improve communication throughput and to handle equipment degradation. The Mobile User Objective System (MUOS) is the Navy's transformational narrowband communication system, which will provide tactical terminal access to Global Information Grid resources via terrestrial teleport switches. MUOS initial operational capability (IOC) is scheduled for 2010. Aerospace supports several MUOS acquisition activities, including verification that the contractor design and equipment will satisfy requirements. A new Aerospace branch office was opened in San Diego to more effectively interact with the Navy's program office.

During 2006, Aerospace supported several high-value MUOS acquisition activities oriented to the critical design review (CDR), which is scheduled for completion in March 2007. Aerospace led the independent program assessment (IPA) used by the Undersecretary for Defense Acquisition to authorize entry into the CDR phase, which was granted this summer.

Aerospace also performed a series of radio frequency emission collections around the country to support design verification pursuant to international standard operation certification.

Aerospace supported critical UFO operational reconfiguration activities. Operational degradations had been realized in the UFO constellation. We collected and analyzed data used to reconfigure on-orbit equipment that restored throughput performance. The Navy awarded its Lightning Bolt Award to the UFO program team, including Aerospace, for restoring these important communications links to the warfighter.

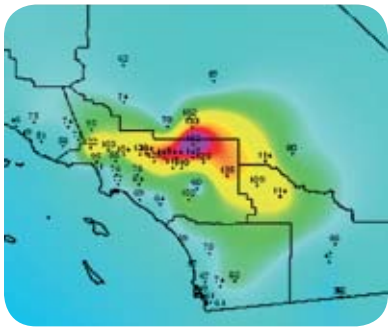
Meteorological Satellite Systems

The Defense Meteorological Satellite Program (DMSP) has been providing timely and accurate worldwide terrestrial and space environmental data to DoD and national program users for nearly four decades. Satellites are deployed in two low-Earth sun-synchronous orbits to support both strategic and theater users. Currently the program has three remaining satellite launches. Satellite F-17, on a Delta IV, was launched in November 2006. Aerospace provided critical technical support for spacecraft development, test and integration, launch and on-orbit support, and environmental data processing and exploitation.

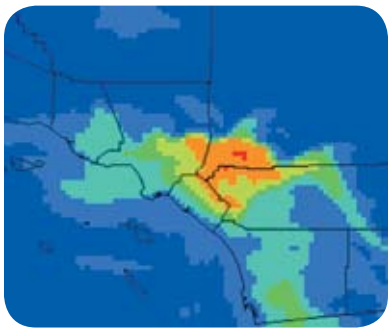
In fiscal 2006, proof-of-concept transmission of DMSP stored mission data from McMurdo, Antarctica, to CONUS was successfully demonstrated using commercial communication. Aerospace led both concept demonstrations to validate significant reduction in stored mission data latency to strategic weather forecasting centers. NPOESS is partnering with the National Science Foundation (NSF) to acquire a commercial wideband link between McMurdo and CONUS starting in January 2008, with initial 10-mbps data-rate capability, and expanding to 60 mbps prior to the first NPOESS satellite launch. Dialogue with both NPOESS and NSF in sharing this communication link with DMSP has demonstrated synergy benefiting all agencies. A tri-agency memorandum of agreement sharing this wideband communication link is being discussed with NPOESS and NSF.

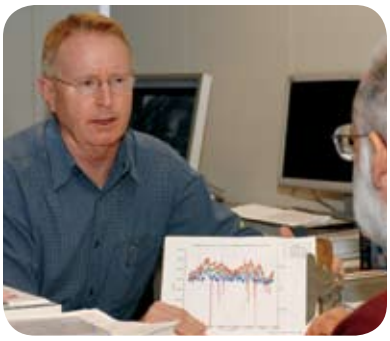
U.S. AIR FORCE

Aerospace led the successful demonstration of proof-of-concept transmission of DMSP stored mission data from McMurdo, Antarctica, to CONUS.



Observed ozone levels (top) were compared with CAMx ozone predictions (bottom) using forecast fields generated by the numerical weather prediction (NWP) models provided by Aerospace to the South Coast Air Quality Management District.





Donald Boucher received the 2006 Trustees' Distinguished Achievement Award for providing outstanding technical leadership in recovering functionality of a new Defense Meteorological Satellite Program (DMSP) sensor in support of critical national programs.

Aerospace and the South Coast Air Quality Management District (SCAQMD) jointly tested the Comprehensive Air Quality Model with Extensions (CAMx) with numerical weather prediction (NWP) models to evaluate the system as an ozone forecasting tool for Southern California. NWP models are applied at increasingly high spatial resolutions to support military operations and domestic emergencies. The assimilation of satellite data into NWP models is a means to exploit environmental satellite data to improve the NWP forecasts to satisfy end-user needs for quality environmental prediction. Assimilating observations from a number of sources, including DMSP satellite data, Aerospace generated meteorological forecasts at 5-km spatial resolution for two high-ozone episodes over Southern California to determine the optimal modeling configuration for use in conjunction with the air quality prediction model. The Aerospace forecast fields were provided to the SCAQMD and the resulting ozone predictions were compared to surface ozone measurements with observed ozone. Data assimilation has been shown to improve forecast predictions used in real-time forecasting applications, such as those used to support operational air-quality forecasts.

Global Positioning System (GPS)

Aerospace played a key role in the launch, early orbit operations, and on-orbit test of GPS Mission IIR-14(M) from September to December 2005. The first of a new generation of modernized satellites, it hosts a new civil signal and two new military signals. Prior to launch, Aerospace performed extensive reviews of new features to ensure mission success. In support of the launch, Aerospace served as prime advisors to Air Force operations personnel at Schriever AFB during commanding contacts and maneuver planning. Following launch, we reviewed the results of on-orbit validation tests to ensure compliance with the program requirements. The second modernized satellite was launched Sept. 25, 2006, as GPS Mission IIR-15(M), with key support from Aerospace. A total of 29 GPS satellites are currently operational.

Aerospace provided significant support to the government and industry team in analyzing a major slip in the delivery of the first Block IIF satellite. Our team conducted an independent program assessment of the IIF program, and made recommendations to improve the execution. Aerospace assessed on-orbit satellite reliabilities to develop improved forecasts of remaining satellite life. These projections were key factors in Air Force constellation sustainment planning.

Aerospace completed a comprehensive GPS constellation design study at the request of the GPS independent review team. The analysis was provided to the AF for their use in responding to Defense Science Board recommendations to increase the size of the GPS constellation to 30 or more satellites to better support users with visibility constraints.

Aerospace provided leadership and technical support to the Architecture Evolution Plan (AEP) ground system. Through the help of the government and Aerospace team, AEP version 5.2 completed system-test dry runs, test readiness review, and initiated the run for record of the system test. This represents a significant step toward official transition to operations, planned for April 2007.

Aerospace supplied significant technical leadership for the modernized user equipment (MUE) and modernized space receiver (MSR) programs. MUE awarded three contracts for receiver card development in June 2006. This will solidify an industrial base capable of supporting future production of GPS user equipment that will meet a wide variety of military requirements. MSR awarded two contracts in September 2006.

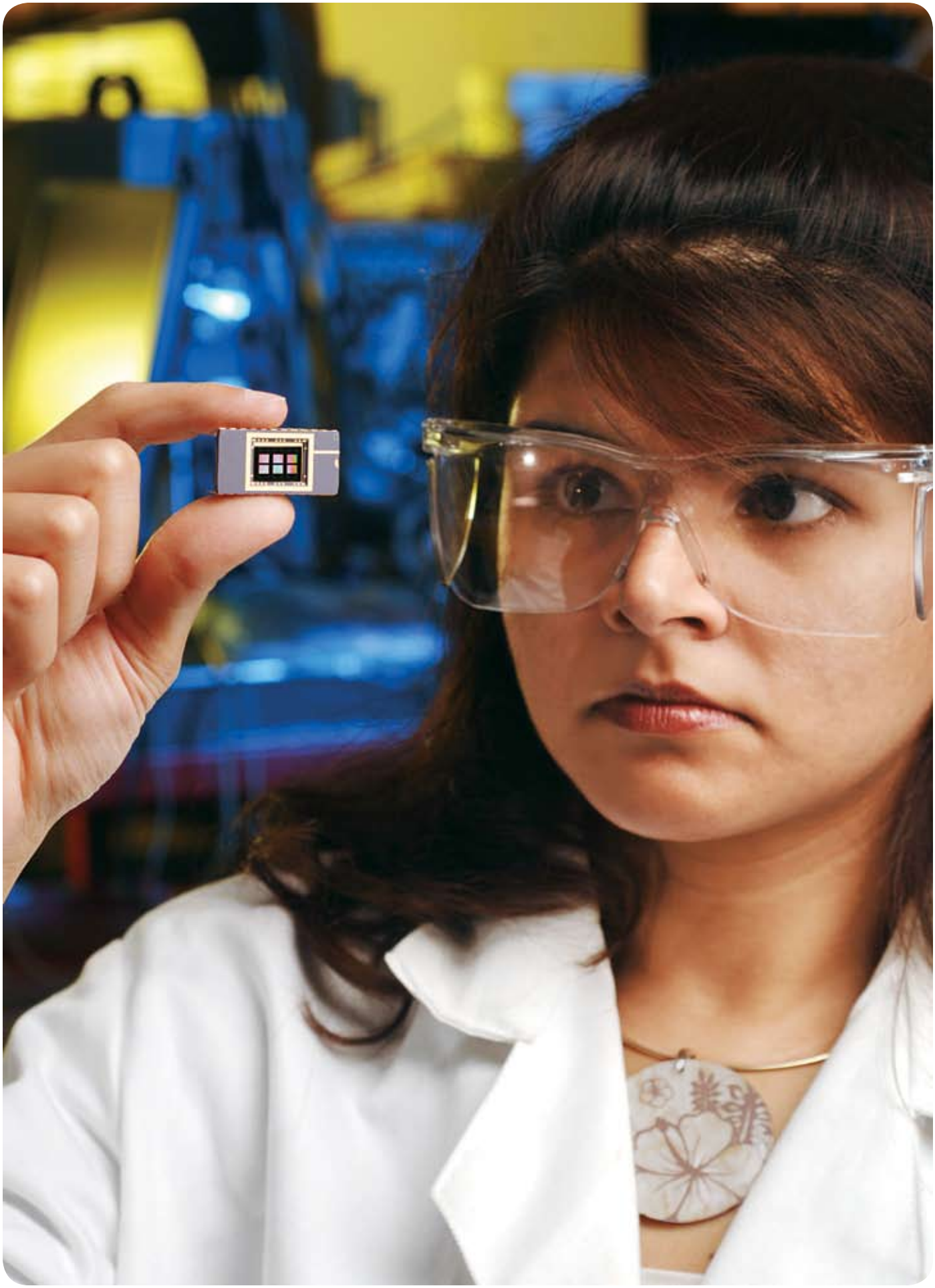
THE BOEING COMPANY

Engineering and Technology Group

etg

The Engineering and Technology Group (ETG), a nationally recognized space systems and technology resource, provides cross-program technical support to a variety of military, civil, commercial, and corporate projects. Containing nearly half of the company's technical talent, the group consists of six specialty organizations equipped with state-of-the-art computing, testing, diagnostic, research, and simulation facilities, as well as proprietary Aerospace databases that have evolved since the beginning of the space era. This group of nationally recognized engineers and scientists assesses and evaluates existing and new space technologies, investigates and resolves anomalies, and conducts research and development. Over the more than 40-year span of the space era, ETG has become a leader in realizing the full potential of space technology.

The Engineering and Technology Group (ETG), comprised of nationally recognized engineers and scientists, assesses and evaluates existing and new space technologies, investigates and resolves anomalies, and conducts research and development.

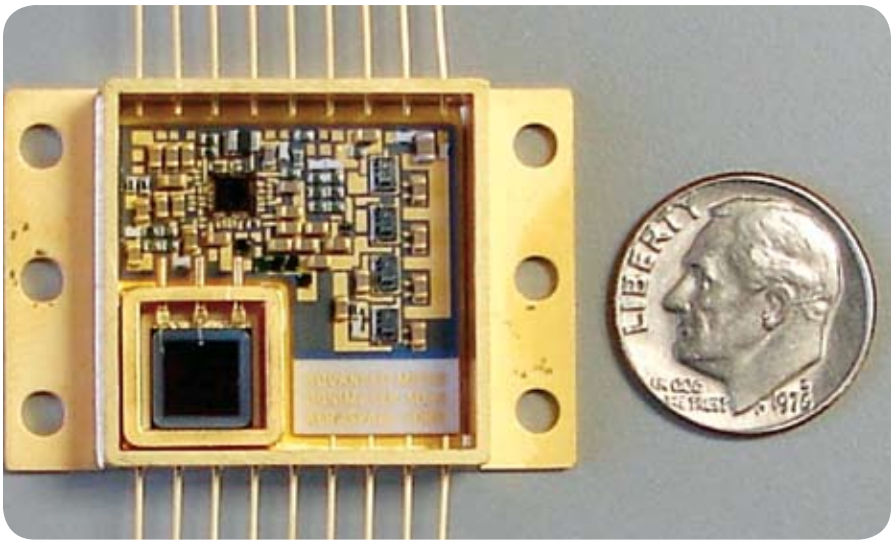


LOCKHEED MARTIN MISSILES AND SPACE

Aerospace performed several analyses of the Global Positioning System (GPS) Program to determine the effect of number of orbit planes and constellation size on GPS performance.

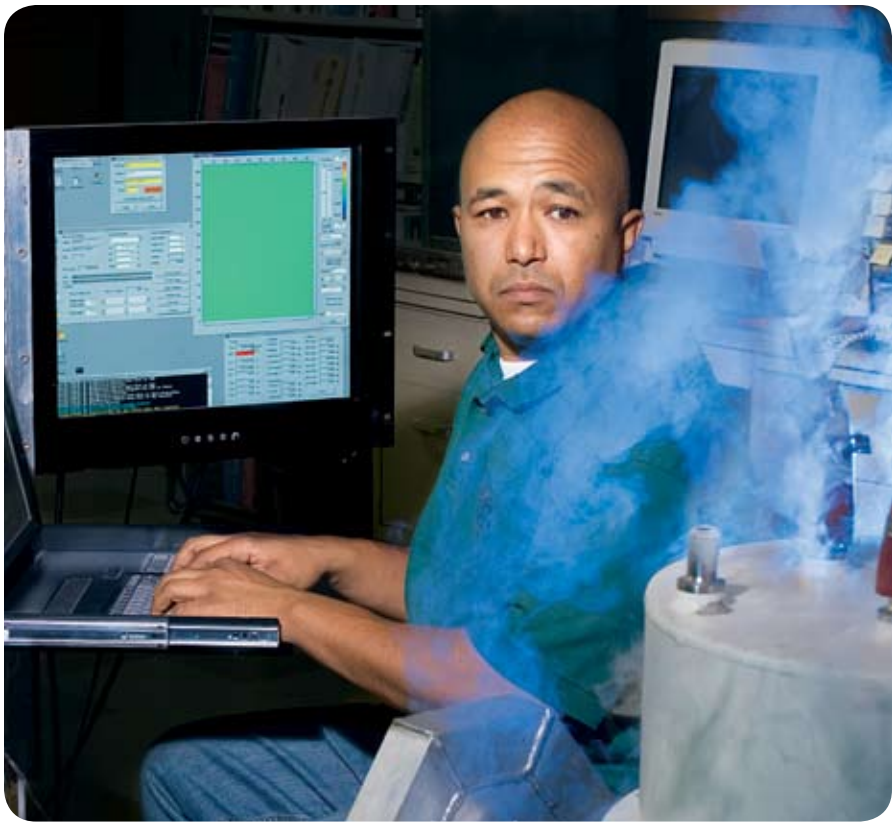
GPS Constellation Trade Study

The GPS independent review team (IRT) is sponsored by Air Force Space Command to review the GPS Program and make recommendations related to program execution, system architecture, and planning. The IRT consists of world-class GPS experts from industry, academia, and the military. In response to recommendations made by the GPS IRT, Aerospace performed several analyses to assess the effect of constellation size and number of orbit planes on GPS performance. The study included an investigation of GPS accuracy and availability for users operating in mountainous terrain, foliage, and urban areas. The trades included availability of accuracy, robustness of the constellation to satellite failure, constellation management flexibility, and availability of GPS to military and civil aviation users. The ability to support dual-manifest launch opportunities was also assessed. The objective analyses were in-depth and comprehensive, which provided a solid foundation for decisions by the senior leadership of the Air Force, including the GPS program director, the commander of the Space and Missile Systems Center, Air Force Space Command, and the Undersecretary of the Air Force. Based on this solid foundation, further evaluations are now under way on budgetary and timing issues.



Miniature Space-Weather Instrumentation

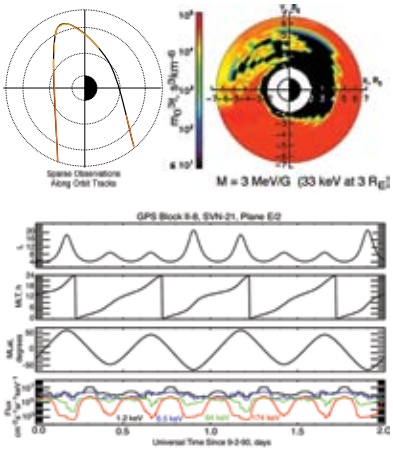
Aerospace is developing miniaturized spaceflight-worthy and commercially viable devices that will enable continuous space-weather situational awareness by monitoring total radiation dose, electrostatic discharges, and other environmental effects on spacecraft. The figure shows the first of these devices, a dosimeter that will enable in situ measurements of total radiation dose within a spacecraft. This design is slated to fly on the NASA Lunar Reconnaissance Orbiter.



Wahoo sensor is prepared for laboratory testing.

The Radiation Environment at MEO

Aerospace is actively pursuing several strategies to improve the understanding of the radiation environment in medium Earth orbits (MEO). MEO has been used to refer to various orbits: highly elliptical orbits (HEO), GPS, higher-than-traditional low Earth orbits (LEO), and mini-GPS (ICO), among others. What all of these orbits have in common is that they encounter radiation environments that are qualitatively different from, and in most respects quantitatively more severe than, traditional LEO and geosynchronous Earth orbit (GEO) environments. This change in nature and degree of the radiation environment brings renewed interest in accurate climatology specifications for spacecraft design. Aerospace is developing new specification models that represent improvements in quantitative accuracy as well as capability. Whereas the existing models tend to provide only average environment specifications, the new models will provide the statistical information needed to compute error bars on traditional total-dose estimates as well as worst-case environments for spacecraft charging and single-event effects. Developing these new models requires a combination of new observations, physics-based simulations, and statistical modeling.

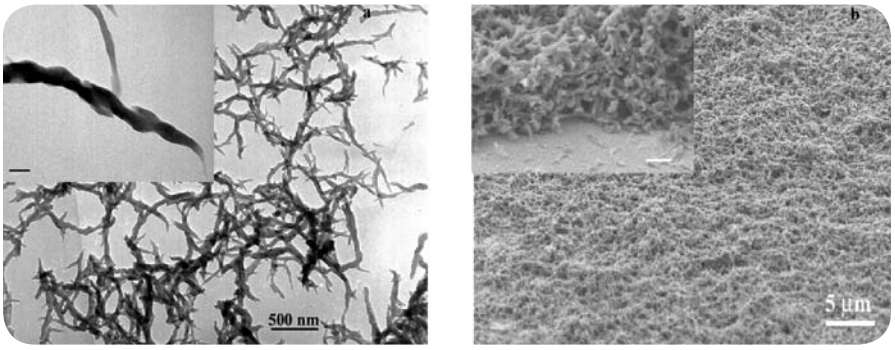


The figure shows how the new approach integrates observation (top left), data-assimilative numerical simulation (top right), and statistical analysis (bottom) to produce a standard solar cycle specification through which planned vehicles can be flown in simulation to obtain a specification of the environment at the vehicle throughout a mission.

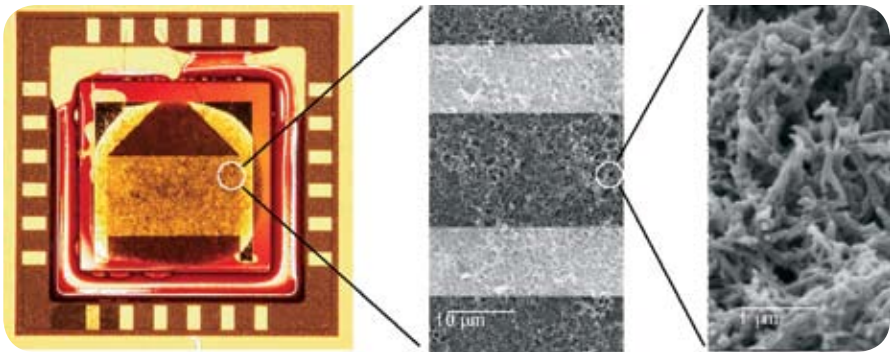
Improved chemical sensors that can detect many different chemicals, using polyaniline nanofibers, were developed at Aerospace in collaboration with the University of California, Los Angeles (UCLA).

New Chemical Sensors Based on Polyaniline Nanofibers

Better chemical sensors are needed to detect hazardous propellant leaks and to track exhaust plumes in launch support applications. Aerospace has been developing more sensitive sensors for toxic chemicals than exist at launch sites. These sensors are also of interest for homeland security. The new sensors that can detect many different chemicals, using polyaniline nanofibers, have been developed at Aerospace in collaboration with the University of California, Los Angeles (UCLA). Polyaniline is a conducting polymer whose conductivity can vary by 10 orders of magnitude upon



chemical doping or dedoping. Polyaniline nanofibers are synthesized using a novel interfacial polymerization method for which Aerospace and UCLA were recently granted a patent. When aniline is polymerized in a simple interfacial process at room temperature, nanofibers of polyaniline are exclusively formed. The nanofibers can be isolated, purified, and dispersed in water, and used to deposit nanofiber-thin films with a wide range of applications. The nanofiber films have a very open and porous structure, which greatly enhances their interaction with gases and makes them ideal for chemical detection applications.



Polyaniline nanofiber chemical sensor
Length scales are 5 mm, 10 micron, and 1 micron

Aerospace personnel have conducted extensive testing of foam debris in support of the Space Shuttle Systems Engineering and Integration Office at NASA Johnson Space Center (JSC). These tests initially began in support of the STS-114 return-to-flight activity, but have now expanded in depth and scope for STS-121 and beyond.

The conductance of the nanofibers can be made to vary by many orders of magnitude in response to chemicals of interest. In addition, new nanofiber composite materials can easily be made, which greatly broadens the range of chemicals that can be detected. Chemical sensors for many chemicals have been demonstrated including hydrogen chloride, hydrazine, ammonia, and hydrogen sulfide. Detection of many toxic chemicals of interest to the Department of Homeland Security was also demonstrated in a program for development of a handheld detector to respond to terrorist chemical incidents. Recently, Aerospace discovered a completely new response of polyaniline nanofibers to hydrogen gas that was entirely unexpected based on the known chemistry of polyaniline. Doped polyaniline nanofibers show a significant and reproducible increase in conductance when exposed to hydrogen gas below the explosive limit of four percent hydrogen in air. Interestingly, the response is not inhibited by oxygen, unlike many common hydrogen sensors. Not only does this work indicate a new, practical hydrogen sensor that could be used for launch support, it also has implications for hydrogen storage applications.

Dr. Joseph Fennell was recognized by The Aerospace Corporation for his achievement in the development of a scientific understanding of spacecraft charging and its effect on space systems.

National Systems Group

nsg

The National Systems Group (NSG) serves as the technical "backbone" for the National Reconnaissance Office (NRO) and its mission partners involved in the collection and distribution of intelligence information. The NSG utilizes Aerospace's core skills and cutting-edge technology to support the acquisition and operation of major programs. In April 2006, the director of the NRO released his strategic framework for the future of the NRO. The strategic focus for the NSG for 2007 is to continue to apply a strong systems engineering approach to national intelligence programs, to provide sound and objective technical recommendations and solutions, as well as to lead in meeting those challenges the director of the NRO outlined in his strategic framework. The following projects and programs highlight some of the efforts in which NSG has engaged, and successfully applied these principles and procedures to support the intelligence community during 2006.

The National Systems Group (NSG) utilizes Aerospace's core skills and cutting-edge technology to support the acquisition and operation of major programs.

TECHNICAL EXCELLENCE ◎ OBJECTIVITY ◎ INTEGRITY ◎ DEDICATION TO MISSION SUCCESS ◎ COMMITMENT TO OUR PEOPLE

Gyro-Less Attitude Determination

Aerospace innovation provided a key role in preventing the early loss of a high-value national space asset. Aerospace engineers invented the concept of an on-orbit satellite-attitude reference system called the gyro-less attitude determination (GLAD). The groundbreaking work was implemented on a system to compensate for a severely reduced-life-time gyro and star tracker. The GLAD implementation allows a national space program to meet its mission requirements with no performance degradation.

The concept of GLAD was conceived, developed, and tested by The Aerospace Corporation in a race against imminent inertial reference unit (IRU) failure. A team comprising government, contractor, and Aerospace personnel worked for more than a year to implement GLAD. While the application of software and math would do an excellent job of maintaining attitude in a perfect universe, the team understood that the real universe would introduce errors that would need to be mitigated. The team solved this by utilizing secondary and tertiary attitude references, thereby allowing the attitude control computer to distinguish and correct any non-ideal attitude errors.

The GLAD system is an evolutionary enhancement of a previous pseudo-gyro effort. It combines the earlier work with revolutionary pseudo-tracker techniques to compensate for the premature loss of hardware. The Aerospace independent development of these techniques jump started the recovery process to avoid a complete mission loss. The impact of this work on national security assets was recognized by the customer, which presented a team award to the Aerospace and contractor team.

Aerospace engineers invented the concept of an on-orbit attitude reference system called the gyro-less attitude determination (GLAD).

Essential Enterprise Capabilities (EECs) for NRO Programs and Acquisitions

An Aerospace core team led a cross-directorate NRO team to specify and describe 20 essential enterprise capabilities (EEC) addressing program definition and system acquisition throughout the NRO. These capabilities have been coordinated with NRO directorates and offices and fall into the categories of information management, mission management, processing, and operational services.

The essential enterprise capabilities represent the NRO director's intent to accomplish integration within the NRO and among the NRO, mission partners, users, and foreign partners. The EEC are the basis for the horizontal integration/information sharing (HI/IS) aspects of future NRO ground system acquisitions. Both HI/IS capabilities as well as traditional

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intelligence requirements fall within the trade space of normal program planning and are key elements of review at the NRO senior acquisition review boards. Additionally, the EECs have become the basis for:

- Allocating functions to NRO acquisition elements
- Deriving metrics and weights for evaluation
- Evaluating directorate baseline programs and initiatives
- Planning horizontal Integration investment
- Building a roadmap for field site fusion tools
- Identifying technology for insertion into the NRO ground architecture
- Planning Systems engineering for directorate ground system
- Building the NRO integrated program
- Resolving procedure and policy obstacles to information sharing
- Improving NRO utility to meet National Security Enterprise (NSE) intelligence needs and to benefit end-users

Aerospace Launch Support for NRO Missions

NSG Launch Directorate completed a record eighth consecutive year of 100-percent mission success for the NRO. This was accomplished with the successful launch of two critical missions, which also resulted in historic milestones culminating the end of one era and the beginning of a new one. The last Titan IV vehicle, launched in October 2005, was the crowning event for more than 360 Titan launches in more than 45 years of service to the nation. The first launch of an NRO payload on the new Delta IV vehicle from Vandenberg Air Force Base, Calif., in June 2006 also marked the new era of EELV launches for critical NSS missions.

The launch of the final Titan IV in October 2005 was the crowning event for more than 360 Titan launches in over 45 years of service to the nation.

Ground Software Study

In fiscal 2006, The Aerospace Corporation led an FFRDC-conducted ground software study (GSS) for the NRO on "troubled" software-intensive ground programs from March 2005 to June 2006. Composed of Aerospace, MITRE, and SEI, the study was commissioned by the deputy director for system engineering (DDSE) to resolve issues identified by the NRO Mission Assurance Improvement Task Force (MAITF) and respond to the personal requests from the directors of SIGINT and IMINT. The study focused on determining the most common causes of program problems, identifying any best practices that could be implemented by other programs, and offering programs recommendations to better achieve mission success. The study surveyed four SIGINT and three IMINT programs that were considered "troubled" due to the fact these programs were either late in delivery and/or significantly over budget. The study team provided specific, as well as synthesized, SIGINT-IMINT program findings and recommendations.

The study conducted more than 200 private interviews of government, contractor, FFRDC, and SETA personnel from the acquisition, development, and operations and maintenance organizations to elicit their concerns, lessons-learned, and recommendations on their respective programs. At the conclusion of each survey, the team prepared a program-approved report and briefing that characterized the key issues, determined the root causes, identified effective practices, and provided a candidate recommendation roadmap. The final study roadmap included recommendations to improve software contracting and acquisition processes, program risk management, a recommendation to develop new expertise for government and industry, and a recommendation to improve management processes and control.

To ensure the highest quality product to the NRO, Aerospace created and led a senior review team (SRT), composed of some of the country's preeminent experts, to provide oversight of the study process and the products. Participation included representatives from Aerospace, MITRE, and SEI as well as academia. Chaired by The Aerospace Corporation, the SRT met at the end of the SIGINT and IMINT periods of the study, and again at the end of the study period to review and provide specific recommendations for improving the final product content and presentation.

The Aerospace Corporation led an FFRDC team in conducting a ground software study (GSS) for the NRO on software-intensive ground programs that were experiencing problems and made recommendations to better achieve mission success.

The post-study implementation phase will socialize the GSS study findings and recommendations across the NRO enterprise to implement cross-enterprise actions within agreed-to resource allocations and priorities. The results have major implications across national-security space (NSS), and will also be shared externally with the Air Force's Space and Missile Systems Center (SMC) and other organizations to ensure that NSS can best synchronize cross-community institutional improvements.

Parts, Materials, and Processes (PM&P) Revitalization

The Aerospace Corporation's parts, materials, and processes (PM&P) revitalization continues to develop across a broad front. Our efforts are aimed at achieving the earliest warning of parts problems or potential problems, and communicating to programs that are potentially affected. Specific actions related to this have involved the establishment of a space government-industry data exchange program (GIDEP) attempting to overcome the legal hurdles associated with sharing information related to suspect parts. The Aerospace Corporation was primary in the development of a parts problem database to both record and track suspected parts problems. That same database has now been operating for more than a year, and has met with several successes in stopping parts problems before they have significant mission or program impacts. The Aerospace Corporation is deeply involved in the revitalization of former military specifications and standards, bringing them up to date to account for new realities of organizations and the parts industry. Associated with this effort is a drive to fill in policy gaps left over from the discontinuance of many acquisition reform policies. The corporation has been and currently is at the forefront of addressing the related issues of replacing the former functions of Rome Air Development Center and their responsibilities in parts and materials qualification, as well as addressing the industrial base concerns generated by a diminishing market of space-qualified parts manufacturers. Across the spectrum of PM&P, The Aerospace Corporation is working closely with industry and government partners to re-establish confidence and enhance mission assurance.

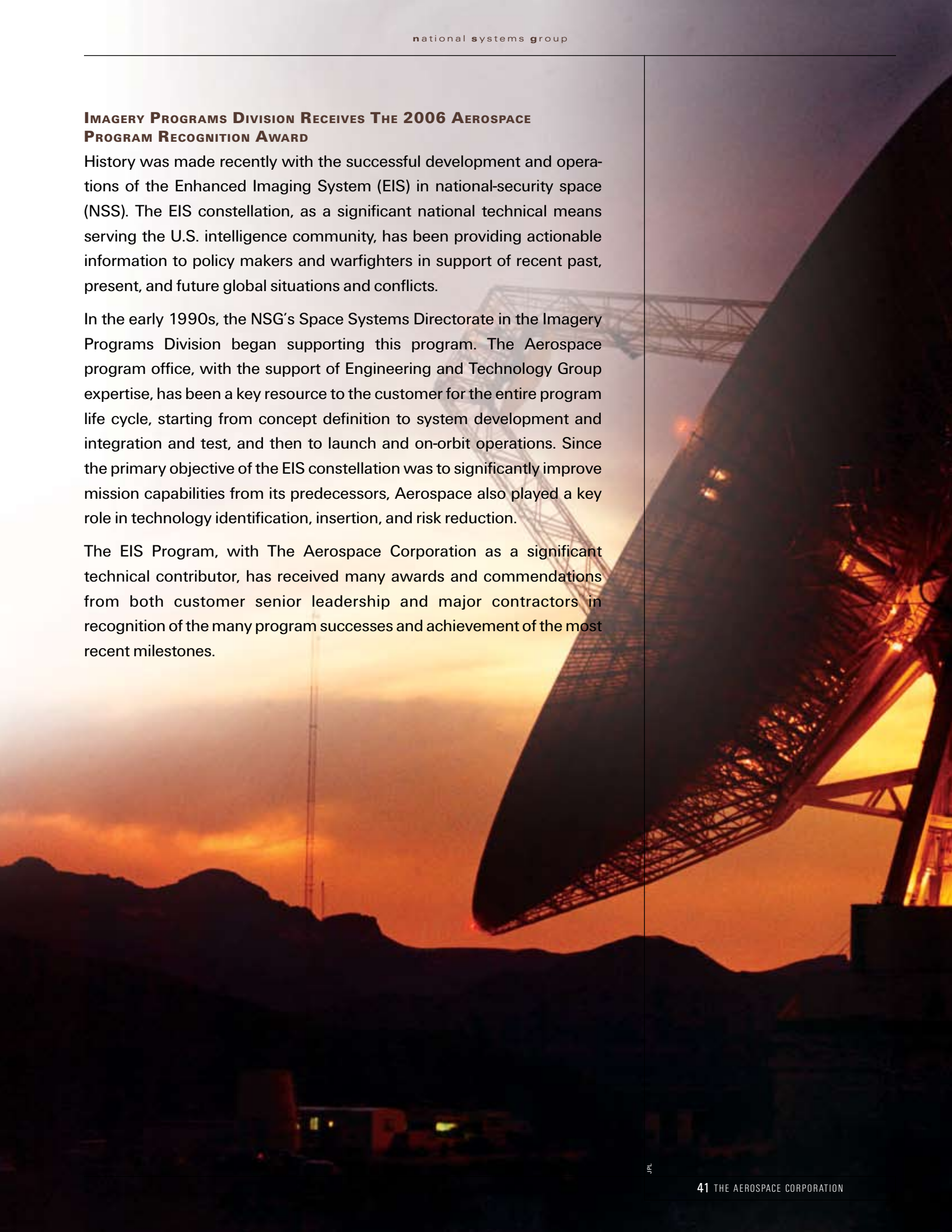
The Aerospace Corporation played a primary role in the development of a parts problem database to both record and track suspected parts problems.

Imagery Programs Division Receives The 2006 Aerospace Program Recognition Award

History was made recently with the successful development and operations of the Enhanced Imaging System (EIS) in national-security space (NSS). The EIS constellation, as a significant national technical means serving the U.S. intelligence community, has been providing actionable information to policy makers and warfighters in support of recent past, present, and future global situations and conflicts.

In the early 1990s, the NSG's Space Systems Directorate in the Imagery Programs Division began supporting this program. The Aerospace program office, with the support of Engineering and Technology Group expertise, has been a key resource to the customer for the entire program life cycle, starting from concept definition to system development and integration and test, and then to launch and on-orbit operations. Since the primary objective of the EIS constellation was to significantly improve mission capabilities from its predecessors, Aerospace also played a key role in technology identification, insertion, and risk reduction.

The EIS Program, with The Aerospace Corporation as a significant technical contributor, has received many awards and commendations from both customer senior leadership and major contractors in recognition of the many program successes and achievement of the most recent milestones.



JPL

Systems Planning and Engineering

sp&e

Systems Planning and Engineering (SP&E) provides customer support across the full spectrum of national-security space (NSS) programs to include requirements definition and planning, program formulation and systems engineering, and support to program offices and operational users.

Aerospace's goal is to increase the utility of NSS by providing space systems that are responsive to user needs. Aerospace does this by planning system engineering innovative solutions as well as by better utilizing existing space capabilities through horizontal integration initiatives. The corporation also provides cross-system common services such as updated military specifications and standards so that the system program offices are able to focus on building and launching successful capability more efficiently.

Systems Planning and Engineering (SP&E) provides customer support across the full spectrum of national-security space (NSS) programs.

Joint Functional Component Command for Space and Joint Space Operations

United States Strategic Command (USSTRATCOM) provides the nation with global deterrence capabilities and synchronized effects to combat adversary weapons of mass destruction worldwide. It also enables decisive global kinetic and nonkinetic combat effects through the application and advocacy of integrated intelligence, surveillance, and reconnaissance (ISR); space, global strike, and information operations; integrated missile defense; and robust command and control. To more efficiently execute the space operations functions assigned, USSTRATCOM recently created a new command structure for the space mission. This new organization is led by the recently created Joint Functional Component Command for Space (JFCC Space). JFCC Space, headquartered at Vandenberg Air Force Base, Calif., operates the Joint Space Operations Center and provides planning and operational support to combatants around the globe. Aerospace played a number of key roles in the creation of this emerging space command and control force, including detailed mission analysis, development, test, and exercise of critical space control and space force enhancement processes, and timely analytic support to several actual events. Aerospace provided technical assessments of hostile space defense activities, and it has led the efforts to create effective space defense tools to help detect, characterize, and locate adversary space control activities, such as attempts to jam satellite-based communications. Aerospace also supported U.S. Central Command (USCENTCOM) as it created its own space force structure within its area of responsibility. Aerospace performed system performance assessments of several demonstration systems as they were deployed to the Middle East. Aerospace also analyzed existing command structures and made key recommendations on how to best coordinate theater and global space force management activities.

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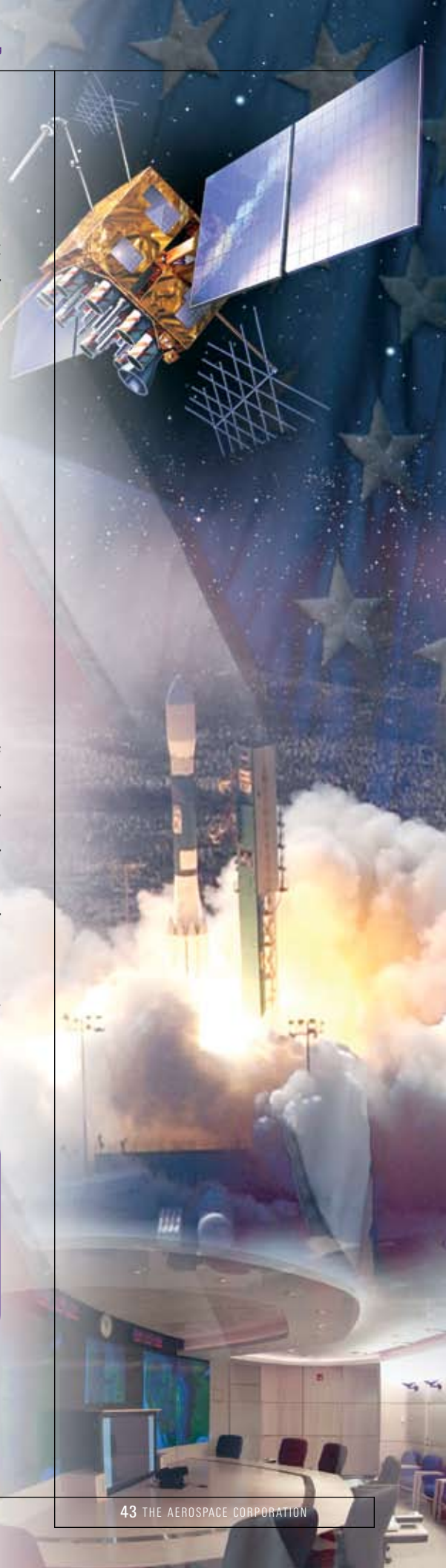


Joint Blue Force Situational Awareness (JBFSA)

Aerospace, in its lead systems-engineering role, supported the Army Space and Missile Defense Command in its successful completion of the Joint Blue Force Situational Awareness Advanced Concept Technology Development (ACTD), and the transition of capabilities developed to operations. Accomplishments included successfully completing the demonstration and Extended User Evaluation phase and transitioning of capabilities to the operational JBFSA Mission Management Center, where the capability was rapidly pressed into operational service. Operational support to Combatant Commanders (COCOMS) included support to U.S. Northern Command during Hurricanes Katrina and Rita relief operations, U.S. Central Command operations in Iraq and Afghanistan, and U.S. Pacific Command operations in Korea and the Philippines. Aerospace performed integration, demonstration, and test activities, ensuring information from disparate Blue Force tracking systems was collected and displayed on a common operational picture. Aerospace led the establishment of a software development capability within the Mission Management Center Testbed to provide development, integration, and sustainment of the JBFSA capability beyond the end of the ACTD; as well as supporting the stand-up of a JBFSA Mission Management Office within U.S. Army Strategic Command to provide planning and policy support to all COCOMs, on behalf of U.S. Strategic Command, in the JBFSA mission area. Aerospace also supported Air Force Space Command (AFSPC) as they interfaced with the service Headquarters and Joint Forces Command. At the direction of the Chief of Staff of the Air Force, AFSPC and Aerospace teamed with the Joint Datalink Information Combat Execution (JDICE) Joint Test and Evaluation organization to get selected ground-unit position data into tactical aircraft cockpits to enhance kill chain operations and reduce fratricide. Finally, in response to a warfighter-identified gap in DoD MILSATCOM capabilities, Aerospace conducted analysis for AFSPC to examine DoD alternatives to the restricted national capability and vulnerable commercial capabilities. Aerospace supported submission of a fiscal 2008 program objective memorandum input for a tactical space communications capability to address this gap. Aerospace served as the chief systems engineer, demonstration lead, command architect, and lead requirements analyst in effectively leading government and contractor teams.

DoD TSAT Congressional Appropriations Conference Report

Aerospace assisted in the preparation, coordination, and final disposition of the DoD TSAT Congressional Appropriations Conference Report. The disposition responded to a December 2005 Appropriation Conference Report, which withheld $120M from the TSAT program in fiscal 2006 pending DoD submission of an independent review to determine whether additional Advanced Extremely High Frequency (AEHF) or Wideband Global SATCOM (WGS) satellites would be required, and whether it would be feasible to insert advanced capabilities by evolving either the AEHF or WGS programs.

The DoD response summarized the status of the key TSAT technologies, reviewed the QDR and Young panel results, and restated the case for the DoD's latest block capability approach for TSAT. SAF/USA drafted the report in January, and initiated coordination across the Air Staff and OSD in February. Aerospace helped develop the original document, assisted comment adjudication, and provided technical support to presentations to Congress. The document was approved and transmitted to Congress on March 22. Aerospace then played a key role in obtaining the SAC-D's release of $120M withheld from TSAT in fiscal 2006, supporting briefings to SAC-D and HAC-D personnel in April. The briefings focused on how DoD and the Air Force restructured TSAT to lower risk and address Congressional and GAO concerns. The $120M was released to the MJPO in May, enabling continued technology risk reduction for the program.

SATCOM QDR USAF 30-Day Study

In late October 2005, DoD tasked the Air Force to investigate measures to reduce the risk of further delays in the initial delivery of TSAT capabilities. Over the next 30 days, Aerospace supported SAF/USA and the MILSATCOM JPO in developing and briefing several risk-reduction options. The ultimate recommendation emerging from the 30-day study was to adopt an incremental TSAT option that would initially provide two reduced-capability TSATs (reduced in capability from the original TSAT 1a baseline), followed by three significantly enhanced TSATs (delivering capability beyond the original TSAT 1b baseline). The Incremental TSAT constellation at FOC would satisfy the same user need set as the baseline TSAT, but with less risk due to the decreased size and complexity of the first two satellites. Incremental TSAT also adheres to the Undersecretary of the Air Force's block development acquisition strategy while easing congressional fears with space acquisition management and TSAT technology development. In early December, DoD endorsed the results of the 30-day study.

In December 2005, the DoD endorsed the results of an Aerospace-supported study that was tasked to the Air Force to investigate measures to reduce the risk of further delays in the initial delivery of TSAT capabilities.

Aerospace played a critical role in defining the acquisition strategy for the Alternative Infrared Satellite System (AIRSS) and in identifying key technology-development issues to senior government leadership.

Alternative Infrared Satellite System (AIRSS)

In a December 12, 2005, letter to Congress, the Undersecretary of Defense (Acquisition, Technology, and Logistics) certified the Space Based Infrared System (SBIRS) High program in accordance with the Nunn-McCurdy law. Further details on the certification were provided in an Acquisition Decision Memorandum (ADM) dated December 15, 2005. In addition to restructuring the SBIRS program to eliminate two of the three procurement satellites, the ADM also created a new program, now called the Alternative Infrared Satellite System (AIRSS). AIRSS is intended to generate competition for future SBIRS GEO satellites and exploit alternative technologies. Aerospace played a critical role in defining the acquisition strategy for AIRSS and in identifying key technology development issues to senior government leadership. Support included participation in a 30-day study of sensor focal plane technology directed by the Undersecretary of the Air Force, a 120-day study of AIRSS end-to-end concepts, requirements development activities, and meetings with industry representatives. An ADM-directed study of architectural alternatives for Overhead Non-imaging Infrared (ONIR) began in June 2006. Aerospace provided evaluation criteria and is continuing to support the development and assessment of alternatives.

Milstar Survivable Emergency Conferencing Network (SECN) Engineering Configuration Audit

The SECN system is a survivable, anti-jam, secure voice conference capability used by the president to confer with the nation's civilian and military leaders during crisis. The Joint Staff requested the assistance of the Defense Information Systems Agency (DISA) to resolve SECN performance issues that had developed. DISA in turn asked Aerospace to lead the engineering team tasked with conducting the engineering investigation of current system configurations at all SECN-capable sites. The Aerospace-led SECN engineering team visited 13 SECN sites, including the National Military Command Center, NMCC-Site-R, the National Airborne Operations Center (NAOC), and Combatant Command (COCOM) sites worldwide during a three-month period. The team conducted detailed engineering audits and analysis of the installed SECN configuration at each site, documenting current system configuration and resolving numerous local and system-wide problems. Periodic status briefings and individual site reports were prepared and presented by Aerospace to DISA and the Joint Staff. Aerospace also prepared and submitted a comprehensive final report that included recommendations

for additional SECN system performance enhancements. The immediate impact of this three-month, Aerospace-led effort has been a marked performance improvement of the SECN system, particularly at the National Military Command Center and U.S. Strategic Command Center.

Aerospace prepared and submitted a comprehensive report that made recommendations for additional Milstar Survivable Emergency Conference Network (SECN) system performance enhancements, which resulted in a marked performance improvement of the SECN system.

Nunn-McCurdy Activities

NSSO led Nunn-McCurdy breach activities for the Space-Based Infrared System (SBIRS) and National Polar-orbiting Operational Environmental Satellite System (NPOESS) programs. For both efforts, Aerospace provided the technical lead for Integrated Product Team (IPT) 2, charged with conducting an analysis of alternatives to determine if an alternative existed that simultaneously met or exceeded required utility at a cost equal to or lower than the program cost to complete. Although no alternatives were found that satisfied the proscribed criteria, Aerospace conducted analyses, including extensive use of the Concept Design Center (CDC), and identified several attractive alternatives should the government elect to make a programmatic change in the future. For SBIRS, the identified Alternate Infrared Satellite System (AIRSS) may become the replacement for SBIRS Vehicles. For NPOESS, since no alternatives were found that satisfied the criteria, the focus shifted to cost-avoidance alternatives based upon a new set of performance/capability criteria. Again, the Aerospace analysis, bolstered by the CDC, was the primary technical source for identifying and evaluating alternatives. These alternatives are currently under study within DoD and may lead to future procurement activities similar to that witnessed on SBIRS.

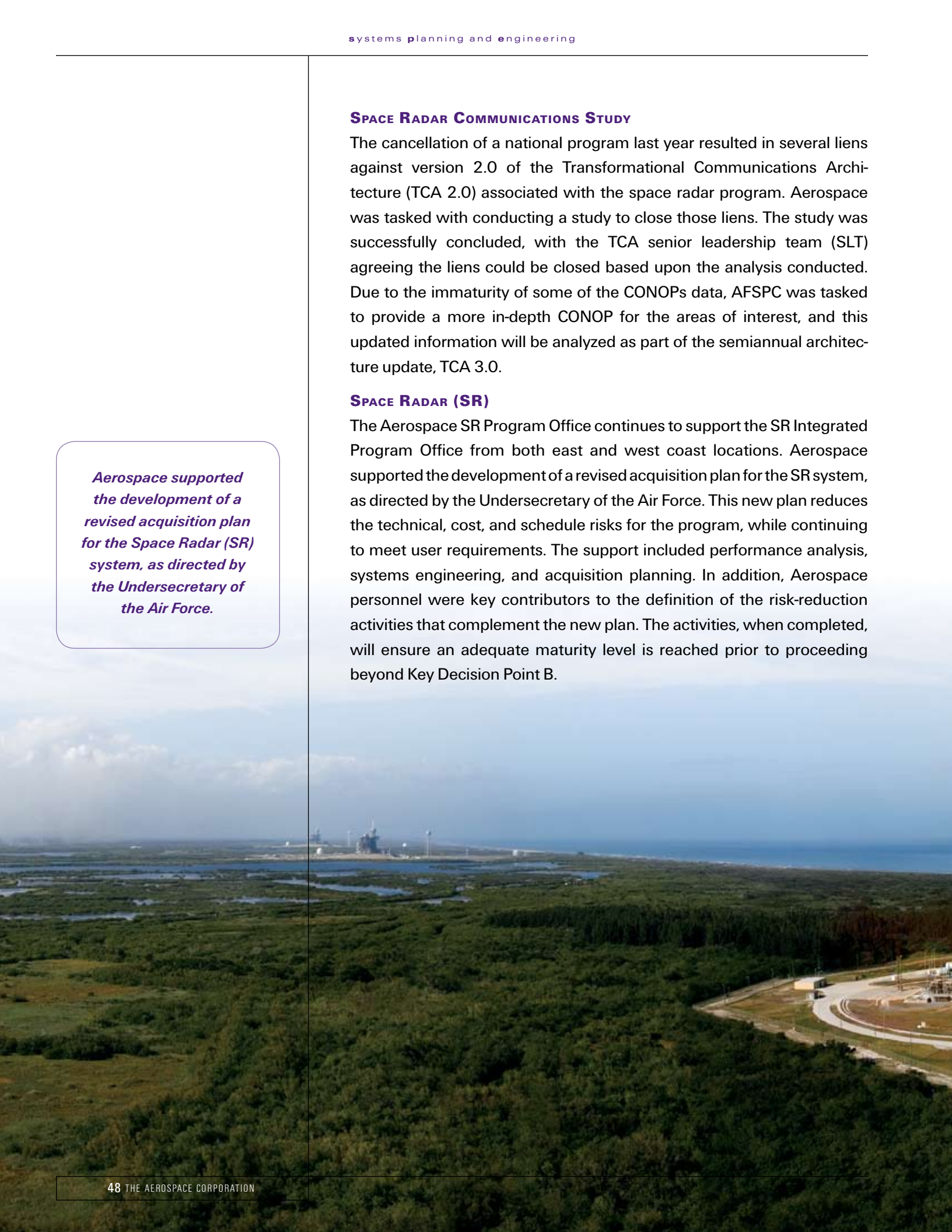
Space Radar Communications Study

The cancellation of a national program last year resulted in several liens against version 2.0 of the Transformational Communications Architecture (TCA 2.0) associated with the space radar program. Aerospace was tasked with conducting a study to close those liens. The study was successfully concluded, with the TCA senior leadership team (SLT) agreeing the liens could be closed based upon the analysis conducted. Due to the immaturity of some of the CONOPs data, AFSPC was tasked to provide a more in-depth CONOP for the areas of interest, and this updated information will be analyzed as part of the semiannual architecture update, TCA 3.0.

Space Radar (SR)

The Aerospace SR Program Office continues to support the SR Integrated Program Office from both east and west coast locations. Aerospace supported the development of a revised acquisition plan for the SR system, as directed by the Undersecretary of the Air Force. This new plan reduces the technical, cost, and schedule risks for the program, while continuing to meet user requirements. The support included performance analysis, systems engineering, and acquisition planning. In addition, Aerospace personnel were key contributors to the definition of the risk-reduction activities that complement the new plan. The activities, when completed, will ensure an adequate maturity level is reached prior to proceeding beyond Key Decision Point B.

Aerospace supported the development of a revised acquisition plan for the Space Radar (SR) system, as directed by the Undersecretary of the Air Force.



Center for Space Policy and Strategy (CSPS)

Recognizing that the nation's increasingly interdependent national security, civil, and commercial space sectors can benefit from Aerospace's unique ability to address crosscutting space policy issues with technical know-how, the Center for Space Policy and Strategy (CSPS) collects and analyzes policy, legislative, and regulatory information, assesses the impact of national policy issues on space programs and planning; and develops policy and strategy analyses to support the government's formulation and implementation of space policy. Reports completed in fiscal 2006 included a congressionally mandated study on the options for renewing, changing, or eliminating third-party liability indemnification to U.S. commercial launch companies provided through the Federal Aviation Administration, and an assessment of U.S. government strategy for implementing the United States-European Union GPS-Galileo Cooperation Agreement. The CSPS also completed a chapter on "The Impact of Foreign Space Developments on U.S. Defense Policy" for a new textbook on space and defense policy compiled by the U.S. Air Force Academy for use throughout the military academies and U.S. universities.

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Civil and Commercial Operations

CCO

Civil and Commercial Operations (CCO) is responsible for all business that reaches beyond the corporation's primary DoD and the intelligence community customers. Support of both developing and operational civil space systems for NASA and the National Oceanic and Atmospheric Administration (NOAA) comprises a large portion of this work. However, a wide variety of tasks for commercial and international companies as well as other civil customers are also included. Commercial customers include satellite owner-operators, manufacturers of space or other complex systems and components, consultants, insurance companies, and legal firms.

Concerted efforts maintained our alignment with NASA this year through major shifts in leadership and direction, including initiation of the Constellation Program. We also earned extensions of solid relationships in NOAA, nurtured new and existing industry contacts with contractors who serve NASA as well as commercial operators, and continued gradual expansion of Aerospace support in non-space arenas. For instance, Aerospace now provides program management and technical analysis support to the FBI and the National Institute of Justice (NIJ) in next-generation communication and information technology applications.

The nature of our work for these customers mirrors, exercises, and expands the capabilities applied to our traditional customers: support of all phases of the life cycles of complex systems and a staggering array of niche expertise in high-technology areas. Aerospace continues to play key roles in spacecraft operations, acquisition planning, strategic planning, acquisition management, and risk assessment for operational, near-term and future NOAA satellite programs. We also continue to operate a Technology Center for the NIJ to help apply technology in law enforcement and prisons. Commercial work encompasses broad reviews and studies at architecture level to resolving issues stemming from submicroscopic details of a single component's internal structure.

Some examples of Aerospace's accomplishments in helping create, operate, fix, and avoid problems with complex systems follow. As the world's technological well-being becomes more integrated and internationally interdependent, the independent, objective, and competent perspective that Aerospace offers will become increasingly critical.

NASA

Multi-Customer Component Failure Analysis

Aerospace helped investigate a critical pyrovalve failure on a commercial spacecraft. Our unique objectivity and industry involvement allowed us to preserve the propriety of sensitive customer data, yet gather technical information about similar devices in commercial, DoD, and NASA applications. We continue to make progress toward fully characterizing the issues and avoiding mission-critical failures for a number of customers. Consolidation in the global space industrial base increases the potential implications of component failures on any spacecraft. Aerospace has also investigated several other commercial hardware issues that apply to national security missions.

Aerospace performed an independent assessment of pyrovalve flightworthiness for several commercial spacecraft manufacturers.

National Law Enforcement and Corrections Technology Center – Western Region (NLECTC-WR)

The Center, operated by Aerospace for the National Institute of Justice, achieved four notable milestones this year that illustrate several ways that we significantly impact the law enforcement world. The following are examples of NLECTC-WR technical outreach to, and free forensic analysis services for, small and large agencies in the Western Region states. We focus on integrating commercial technologies with legacy systems to address the emerging threats posed by terrorism, as well as current operations.

- Critical video frames that had recorded significant elements of a murder in San Diego were recovered from a digital video file by Aerospace staff.
- The International Association of Chiefs of Police approved a standard that will now help local agencies to buy effective digital video recording systems for use in patrol cars. A member of the Center's staff provided key technical support.
- A system that can provide tactical command information for multiple agencies reached the prototype demonstration stage of development. The system prototyped and demonstrated by Aerospace staff can display streaming video and other information from police cars, fire trucks, equipped personnel, and other resources by clicking on icons indicating real-time location of those resources on local maps at various resolutions.
- A database of laser strikes against aircraft, along with training materials on this increasing hazard, were delivered to the Federal Aviation Administration and the International Association of Chiefs of Police. Even common laser pointers directed by hand from the ground can

light up aircraft windows, distracting pilots, or even fully obscuring their vision. Center staff generated the database from disparate data on incidents and devices.

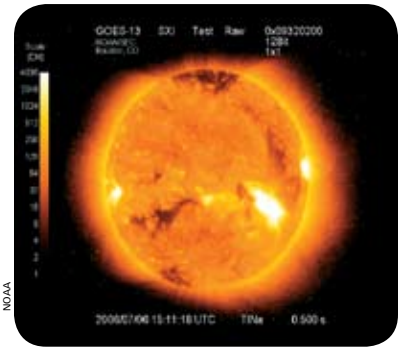
National Oceanic and Atmospheric Administration (NOAA)

Aerospace's long-term technical and programmatic support to NOAA continues for both national and international activities. Primary programs supported include: the Geostationary Operational Environmental Satellite (GOES) and the Polar Operational Environmental Satellite (POES). Aerospace provided extensive support to the next generation of satellites for these programs, GOES-R and National Polar-orbiting Operational Environmental Satellite System, and participated in the program definition and risk-reduction phases for new acquisitions of spacecraft, instruments, and ground processing. Support was also provided to the Jason, a US-European ocean-topography satellite, and the Meteorological Operational Satellite Program (MetOp), a European weather and environmental satellite.

In addition, NOAA requested that an Aerospace staff member serve as a test director during the launch and checkout of the GOES-13 satellite. Another Aerospace employee was selected by NOAA to lead the validation and verification effort for the end-to-end flow of MetOp data. Aerospace continued development of a prototype data-distribution system called alternative dissemination methods (ADM). The ADM will collect, format, and distribute environmental data to worldwide users through digital video broadcast signals or the Internet. Aerospace also developed a prototype satellite ground-receive capability called the Multi-Constellation User Terminal, capable of receiving data from many environmental satellites. Aerospace continued to provide technical support to NOAA's strategic and global planning activities including an integrated Earth observation system architecture and NOAA's contributions to the international Global Earth Observing System of Systems. Aerospace also assisted NOAA in their contributions toward developing a national-security space environmental monitoring architecture.

NASA Goddard Space Flight Center (GSFC) – Lunar Relay Satellite Study

Aerospace led the architecture and system engineering activities for the short-term Lunar Relay Satellite study at NASA Goddard Space Flight Center. Commissioned by NASA's Exploration and Space Operations Directorates, the study's objectives are to develop viable, affordable relay system and satellite architectures that would enable communication to the South Pole of the Moon all or most of the time. These architectures



NOAA

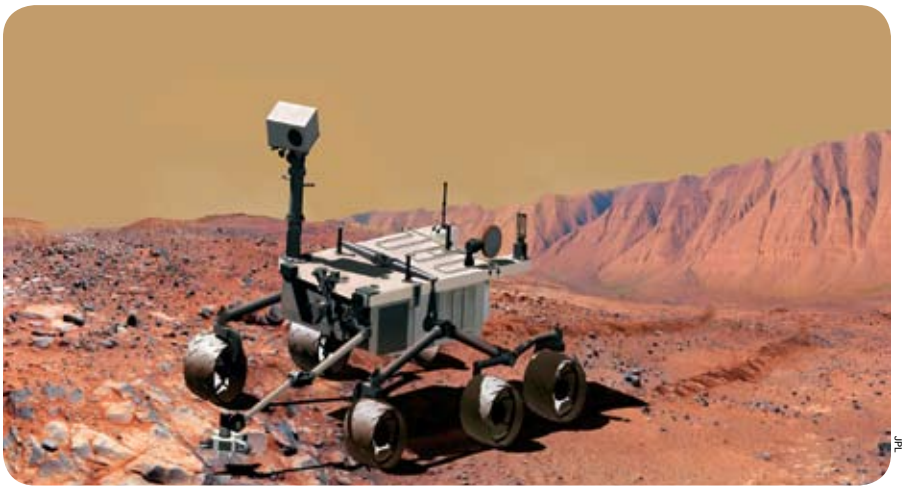
Dramatic first image from the GOES-13 Solar X-ray Imager (SXI)

Aerospace continued to provide technical support to the National Oceanic and Atmospheric Administration's (NOAA) strategic and global planning activities, including assistance with the development of a national-security space environment monitoring architecture.

are primarily intended to support the Lunar Precursor Robotic Missions in the 2010-2020 timeframe, but have the potential to provide a path to support NASA's Constellation missions. Aerospace is providing technical guidance to the combined study team consisting of GSFC, JPL, Glenn Research Center, and the Applied Physics Laboratory in the areas of service requirements, payload design, and operation. Aerospace is providing expertise in the key areas of launch vehicle performance, optical communications, RF communications, and ground networking. The Lunar Relay Satellite study will provide NASA management with information on design trades, system costs, and risks as a function of service capability levels.

Aerospace is playing a key role in the success of Jet Propulsion Laboratory's (JPL) 2009 Mars Science Laboratory (MSL) mission that will use precision landing to sample surface material at several locations.

JPL



JPL

NASA Jet Propulsion Laboratories (JPL) – Mars Science Laboratory (MSL) Support

Aerospace is playing a key role in the success of JPL's 2009 MSL mission that will use precision landing to sample the surface material at several locations. MSL has completed Phase B and is ramping up on the spacecraft development phase. The payload is much larger than on previous Mars missions, and the rover is expected to have a one-year minimum mission life. Aerospace's support to the MSL Project Office is similar to that provided to the Mars Exploration Rover mission. Aerospace is participating in instrument review boards and hardware reliability analyses, and is performing risk management, including developing hardware fault trees and performing Failure Modes and Effects Analyses on complex components that are critical to mission success. Aerospace has presented its results at risk reviews and the MSL Preliminary Design Review. Aerospace structural experts have also developed Adams software simulations for the entry and descent phases of this mission, and are sharing lessons learned to assist in MSL tribology applications.

JPL

NASA Jet Propulsion Laboratories (JPL) – Deep Space Network (DSN)

Aerospace performed studies for the DSN to address current technical challenges and support planning for future network upgrades. Aerospace performed an assessment of the DSN's current maintenance program and demonstrated an analytical capability for determining its reliability based on existing operational data and supported the DSN's move to a reliability-centered maintenance program. Aerospace also performed an architecture-level study to assess costs for implementing JPL's concept for a future Deep Space Network Array. In this concept, the existing DSN antenna assets would be replaced with arrays of smaller-diameter antennas, which would support the greatly increased downlink data rates anticipated for future deep space missions.

Aerospace conducted studies for NASA Jet Propulsion Laboratory's (JPL) Deep Space Network (DSN) to address current technical challenges and support planning for future network upgrades.

JPL

Aerospace performed an architecture-level study for implementing JPL's concept for a future Deep Space Array Network.

JPL

NASA Johnson Space Center (JSC) – Foam Debris Task

Aerospace continued various analyses and tests to assist the NASA Johnson Space Center (JSC) in making as informed a flight decision on foam debris as possible. Support to the Space Shuttle Systems Engineering and Integration Office at NASA JSC began as an STS-114 return-to-flight activity, and has expanded in depth and scope for STS-121 and beyond. Aerospace contributions include: implementation of an integrated damage/risk validation plan to assess the overall foam hazard, building from external tank (ET) imagery to account for historical foam loss and overall validation using actual Orbiter damage data; exposure of weaknesses in assessing risk to the Orbiter from ascent foam, resulting in improved damage/risk models needed for small debris; working with NASA to collect comprehensive Orbiter damage data; development of an ET foam combined environments wind tunnel test program to characterize crushed foam failure modes; and development of a database for rapid analysis response. Aerospace was also a key contributor to the STS-121 Debris Verification Review, reporting on analysis results and receiving additional actions from the NASA Associate Administrator for Space Operations.

Aerospace employees have made numerous contributions to analyses of foam debris.

NASA Headquarters (HQ) – Office of Program Analysis and Evaluation (PA&E)

Aerospace has performed several studies for PA&E that span the entire NASA agency and are intended to assist the NASA Administrator in making key strategic decisions for the agency. One study consisted of evaluating the costs and logistics of environmental test chamber options for the James Webb Space Telescope (JWST) project and major elements of the Constellation program. One major finding was that the time and cost to clean and re-clean a test chamber to optical testing standards for JWST after use by Constellation hardware would lead to schedule risk for both programs if they attempt to share one chamber. This conclusion may have a major impact on NASA test facility decisions. Aerospace assessed the organizational readiness of various NASA centers to support the Vision for Space Exploration initiative. In addition, Aerospace is supporting a study to detect, characterize, and study near-Earth objects. NASA Headquarters frequently asks Aerospace to perform independent studies and analysis on important topics, and has a five-year contract with us to ensure availability of such support.


JPL

NASA Jet Propulsion Laboratory (JPL) – Stardust

Stardust was launched in February 1999. It passed about 300 kilometers in front of Comet Wild-2 in January 2004 through a halo of gas and dust jetting from the comet's nucleus, trapping particles in a tennis-racket-sized frame filled with blocks of Aerogel. Aerogel is a stiff, but light, substance sometimes called "solid smoke." The Stardust sample return capsule (SRC) arrived back on Earth in January 2006 after a seven-year interplanetary


JPL

The Aerospace Corporation, through its ongoing contract with NASA's Jet Propulsion Laboratory (JPL), provided an independent review of the Stardust program's re-entry break-up and casualty analysis.

odyssey with a load of extraterrestrial material including the first samples ever collected from a comet. The particles from the SRC were recovered from their Aerogel collectors and sent worldwide from Johnson Space Center in Houston, Texas, to participating labs for analysis.

In the months leading up to the capsule's return to Earth, Aerospace, through its ongoing contract with the Jet Propulsion Laboratory, provided an independent review of the Stardust program's reentry break-up and casualty analysis. Aerospace helped assess requirements regarding its predictions, and reviewed analysis and test results. Aerospace also supported risk reduction and problem prevention, and participated on the review boards for the SRC Recovery, Safety and Mission Assurance, SRC Separation Sequence, and Earth-Return Spacecraft Operations.

As a member of the independent recovery team (IRT), Aerospace reviewed the recovery procedure and provided comments after studying a series of recovery exercises at Dugway Proving Grounds in Utah in October 2005. In December 2005, the IRT also monitored the canister drop test, which was the final recovery team exercise prior to actual reentry.

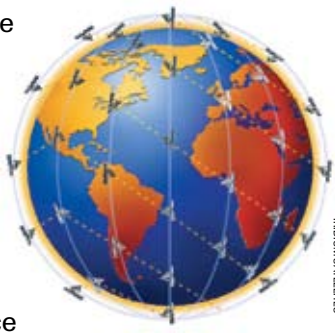
Aerospace assisted the United States Geological Survey (USGS) with two Landsat-5 satellite operational recoveries, which resulted in the AIAA awarding the Space Ops Award for Outstanding Achievement for 2006 to key members of the USGS anomaly investigation teams, including two Aerospace Corporation members of the technical staff (MTS).

United States Geological Survey (USGS) – Landsat 5 Recovery

USGS operates the Landsat 5 and Landsat 7 missions, and will operate the follow-on mission planned for launch in 2011. Landsat 5 continues to operate in its LEO orbit 19 years beyond its three-year design life, and the frequency of anomalies has risen. In 2005, Aerospace helped identify high friction as the cause of crippling solar array drive problems and implemented an operational fix that allowed operations to resume. In 2006, Aerospace supported resolution of an over-current issue with a TWTA that threatened to prevent transmission of data to the ground. In recognition of the achievements represented by these two Landsat 5 recoveries, the AIAA awarded the key members of the USGS anomaly investigation teams the International Space Ops Award for Outstanding Achievement for 2006. Two Aerospace MTS were included among the 10 named in this prestigious award.

Iridium Wear-Out Study

The Iridium constellation consists of 66 active low-Earth orbiting (LEO), crosslinked satellites and has multiple on-orbit spares. The constellation operates as a fully meshed network and is the largest commercial satellite constellation in the world. Aerospace supported Iridium on a variety of tasks, projecting the lifetime and future performance



IRIDIUM SATELLITES

of the existing satellite constellation. Aerospace built reliability models starting at the satellite component level and moved to building and validating system-level models for the entire constellation. Aerospace models are used to provide an estimate of constellation network availability as a function of mean wear-out lifetime. Lifetime estimates are based upon satellite reliability models developed by Aerospace. Analysis included incorporation of constellation performance requirements, satellite performance capabilities, failure data, solar array trending data, required power, engineering reliability models, and satellite design data. Aerospace continues to support Iridium in developing methods for optimizing the constellation's performance with respect to voice and data services, while also supporting Iridium's satellite replenishment planning.

International Commercial Support

U.S. export laws impose significant restrictions on international organizations to keep them from gaining technical insight into the development of systems purchased from U.S. manufacturers. As an objective entity working free from any conflicts of interest, Aerospace acted as a trusted agent to provide international clients with in-plant evaluations during the development of spacecraft systems and components. Aerospace supported EADS Astrium on a variety of tasks in 2006. EADS Astrium, a European company, is one of the largest satellite manufacturers in the world. All of these tasks supported EADS Astrium's acquisition of U.S.-made satellite hardware. Aerospace supported several anomaly investigations that involved U.S.-made hardware. In these situations, Aerospace worked directly with U.S. vendors to verify flightworthiness of various hardware. Aerospace also led a joint failure investigation team that included EADS Astrium and Boeing Space Systems.

NASA Johnson Space Center (JSC) – Tin Whiskers Task

Aerospace greatly raised the awareness of the Space Shuttle Program Office to the risk of avionics failure from tin whisker development and electrical shorting. Tin whiskers are electrically conductive, crystalline structures of tin that form and grow on surfaces that use tin as a final finish. Aerospace presented a tin whisker dissenting opinion to the Space Shuttle Program Requirements Control Board and STS-121 Safety and Mission Success Review (SMR). Aerospace argued that without comprehensive inspection of avionics boxes, insufficient data existed to determine risk. As part of this dissenting opinion, Aerospace also presented concerns about catastrophic failure due to metal vapor arcing, and provided NASA with new data via independent testing in Aerospace laboratories. Aerospace concerns were documented as part of the NASA Orbiter Project Office position at the STS-121 Flight Readiness Review.

NASA

NASA Johnson Space Center (JSC) – Lightning Protection Assessment Task

Aerospace provided the NASA Shuttle Program with an independent lightning assessment of the Space Shuttle fleet and its supporting infrastructure. Working with the Shuttle Program Systems Engineering and Integration Office, the JSC Engineering Directorate, Lightning Technologies, Inc., and other elements of the Space Shuttle Program, the lightning assessment team focused on reviewing the susceptibility and vulnerability of the fleet to lightning strikes and attachments at the different mission phases. The team evaluated changes and upgrades to the fleet and supporting infrastructure since the previous lightning assessment, which was completed in 1988. The team also evaluated vulnerabilities of the vehicle to the direct and indirect effects of lightning attachments. In addition, the assessment included evaluation of launch commit criteria, flight rules, lightning protection systems, lightning effects instrumentation, and system retest criteria.

NASA Langley Research Center (LaRC) – Exploration Technology Development Program (ETDP) Support

The ETDP at NASA Langley explores new technologies for potential insertion into NASA's Constellation Program. One such research endeavor, the Radiation Hardened Electronics for Space Environments (RHESE) project, will expand the current state-of-the-art in radiation-hardened electronics to provide Constellation with high-performance devices robust enough to withstand the demanding space environment. Capabilities developed in this project will support both lunar and Mars exploration missions. Aerospace conducted an independent review of the RHESE project and its nine research activities for NASA Langley, assessing the technical performance, cost, and schedule risks.

Federal Bureau of Investigation (FBI)

Since July 2005, Aerospace has provided technical support to the FBI for the SENTINEL acquisition. Initially, this support focused on the definition of roles and responsibilities for both FFRDC and contractor staff support to the Bureau's program office. In addition to organizational guidance, Aerospace was requested to provide primary leadership and execution of all necessary acquisition package materials, including acquisition strategy and independent cost and schedule estimates.

Beginning in the late fall 2005, Aerospace began providing dedicated support of the SENTINEL Program Office, including program management, systems development, program integration, and transition. This support continues today, with significant resources being applied to technical and programmatic reviews as the SENTINEL capability proceeds through preliminary design.

People Committed to Excellence

achievement award

The annual President's and Trustees' Distinguished Achievement Awards pay homage to employees for their exemplary accomplishments in science, engineering, and related technical fields.

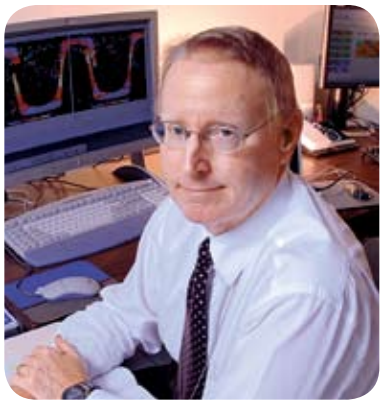
Whether their efforts are in support of the U.S. Air Force, another branch of the military, or a government agency, they represent the highest commitment to the corporation's values of **technical excellence**, **objectivity**, **integrity**, and **dedication to mission success**. It is through such efforts that the corporation's values continue to thrive.

2006 Trustees' Distinguished Achievement Award

Donald Boucher received the 2006 Trustees' Distinguished Achievement Award, the corporation's highest honor.

Boucher was recognized for outstanding **technical** leadership in recovering functionality of a new Defense Meteorological Satellite Program (DMSP) sensor in support of critical national programs.

Boucher was honored for providing outstanding **technical** leadership to successfully deploy and bring into operation the first state-of-the-art conically scanning Special Sensor Microwave Sounder (SSMIS), launched on the DMSP F-16 satellite in October 2003.



He led a national team of government, industry, and university experts to overcome mission-ending anomalies during early-orbit deployment, identify performance-limiting design flaws, and successfully complete a challenging and path-finding 18-month sensor calibration and validation effort on schedule.

His leadership and technical contributions were crucial to the transition of this new $40-million-plus sensor to operational use, and provided timely lessons learned to benefit the next-generation microwave imager/sounder sensor on the National Polar-orbiting Operational Environmental Satellite System (NPOESS).

Our Corporate Values

TECHNICAL EXCELLENCE ◎ OBJECTIVITY ◎ INTEGRITY ◎ DEDICATION TO MISSION SUCCESS ◎ COMMITMENT TO OUR PEOPLE

Dr. Joseph Fennell was recognized for developing a scientific understanding of spacecraft charging and its effect on space systems.

Fennell has successfully built upon his world-class understanding of magnetospheric physics and the space environment to develop an unrivaled corporate expertise in understanding all aspects of spacecraft charging. His **dedicated** and thorough work has produced the scientific basis for understanding the causes, signatures, and mitigation of charging effects on spacecraft. He provides indispensable expertise for anomaly investigations. His expertise in mission design has resulted, in many instances, in the avoidance of charging-related anomalies.

The corporation's discovery that charging is an important causative factor in a large portion of environmentally related spaceborne anomalies has caused mission designers to be ever more cognizant of these issues. Fennell is responsible for many aspects of this discovery, as well as developing ways to mitigate the problems through design.

The team of **William Fruland**, **Kenneth Kowalski**, **Terrence Ladau**, and **Martin Oetting** was recognized for their sustained **technical** and programmatic leadership in providing combat forces with an integrated, worldwide Blue Force Situational Awareness (BFSA) capability.

The team collectively provided a critical leadership and oversight role in a broad spectrum of activities to address gaps in BFSA capabilities. These efforts included analyzing emerging BFSA collection and dissemination requirements, assessing coalition partner needs, developing operational and technical concepts to meet critical warfighter needs, directly participating in the development, demonstration, and rapid operational fielding of a capability to provide integrated joint BFSA on a worldwide scale.

The team played overarching and defining roles in migrating and expanding existing architectures used in highly restricted applications

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by select users to an integrated, comprehensive BFSA capability for joint, inter-agency and multinational coalition combat forces. The team's multifaceted effort included studies and analyses of material space segment alternatives, establishing system-level functions and performance parameters that led to technology demonstrations and subsequent rapid-prototyping, deployment, operational test and evaluation, and operational implementation.

Through the team's concentrated efforts, and the focused attention of the highest levels of Defense Department leadership, a remarkable capability has been delivered to U.S. combat forces.

Matthew Hart, **Debra Emmons**, **Dr. David Bearden**, and **Robert Bitten** were recognized for providing critical analysis of alternatives for the Hubble Space Telescope Servicing and Repair Mission.

The team led a Hubble Space Telescope (HST) Servicing Analyses of Alternatives (AoA), developing the critical finding that a robotic servicing **mission** could not be developed in time and within the available budget before HST would become nonserviceable. This work demonstrated Aerospace at its best, advising the U.S government on a critical space project, and backing up recommendations with hard technical evidence and programmatic/risk analysis.

The AoA was the subject of unprecedented visibility, scrutiny, and political interest at the highest levels of the government, culminating in testimony before Congress. Results were presented to then-NASA Administrator Sean O'Keefe and Dr. Mike Griffin prior to his appointment as NASA administrator, influencing the policy change that ended consideration of robotic servicing and brought a shuttle-servicing **mission** back into consideration. The study's findings clearly demonstrated that in all likelihood a robotic servicing **mission** could not be developed in sufficient time to prevent the Hubble telescope from lapsing into an unrecoverable state.

Typically AoA takes months to years and many millions of dollars to arrive at useful information for decision-making. However, NASA's decision timeline was very short in light of HST's degradation. The team stepped up to this challenge. The National Research Council Committee noted that the corporation's analysis was "the only quantitative analysis" of the problem and the committee was grateful to have the AoA to assist in their deliberations.

Board of Trustees

2006

The Aerospace Corporation's board of trustees consists of prominent individuals from the business, scientific, academic, and public-service sectors. The board elects corporate officers and sets policy while supervising and directing the general management of the corporation. Corporate powers are exercised under its authority, as outlined in the Articles of Incorporation and Bylaws. From its inception the board has established and maintained stringent conflict-of-interest standards for its members and for the corporation's officers and employees.

Trustees are elected to three-year terms. Re-election is possible, but no member other than the president and chief executive officer of the corporation, who is elected annually by the board and is an ex officio member, may serve more than three consecutive terms.

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Corporate Leadership

2006 executive council

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Executive Vice President

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Vice President,
Chief Financial Officer,
and Treasurer

JOHN R. WORMINGTON
Vice President
Program Assessment

Financial Highlights

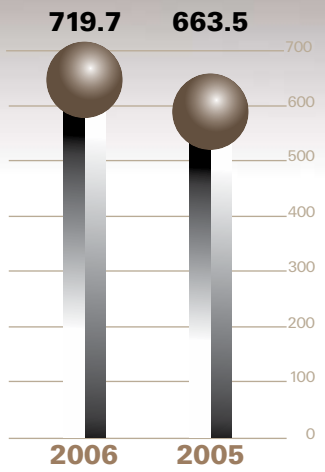
2006

Aerospace revenue from operations increased to $719.7 million in fiscal year 2006, up from $663.5 million in fiscal year 2005. This increase was primarily from FFRDC efforts for the Air Force and Department of Defense. Civil and commercial efforts, including those managed through the Air Force contract as well as those on separate contracts with Aerospace, resulted in revenues of $82.0 million (11.4 percent of total revenues) for fiscal year 2006, down from $83.0 million in fiscal year 2005. This decrease was primarily in the civil space arena.

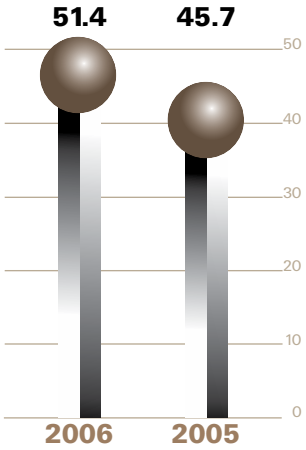
The corporation's independent auditors are Deloitte & Touche, LLP.

For a copy of the audited financial statements, please contact the chief financial officer, The Aerospace Corporation, P.O. Box 92957 - M1/064, Los Angeles, CA 90009-2957.

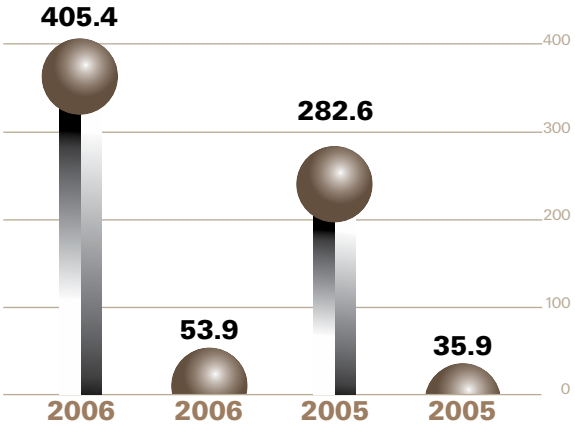
Revenue
(Dollars in Millions)



Net Cash Provided by Operating Activities
(Dollars in Millions)



Total Assets, Corporate Equity
(Dollars in Millions)



Corporate Headquarters and Offices

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