

**Commercial Space Transportation Advisory Committee**  
**October 31, 2002**  
**MEETING MINUTES**

COMSTAC Chair, Livingston L. Holder, Jr., convened the 36<sup>th</sup> meeting of the Commercial Space Transportation Advisory Committee (COMSTAC) at 8:46 a.m., and welcomed COMSTAC members and guests. He announced the tentative meeting dates for the 2003 COMSTAC meetings as May 22 and October 23. He also announced that a closed session of the Committee would take place later that day from 12 noon until 1:30 pm to hear a special national security briefing by Gil Klinger, director of Space Policy at the National Security Council. After members introduced themselves, Chairman Holder introduced the newly-appointed Administrator of the Federal Aviation Administration (FAA), Marion Blakey.

**Remarks by FAA Administrator Marion C. Blakey**

FAA Administrator Blakey's remarks focused on the contributions that the COMSTAC has made over the years to the Department of Transportation. She acknowledged several former members, including former astronauts Deke Slayton, Rick Hauck, Ron Grabe, and Ox Van Hoften. She also noted FAA's continuing work on the development of an integrated space and air traffic system and emphasized her support of this critical initiative.

**Report on AST Activities**

Patricia G. Smith, Associate Administrator for Commercial Space Transportation (AST) reported on the establishment of an AST field office in the Air Force Safety Office in Florida at Patrick Air Force Base, staffed by AST employee, Al Wassel. She added that the Air Force would be sending a launch safety representative to work in AST by Summer 2003. She also reported on FAA's Supplemental Notice of Proposed Rulemaking (SNPRM), noting that the comment period for the SNPRM had closed and that AST is now in the process of reviewing those comments received.

Ms. Smith reported six licensed launches for 2002, included the successful launch of Lockheed Martin's Atlas V Evolved Expendable Launch Vehicle (EELV) in August, adding that two additional launches are scheduled before the end of the year. She also reported on the development of an EELV Technical Expertise Program within AST, the publication of an Advisory Circular on Licensing Test Flight Reusable Launch Vehicle Missions, an environmental impact statement for the Oklahoma Space Industry Development Authority as part of its efforts to establish a commercial spaceport in Oklahoma, and the upcoming FAA Commercial Space Transportation Forecast Conference scheduled for February 11-12, 2003.

**The NASA Advanced Range Technology Working Group**

Philip Weber, program formulation manager for Spaceport/Range Technology for NASA Kennedy Space Center (KSC), reported on the background and status of the Advanced Range Technology Working Group (ARTWG) and the Advanced Spaceport Technology Working Group (ASTWG). He told the Committee that the working groups were

developed as a result of the Office of Science and Technology Policy and the National Security Council interagency working group to assess space launch ranges, which produced a report in February 2002 and which included a recommendation to identify a program on next-generation range technologies to improve safety, flexibility and capacity, and lower costs. He indicated that the ARTWG, which is co-chaired by Air Force Space Command and KSC, is developing a national roadmap for next-generation range technology development and includes representation from industry, state and federal governments, and academia. He added that the ARTWG will be a clearinghouse of information on range technology development, and the ASTWG, which is chaired by KSC, will be the clearinghouse for spaceport technology development.

Mr. Weber reported on the status of both working groups, indicating that the ARTWG, which has over 300 members, has its leadership in place and is on schedule for the development of its technology roadmap. He noted that the ASTWG is about six months behind this schedule. He noted that an ARTWG/ASTWG conference was held on September 23-27 hosted by Air Force Space Command. He included websites for both working groups: <http://artwg.ksc.nasa.gov> and <http://astwg.ksc.nasa.gov>. COMSTAC member Lou Gomez asked if their work included the development of space-related policy. Mr. Weber said policy is not the purview of Federal agencies.

#### **National Security Space Integration**

Col. Stanley Mushaw, chief of the Space Plans, Policy, and Strategy Division in the Office of the Under Secretary of the Air Force, reported on the National Security Space Integration (NSSI). Col. Mushaw pointed out that Peter Teets, Under Secretary of the Air Force, has been designated as the senior-level space advocate responsible for all DOD space programs (Air Force, Army, and Navy), as well as the Air Force space acquisition executive and the director of the National Reconnaissance Office. Col. Mushaw added that to handle this responsibility, Mr. Teets established the Directorate of National Security Space Integration, which is responsible for the development, coordination and promulgation of the National Security Space Strategy, the Annual National Security Space Plan, the Annual and Integrated Science and Technology Plan; and the identification and implementation of best practices to include streamlining the space systems acquisition process and coordinated budget programming.

Col. Mushaw also discussed several areas that the NSSI has been addressing, including the use of U.S. space launch ranges and bases and the related Air Force/FAA Memorandum of Agreement on Safety Roles and Responsibilities. He noted several recommendations, submitted by the FAA and the Department of Commerce reflecting commercial needs, including the demonstration and certification of GPS metric tracking capabilities and autonomous flight safety.

#### **Commission on the Future of the U.S. Aerospace Industry**

Charles Huettner, executive director for the Commission on the Future of the U.S. Aerospace Industry reported that the mandate for the Commission is to assess the industry overall including air, space, civil, military, and commercial. He reported that the Commission gathered information through public meetings and meetings with individual

companies in the U.S. as well as Europe and Asia. He noted that the Commission identified three aerospace deliverables: air transportation, space, and national security/homeland security and five "enabling pillars:" government, global markets, business, workforce, and research. He emphasized space as an important component for all five pillars. He told the group that the report would be available on November 18<sup>th</sup>.

#### **EELV Update: Atlas V**

Alison Fortier, Lockheed Martin's vice president for Space and Strategic Programs, provided an update on the Atlas V program, discussing the successful first launch of the Atlas V on August 21<sup>st</sup>. She noted that the launch vehicle was the Atlas 401 configuration, including a 4-meter payload fairing, a common core Centaur booster without solid rocket motors, the RL-10 engine and the Russian RD-180 engine. She also described the clean launch pad system and the vertical integration facility for the launch. Ms. Fortier noted that the lift-off for the Atlas V launch occurred without any count-down issues, all release systems performed as expected, the acoustic water suppression system performed well, and the injection of the satellite (Eutelsat's HOTBIRD 6) was so accurate that it provided an extra year and a half of on-orbit life.

#### **EELV Update: Delta IV**

Dan Marin, director for Delta Commercial Programs, The Boeing Company, discussed the upcoming launch of the Delta IV, scheduled for November 16, carrying the Eutelsat W-5 satellite. Mr. Marin also announced two additional launches for 2003, including the Delta II 7925 Heavy using Delta III solid motors, the Delta IV Medium as the first military EELV launch, and the first Delta IV Heavy at the end of 2003. He noted that the Delta IV includes the RS-68 engine (first stage), the RL-10B2 Pratt & Whitney engine (second stage) and a 4-meter composite fairing. He also summarized the launch preparations for the Delta IV launch, including the LOX loading test on July 31; the Liquid Hydrogen test on August 5; the first wet dress rehearsal on August 30; the spacecraft fit-check on September 7; and the flight readiness firing on October 14.

#### **DoD National Aerospace Initiative**

Dr. Ron Sega, director of Defense, Research, and Engineering in the Office of the Secretary of Defense, provided a briefing on DOD's National Aerospace Initiative (NAI). Dr. Sega described the NAI as an integrated, national approach to sustain American leadership in aerospace using a technology framework for high-speed flight, access to space, and space technologies. He described the attributes for technology transformation as increasing knowledge, agility, speed, and lethality and three technology transformation initiatives: the NAI, surveillance and knowledge systems, and energy and power technologies.

Dr. Sega's briefing included a detailed discussion of each of the three areas. Under the area of high-speed flight/hypersonics, he discussed the DARPA RASCAL Program, the DARPA Navy Scramjet research and development program, other international initiatives for the development of high-speed technologies, and Mach number development. Under access to space, Dr. Sega discussed the need for common system attributes to attain responsive space access and rapid global reach. Under space technologies, he discussed

four approaches: space control, responsive payloads, intelligence surveillance reconnaissance, and flexible communications.

COMSTAC Chair, Livingston Holder, asked whether there is a mechanism in place for the commercial space transportation industry to work with the NAI. Dr. Sega responded that most industry interaction has, so far, been carried out informally. Chairman Holder also asked how the NAI decided on the technologies to be investigated in the current funding-constrained environment. Dr. Sega responded that the initiative is currently pursuing fundamental work with costs decisions being coordinated among the federal agencies involved, including DoD, NASA, and NRO.

In response to a question from Mr. George Nield, (Orbital Sciences Corporation), regarding the initiation of a demonstrator program, Dr. Sega noted that even though demonstrators have yet to be funded, some programs have already been initiated, including DARPA's RASCAL program. COMSTAC member John Logsdon asked about the organization and management of the NAI. Dr. Sega explained that it is managed through an umbrella approach with DoD, NRO, and NASA. Chairman Holder asked whether the NAI is carrying out any activities for K-12 students and Dr. Sega explained that the NAI is working with NASA university consortia to develop programs to interest students in math and science.

#### **DARPA's RASCAL Program**

Preston Carter, director, RASCAL Program, Defense Advanced Research Projects Agency (DARPA), briefed the Committee on the Responsive Access, Small Cargo, Affordable Launch (RASCAL) Program. Mr. Carter explained that the RASCAL program addresses the need for more small spacecraft launch capability through the development of a supersonic, air-launched launch vehicle that could place 50 kilograms into low Earth orbit (LEO), anytime and at any inclination, at a cost of approximately \$750,000 per launch event. He described the RASCAL launch event which uses enabling engine technology called mass injection pre-compressor cooling (MIPCC), which would power the reusable first stage, and at Mach 4, go exoatmospheric to eject the expendable second and third stages. He noted that the first stage is free from launch pads and ranges, able to access all inclinations, and resilient against launch denial; the second and third stages have improved performance at lower costs, designed without aerodynamic constraints, and require no payload fairing. He reported that the RASCAL Program is in the System Design phase, which is the first of three phases. Mr. Carter also discussed the cost-lowering aspects of the RASCAL program.

COMSTAC member Lou Gomez inquired about the site for the demonstration tests and Mr. Carter replied that the program would select the lowest bidder. COMSTAC member Billie Reed asked about the development time line and was advised that flight testing would take place in late 05 and actual orbit activities in early 06. Chairman Holder asked about the commercial market demand analysis for the payload sizes in question. Mr. Carter replied that there were several niche markets including microsat constellations that are perfect for the RASCAL program to launch quickly and cost effectively.

## Special Segment: The States and Space

### California

Andrea Seastrand, executive vice president for Policy, Legislation and Government Relations for the California Space Authority (CSA) updated the Committee on the status of the California Spaceport and other space activities taking place in California. She discussed CSA's role and responsibilities and noted that CSA is a statewide, non-profit mutual benefit corporation, a membership-based "enterprise" association, the space advisor to the state of California and its congressional delegation, California's Spaceport Authority; an administrator of state and federal grant funds, a provider of contract services, but not a launch site operator. She reported that CSA has offices in Sacramento, Santa Maria, and in the future, Los Angeles. She also reported on several major accomplishments of CSA, including the establishment of the California Space Infrastructure Program and the initiation of a 2-year, \$8.5 million infrastructure evaluation. Ms. Seastrand also discussed CSA's strategic purpose to retain, grow, and create California's space enterprise and its strategic objectives to become the most valued voice of California space enterprise retention, growth, and creation; to build CSA identity, credibility, and influence to the point where the strategic purpose can be accomplished; and to make California's space enterprise a "must-keep" industry.

### Florida

Edmond Gormel, executive director, Florida Space Authority (FSA), discussed the current status of the FSA, noting that it was established in 1989 as a subdivision of the state government for the purpose of developing and implementing a strategy to accelerate the growth of space-related opportunity for business education and government. He told the Committee that the FSA has developed \$600 million in new space launch and space enterprise facilities. He outlined FSA's vision of Florida as the world's premier center for space enterprises (i.e., transportation, commerce, research, education, and policy). He also described FSA's roles as the space transportation authority for planning and building new facilities and systems; the space economic development organization for providing world-class business climate and services; the intellectual infrastructure developer to create space research, education and technology partnerships with industry and academia; and the state space agency coordinating strategies for infrastructure, business growth, education, and policy.

### New Mexico

Brig. Gen. Hanson Scott, USAF (Ret), executive director, Southwest Regional Spaceport (SRS), reported that the Office of Space Commercialization was established in 1994 to manage and coordinate the promotion and marketing of space activities including the development of SRS. He discussed the advantages of the Upham site for launch and recovery, including terrain elevation which improves payload to orbit; favorable latitude for equatorial orbits; outstanding weather; and favorable launch trajectories to all orbital inclinations. He added that New Mexico has a strong tradition of supporting science and technology programs and varied institutional resources such as Sandia and Los Alamos National Laboratories, University of New Mexico Centers for High-Technology Materials and Non-Invasive Diagnostics, New Mexico Institute of Mining and

Technology Center for Explosive Technology Research, New Mexico State University Physical Science Laboratory, Kirtland AFB, Holloman AFB, and White Sands Missile Range.

General Scott also reported on the status of several major issues including flight safety, the Memorandum of Agreement signed with White Sands Missile Range in 1997, the application for an FAA commercial launch site license, the water requirements for SRS, the development of a finance plan for SRS, land issues, and political support. He also noted that New Mexico has established a Commercial Space Team made up of the New Mexico Space Commission, the Southwest Space Task Force, White Sands Missile Range, New Mexico State University (CASTE), University of New Mexico (OSER), New Mexico Tech, and several contractors including Ares Corporation, GRAM Inc., General Kinematics Corporation, and RBC Dain Rauscher.

### Oklahoma

General Jay Edwards, executive director of the Oklahoma Space Industry Development Authority (OSIDA), discussed OSIDA's mission and the Oklahoma Spaceport. He noted that OSIDA was tasked by the state to build a spaceport and to become the fourth leg on Oklahoma's economic stool, along with gas, agriculture, and aviation. He reported that the spaceport, which is located on the former Clinton-Sherman Air Force Base, is ready to operate and looking for a launch vehicle customer. He described the facilities, including 2700 acres of inland property, a manufacturing facility, 168 sq. mile spaceport territory for further construction, a 13,500 ft. runway, on-site medical facilities, over 300 flying days per year, five bunkers, a firing range, a control tower, and a railspur that comes onto the facility.

General Edwards noted that OSIDA is governed by a seven-member board and is staffed by five employees. He reported that the spaceport is working on the Environmental Impact Statement with the FAA and space and air traffic issues. He also reported on the types of incentives being offered by the state for potential spaceport customers, including a Quality Jobs Program and a \$15 million tax credit for companies that can meet certain requirements. He listed the current barriers for the spaceport including perception regarding inland spaceports, licensing, need for better incentives, indemnification, funding, and the need for RLV technology.

### Virginia

Dr. Billie Reed, executive director, Virginia Commercial Space Flight Authority (VCSFA), emphasized the dire economic situation for the state of Virginia, noting that 1,877 state employees were terminated on that afternoon. He reported, however, that the budget for the VCSFA was reinstated. He also reported on the status of the Virginia Commercial Spaceport noting that the FAA Launch Site Operator's License renewal is in progress; that \$6.8 million in launch range improvements have just been completed; and that a new \$2.2 million payload processing and integration facility is under construction. He also reported that the VCSFA has been designated by Congress as NASA's Test and Demonstration Site for new launch vehicles and technologies and that the Space Flight Academy is flourishing with 188 students in Summer 2002. Dr. Reed mentioned that a

new, experimental small launch vehicle is currently on the pad at the Virginia Spaceport because the launch has been scrubbed several times, noting that the Virginia facility is ideal for this type of situation. He concluded his presentation by pointing out some of the challenges for the Virginia spaceport and the industry overall, including weakness in U.S. space business and in the economy and resulting State funding pressures, increased insurance costs post 9/11/20, lack of meaningful outcomes in major government space transportation initiatives to achieve lower cost space access, increased competition from subsidized foreign providers, and lack of interest in commercial space by the Administration.

### Working Group Reports

#### ***Risk Management***

John Vinter, president/chief executive officer, International Space Brokers, Inc., presented the Risk Management Working Group (RMWG) report. He focused on the RMWG's review of FAA's liability study, ***Liability Risk-Sharing Regime for U.S. Commercial Space Transportation***. He reported that the RMWG agrees with the findings for questions one through six: (1) that the current regime is adequate, appropriate, effective, and needed; (2) that non-U.S. competitors of launch providers offer similar or superior risk-sharing regimes to their customers and many include unlimited government indemnification with no sunset provision; (3) that space transportation activities should not be deemed ultrahazardous because it would negatively affect the insurance market; (4) that the U.S. is afforded financial protection in meeting certain international treaty obligations at no cost to the taxpayer; (5) that it is premature to offer recommendations on transitioning the risk-sharing regime for RLVs to that of airlines; and (6) that no changes to the risk-sharing regime as it relates to commercial spaceport activities is advisable. Mr. Vinter reported that for question 7, the RMWG addressed the five alternatives and modifications to the current regime and found that the alternatives, i.e., trust funds, self-insurance, captive insurance, catastrophe bonds, and publicly-subsidized insurance/tax subsidies and the modifications were inappropriate. He noted the RMWG recommendation to maintain the current regime with one enhancement, i.e., delete the sunset provision or extend application of indemnification authority for an additional period of 10 years. He added that the RMWG requests that the COMSTAC communicate the above recommendation to the Secretary of Transportation and ask that the Secretary propose and support legislation in 2003 to implement this recommendation. The full Committee adopted the recommendation.

Mr. Vinter also reported on the state of the insurance industry noting that the rate has doubled (one launch in a year for 15-18 percent) and that currently there are about \$1.5 billion of losses still to be resolved. He noted, however, that the market is relatively stable and that a \$300 million satellite could still be insured.

#### ***Technology and Innovation***

Bill Tosney, The Aerospace Corporation, provided the report for the Technology and Innovation Working Group (TIWG), standing in for TIWG Chair, Dr. Alex Liang. He reported on the meeting held on Wednesday and focused on the GSO report for which the

TIWG has responsibility. He reported that the TIWG is considering a change in methodology, including a change in the realization factor analysis to include the first 3 years of demand forecast; formatting charts and sections of the forecast to increase utility and clarity, and asking the FAA to solicit user input on the utility and suggested improvements for the forecast. Mr. Tosney noted that the survey letter for the forecast would be sent by the end of December 2002 or the first of January 2003 and that the draft report would be sent to the full Committee approximately one month prior to the May meeting.

### ***Reusable Launch Vehicles***

Michael Kelly, chairman, Kelly Space & Technology, Inc., provided the report for the Reusable Launch Vehicle Working Group (RLVWG), discussing the issues and presentations at the RLVWG meeting on Wednesday. He noted that the working group had not come to agreement on the issue of E<sub>c</sub> and that no winner has yet been selected for an alternative to the term "reusable launch vehicle." Mr. Kelly announced the establishment of a program at San Bernardino International Airport to establish a jet and rocket engine test facility that will be available to commercial and government programs, under a \$10 million California Space Infrastructure Program. He added that the program is a partnership with Kelly Space & Technology, the Air Force Research Lab, the Inland Valley Development Agency, the San Bernardino Airport and several contractors. Mr. Kelly also listed several action items for the RLVWG, including working with AST to identify reentry characteristics of various types of RLVs for AST's operation and maintenance analysis.

### ***Launch Operations and Support***

Darren Buck, project lead, Florida Operations, United Space Alliance, provided the report for the Launch Operations and Support Working Group (LOSWG), reporting on the Wednesday meeting. He reported on the LOSWG's feedback on AST's security report, noting four recommendations by the working group to benchmark existing threat assessments; to coordinate/crosstalk with other agencies; that additional regulations are currently unnecessary; and to utilize established security discussion forums such as the American Society for Industrial Security.

Mr. Buck also discussed the LOSWG's work with the Air Force on commercial range requirements and reported that the LOSWG's ELV Safety subcommittee, led by Sri Iyengar of Lockheed Martin, will be conducting monthly telecons over the coming year.

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With the conclusion of the working group reports, Chairman Holder adjourned the meeting.



Livingston L. Holder, Jr., Chairman, COMSTAC

**ATTENDEES****COMSTAC Members**

Livingston Holder, COMSTAC Chairman, Andrews Space & Technology  
Eleanor Aldrich, American Institute of Aeronautics and Astronautics  
Darren Buck, United Space Alliance (Alternate for William Pickavance)  
Elaine David, Lockheed Martin (Alternate for Mark Albrecht and Thomas Marsh)  
Frank DiBello, Space Finance Corporation  
Steven Flajser, Loral Space and Communications, Ltd.  
Jeff Foote, Alliant Aerospace Propulsion Company  
Patricia Fresh, MoonSpace  
Louis Gomez, New Mexico Office of Space Commercialization  
Charles Hall, American Airlines  
Michael Kelly, Kelly Space & Technology, Inc.  
John Logsdon, George Washington University  
George Nield, Orbital Sciences Corporation (Alternate for Mark Bitterman)  
James Pagliasotti, JMP Associates, Inc.  
Billie Reed, Virginia Commercial Space Flight Center  
William Tosney, The Aerospace Corporation (Alternate for Alex Liang)  
John Vinter, International Space Brokers  
Hamet Watt, OrderbyTV, Inc.  
Jay Witzling, The Boeing Company (Alternate)

**FAA/Associate Administration for Commercial Space Transportation**

Patricia G. Smith, Associate Administration for Commercial Space Transportation  
Michael Chan  
Kelvin Coleman  
Christopher Draper  
Carole Flores  
Sheila Helton-Ingram  
Chuck Kline  
Chuck Larsen  
Rebecca Martin  
Camilla McArthur  
Michelle Murray  
Brenda Parker  
Edward Springer  
John Weglian  
Kenneth Wong

**Meeting Attendees**

Bob Anderson, The Boeing Company  
Paul Armbruster, FAA/ARS-200 (Aerospace Weather)

Jason Andrews, Andrews Space & Technology  
George D. Baker, NASA  
Jack Bertron, FAA/AFS-430  
Robert R. Bocek, The Boeing Company  
Owen Brown, Booz Allen Hamilton  
Tim Brown, U.S. Air Force  
Bruce Bulin, FAA/ARS-200  
Mark Cantrell, Kelly Space & Technology, Inc.  
Preston Carter, DARPA  
Trip Carter, Colorado Governor's Office  
David Cavossa, Satellite Industry Association  
Suzy Chambers, Arianespace, Inc.  
I-Shih Chang, The Aerospace Corporation  
Major Jeff Davis, Air Force Space Command  
Janice Dunn, California Space Authority  
Dennis Eben, Lockheed Martin Corporation  
Betty Falato, FAA/ASD  
John Falker, Crown Consulting  
Jeff Feigo, NCSS  
Jay Finch, SAF/USI  
Sean Fleming, Zuckert Scoutt & Rasenberger LLP  
Alison Fortier, Lockheed Martin  
Jeff Foust, Futron Corporation  
John Gantt, Mizrack & Gant  
Edmond Gormel, Florida Space Authority  
Jeff Greason, XCOR Aerospace  
Ethan Haase, International Launch Service  
Bernard Ray Hawkins, The Aerospace Corporation  
Wayne Hayes, HQ Air Force Space Command  
Lynn Heninger, ATK  
Thor Hogan, The Rand Corporation  
Tim Huddleston, State of Alabama  
Sri Iyengar, Lockheed Martin Corporation  
Michael Kerr, Praxair, Inc.  
Sid Kimhan, Practical Innovations  
Paul Korkemaz, Honeywell Corporation  
Ted Kronmiller, Law Office  
Larry Lesppa, ASTi  
Bruce Mahone, Aerospace Industries Association  
Matthew Maniscalco, JP Aerospace  
Dan Marin, The Boeing Company  
Jared Martin, The Aerospace Corporation  
McElligott, U.S. Air Force / XOSR  
Neal Milburn, Armadillo Aerospace  
Clay Mowry, Arianespace, Inc.  
Col. Stan Mushaw, Office of the Under Secretary of the Air Force

Christopher Myers, Lockheed Martin Corporation  
Frederic Nordlund, European Space Agency  
Bob Parker, Dyn Space  
Nat Patel, Aerospace Corporation  
Don Pettit, AeroThermal Tech, Inc.  
Tony Piantes, Aerojet  
Stacie Pillans, Marsh  
Justin Pinkham, Booz Allen Hamilton  
Ian Pryke, European Space Agency  
Craig Salvag, NASA  
Chuck Sammons, Space Adventures  
Franceska Schroeder, Pillsbury Winthrop LLP  
B. Gen. Hanson Scott, New Mexico Office of Space Commercialization  
Andrea Seastrand, California Space Authority  
Dr. Ronald Segal, Department of Defense  
Nancy Sheliga, Reed Smith  
Ron Schena, ASTi  
Robert Siebold, The Aerospace Corporation  
Frank Sietzen, Space Transportation Association  
John Sigona, U.S. Department of Transportation  
Darin Skelly, NASA, Kennedy Space Center  
Phil Smith, Futron Corporation  
Tom Stagliano, ITT-AES  
Hank Sterbenz, ITT Industries  
Troy A. Thrash, Futron Corporation  
Paula Trimble, U.S. Department of Commerce  
Victor Villhard, Booz Allen Hamilton  
Philip Weber, NASA Kennedy Space Center  
Erwin Williams, FAA/ARS-200