

Commercial Space Transportation

QUARTERLY LAUNCH REPORT

Special Report:

Space Transportation Forecast Conference, February 10-11, 1998)



2nd Quarter 1998

United States Department of Transportation • Federal Aviation Administration
Associate Administrator for Commercial Space Transportation
800 Independence Ave. SW Room 331
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FAA'S FIRST NATIONAL COMMERCIAL SPACE TRANSPORTATION FORECAST CONFERENCE (FEBRUARY 10-11, 1998)

The Federal Aviation Administration's Associate Administrator for Commercial Space Transportation (AST) convened the first national commercial space transportation forecast conference on February 10-11, 1998. For the theme, *Commercial Space Transportation in the 21st Century: Technology and Environment, 2001-2025*, conference topics covered a variety of issues concerning the commercial space transportation industry for the next century. The conference brought together leaders in the commercial launch, satellite, and telecommunication industries; government and military officials; and academia to explore the future of the rapidly growing U.S. commercial space transportation industry and future industry developments, both domestic and international. Participants shared their visions on technology development, international competitiveness and cooperation, business opportunities, and government oversight requirements.

The conference opened with welcoming remarks and an update of AST activities by Ms. Patricia G. Smith, Acting Associate Administrator for Commercial Space Transportation. Ms. Smith provided an overview of the technology, market, and policy trends shaping the U.S. commercial launch industry, as well as the evolving regulatory and policy processes which AST is implementing to keep pace with industry.

Ms. Smith set the stage for the conference by noting that:

...Communications has been the big driver of space commerce, with first GEO and then LEO satellites offering seamless global transmission of voice data and video signals, but what comes next? Space manufacturing,

power generation, tourism, even mining of the moon, planets, or asteroids. . .I am certain that there are many other uses of space that ...we cannot even imagine... [During this conference] we are seeking to understand and project the coming changes, tomorrow and beyond, into the next century. We have an opportunity to make this conference a defining moment in the history of commercial space launch, and I hope we take advantage of that opportunity. We intend for the knowledge and understanding gained here to be an important element in planning for the future activities and resource requirements for the FAA and other government agencies involved in space activities.

KEYNOTE PRESENTATIONS

The conference featured three distinguished keynote speakers. The opening keynote address for the conference was presented by Lt. General Lance W. Lord, Vice Commander, Air Force Space Command. General Lord stressed three major issues for the space systems of the future:

- Space systems as vital national security interests for warfighting, information/intelligence gathering, global positioning (GPS), natural disaster warning, and strategic and theater warning;
- The development and maintenance of dynamic partnerships to ensure cooperation across and between all sectors of America's space endeavors; and
- The vital importance of lowering launch costs and raising launch reliability.

General Lord provided an overview of the steps already being taken by Air Force Space Command to address these critical issues.

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Dr. Dan Mulville, NASA Chief Engineer, presented the keynote address for the Conference luncheon on Tuesday, February 10th. He provided conference attendees with information on NASA's future space transportation architecture. His remarks highlighted NASA's work to ensure lower cost, more reliable access to space through a number of ways, including the proposed privatization of the Shuttle and the development of the X-33 and X-34 reusable launch vehicles.

Wednesday, February 11th, the second day of the Conference, began with *A Vision of the Future*, provided by Conference Futurist, Dr. William Gaubatz, Director of Market Development, The Boeing Company. Dr. Gaubatz provided an exhilarating vision of a "fundamental new transportation infrastructure" which he called Spaceways, designed to provide services to space industries and the traveling public. He described the Spaceways as "...more than vehicles for getting to low earth orbit... [but infrastructure] which must include elements such as the space traffic control systems, ground support systems, the navigation and weather systems, the collision avoidance systems, the refueling stations and spaceports." Dr. Gaubatz's futuristic vision included an outline of how Spaceways should be planned, regulated, and controlled to support future space markets including space tourism. He also provided several near-term recommendations to industry and government on ways to start now to make Spaceways a reality for the future. Dr. Gaubatz concluded his futuristic presentation by stating that "...the vision of space as a place is tantalizingly close to being fulfilled. For this to happen, we must open the Spaceways to provide routine, low cost, safe transportation to, from, and through space, and engage the public in opening the space frontier for business and pleasure... Science and technologies can make its opening to the public feasible. Vision, public

spirited, entrepreneurial leadership will make it happen."

CONFERENCE PANELS

The conference featured six panels over a two-day period.

Panel 1: Reusable Launch Vehicle Development

The first panel, "*Reusable Launch Vehicle Development*," included industry executives from four of the growing number of entrepreneurial companies working on the development of reusable launch vehicle (RLV) technology and ways that this technology can bring about more frequent and economical space transportation services. Panel members included Charles Lauer, Vice President for Business Development, Pioneer Rocketplane Corporation; Gary Hudson, CEO for Rotary Rocket Company; Michael Kelly, President and CEO, Kelly Space and Technology, Inc.; and Dan Brandenstein, Executive Vice President, Kistler Aerospace Corporation.

Panel 2: Technologies of the Future

The second panel, "*Technologies of the Future*," included two top government scientists who discussed research on cutting-edge space propulsion technology for the future. John Cole, Space Transportation Research Manager for Marshall Space Flight Center, NASA, provided a comprehensive overview of future propulsion systems including beamed energy, fission and fusion concepts, advanced reusable technologies, low-cost upper stages, and exotic fuels. Michael Jacox, Program Manager for the Solar Orbit Transfer Vehicle Program, Air Force Research Lab, discussed the plans and proposals for a reusable orbit transfer vehicle which would focus

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sunlight into a cavity and propel the vehicle into orbit, as well as power the satellite once on orbit.

Panel 3: Overview of Space in the 21st Century

The *“Overview of Space in the 21st Century”* panel provided an overview of economic and technological trends in the commercial launch business. The panelists were Ray Johnson, Principal Director for the Engineering and Technology Group for The Aerospace Corporation, and Shubber Ali, Senior Consultant with KPMG Peat Marwick. Mr. Johnson discussed the report on long-range future spacelift requirements completed by The Aerospace Corporation for NASA and the Air Force. Mr. Johnson explained that the report consisted of a near-term assessment up to the year 2010 which looks at the weight growth of commercial GEO satellites, Big LEO constellations, and the increase of satellite lifetimes; and a long-term assessment (to the year 2020 and beyond), examining such innovative applications as space-based lasers, space tourism, and manufacturing facilities in space. Shubber Ali provided an historical overview of the work that KPMG has provided to the space industry over the past 20 years. He also provided an assessment of how the launch market will develop over the next century, based on the present-day launch costs, and how the market could change as a result of revolution in the cost of space transportation.

Panel 4: The International Market

Panel 4, *“The International Market,”* was concerned with the changing scene of the international market, which has evolved from a market once characterized by a small number of international launch providers competing for market share to one where joint ventures and partnerships among U.S. and international launch providers led to 35 internationally-competed

launches in 1997 with revenues exceeding \$2.4 billion. Panel members included Greg Gilmore, Vice President for Marketing & Sales, International Launch Services (ILS); Marc Nance, Design Manager, Boeing Sea Launch; Marshall Kaplan, Chairman of Launchspace; and Doug Heydon, President, Arianespace. The panel members discussed their respective international ventures, as well as their views on the impact of increased globalization and international partnerships within the international launch market and how such trends will affect the future of the market. Highlights from the panel included the planned launch from the Baikonur Cosmodrome in Kazakhstan by ILS, the first Boeing Sea Launch mission from the Pacific Ocean scheduled for October, the second qualification flight of the Ariane 5 scheduled for July, and a revenue projection of \$100 billion for the international launch market by the year 2000.

Panel 5: Space Commerce Beyond the Communications Era

“Space Commerce Beyond the Communications Era” featured three panelists who discussed new space applications for the future which fall outside of the successful communications satellite industry. Panelist Gregg Maryniak, Senior Scientist for the Futron Corporation, discussed potential energy sources for propulsion and space-based operations such as electric motors, lunar resources, and solar power. John Mankins, Director of the Advanced Programs Office, NASA Office of Space Flight presented his views on the development of an industry for LEO and GEO solar power satellites and a modularized architectural approach for space hardware. Tom Rogers, President of the Space Transportation Association discussed the enormous market potential for new industries in space tourism, sports, and biomedical research.

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Panel 6: Other Perspectives

Panel 6, “*Other Perspectives*,” provided perspectives from representatives of academia, the media, and an industry insider on the future developments which could impact the U.S. commercial space transportation industry. Panel members included Brenda Forman, Director of Academic Liaison and Federal Technology Policy for Lockheed Martin Corporation; Dr. John Logsdon, Chairman of George Washington University’s Space Policy Institute; Lewis Franklin, Visiting Scholar, Stanford University Center for International Security and Arms Control; and James Banke, Space Journalist for Florida Today.

The Conference concluded with a special public session on Flight Safety in a Commercial Environment.

The first national Commercial Space Forecast Conference is just the first step in providing the Department of Transportation and the Federal Aviation Administration critical knowledge and information in order to plan for the types of resources and capabilities that will be required to successfully accomplish oversight and regulatory responsibilities for the U.S. commercial space transportation industry, as well as the context for future policy decisions. With each annual conference, the future vision for the U.S. industry and the DOT/FAA role for the industry will become sharper and more focused.

Imagine a world where access to space is as common, safe, and affordable as air travel is, where people can travel to the mountains of the moon with as little fanfare as we visit the Rockies at the end of the 20th century, where new products and perhaps new medical treatments arise as a result of commercial launch companies routinely placing both government and private sector experiments in space, while military uses of space are

achieved via commercial space launch providers. This conference is about laying the groundwork for the advances in space transportation and technology that will support such a world.¹

Another U.S. Government RLV development program is the Military Spaceplane. This program is intended to provide quick access to space to perform a variety of military missions in the second quarter of the next century.

¹ Excerpt from the Remarks of Patricia G. Smith, Acting Associate Administrator for Commercial Space Transportation for the First National Commercial Space Transportation Forecast Conference: “Commercial Space Transportation in the 21st Century: Technology and Environment, 2001-2025.”