NOAA ADVISORY COMMITTEE on COMMERCIAL REMOTE SENSING (ACCRES)
OPEN SESSION MEETING SUMMARY
March 27, 2008

Open Session

The open session of the twelfth meeting of NOAA's Advisory Committee for Commercial Remote Sensing (ACCRES) was convened on March 27, 2008 at 1:15 pm in the Auditorium of the National Association for Homebuilders, Washington, D.C. In accordance with the provisions of Public Law 92-463, the meeting was open to the public.

Committee members present:

Dr. James A. Lewis, Chair, Center for Strategic and International Studies
Mr. Ray A. Williamson, Vice-Chair, The George Washington University
Dr. William Gail, Microsoft (representing Dr. John C. Curlander)
Mr. J. Christian Kessler, Department of State
Ms. Jill Smith, DigitalGlobe
Mr. Bill Wilt, GeoEye (representing Mr. Matthew O'Connell)
Mr. Liam Weston, Ball Aerospace & Technologies Corporation (representing Mr. David Taylor)
Mr. Joseph Fuller, Futron Corporation
Dr. Marguerite Madden, American Society for Photogrammetry and Remote Sensing
Colonel Mike Spencer, Joint Staff, Department of Defense
Dr. David J. Gorney, The Aerospace Corporation

Observers:

Dr. Rick Heidner, The Aerospace Corporation

Presiding Staff of the National Oceanic and Atmospheric Administration (NOAA):

Ms. Kay Weston, ACCRES Designated Federal Officer
Mr. Charlie Baker, Satellite and Information Service

Opening Statement

Dr James Lewis, Committee Chair, called the twelfth ACCRES meeting to order, welcoming attendees and introducing Committee members and guests.

NOAA Update

Ms. Weston presented an overview of NOAA's timeline information for the first two quarters of FY08, noting that NOAA's processing was well within regulatory requirements. NOAA conducted a study on the Kyl-Bingaman Amendment in 2007 and concluded no change is necessary. Looking to the future, NOAA and USGS are sponsoring a ten-year outlook.

ASPRS 10 Year Industry Forecast

Mr. Charles Mondello presented the 10-year industry forecast (Phase V), conducted by the American Society for Photogrammetry and Remote Sensing (ASPRS). The current forecast has a more international flavor, Mr. Mondello said, and extends the results of the previous four ASPRS surveys. The Phase V survey was conducted online with respondents in some 58 nations participating. Mr. Mondello presented graphs showing the survey's results for workforce educational needs, needed technical skills, and estimates of spending on remote sensing in 2008 and 2010. Two points stand out in considering the relative importance of remote sensing attributes: data currency is continuing to increase in relative importance and there is a lower level of concern internationally in data licensing. In comparing key attributes in remote sensing with regard to what is in use today versus what will be needed in the future, the survey found increased needs as follows:

- Spatial Resolution – between <5cm to 15-50cm
- Geo-Locational Accuracy – <15cm to 50cm-1m
- Elevation – <15cm to 50cm-1m
- Sensor Technology – LIDAR, IFSAR/INSAR and hyperspectral
- Data Currency – under 24 hours, under 1 week, and under 1 month

The study also looked at the average proportion of sources for remote sensing data by geographic region and found a clear difference exists in the ratio of air to space in some regions, with Africa, East Asia and South America using satellite data more heavily than aerial platform data. There was a closer balance between the two sources in Europe, North America, Oceania, and South Asia.

Mr. Mondello's presentation may be found on the NOAA website (www.licensing.noaa.gov).

Orbital Debris Presentation

Substituting for Dr. William Ailor, who was unable to attend because of illness, Dr. Rick Heidner presented an overview of space debris and reentry hazards, prepared by The Aerospace Corporation's Center for Orbital and Reentry Debris Studies. Dr. Heidner opened by providing an indication of the large amount of debris currently in space, over 100,000 pieces large enough to cause loss of a satellite. There are a number of sources, such as debris from exploded satellites and rocket stages, dead satellites, and debris from normal operations, such as a discarded astronaut's glove. The average impact velocity at low earth orbit (LEO) is about 20,000 miles per hour. In the course of over 24 missions, there have been 795 craters on Shuttle windows. The Hubble Space Telescope has also experienced about 500 hits, most from relatively small objects, over a seven year period.

There is also a history of large object interference, which includes three confirmed accidental collisions: a non-operational Russian Cosmos satellite collided with debris from another Cosmos satellite in 1991; the French satellite CERISE was damaged by a fragment from an Ariane rocket body in 1996; and the final stage of a U.S. Thor Burner collided with a fragment from the upper stage of a Chinese Long March 4 in 2005. In addition, the Space Shuttle has had to move at least eight times and the International

Space Station three times to avoid close approaches. To avoid the risk of collisions, commercial operators have also had to move satellites in geosynchronous orbit.

Discussing ways to mitigate creation of debris, Dr. Heidner referred to the Inter-Agency Space Debris Coordinating Committee (IADC) guidelines and to policies adopted by NASA, DoD, and the FCC. He also mentioned that the International Organization for Standardization (ISO) is developing international standards to minimize orbital debris. Turning to reentry issues, Dr. Heidner discussed the hazards and difficulty of prediction, illustrating his comments with several examples of large pieces of debris that survived reentry. The Aerospace Corporation works on reentry issues by publishing estimates for reentry events, improving hazard prediction models and developing sensors to collect *in situ* reentry data. Predictions of upcoming reentry events are available at The Aerospace Corporation's website, www.aero.org/capabilities/cords.

In summary, there have been no major collision incidents to date, but the probability is increasing and orbital debris and reentry hazards are emerging problems for space operators. In response, governments, manufacturers and operators are taking actions to minimize future threats, and capabilities to predict collision, reentry and related hazards are evolving.

Following Dr. Heidner's presentation, Dr. Williamson remarked on the increasing number of satellites in sun-synchronous orbit. In July, NASA had to move a satellite to avoid collision with another operational satellite. The only organization with full awareness is the U.S. Air Force, Dr. Williamson said, and he asked whether DigitalGlobe or GeoEye monitor for orbital debris. Ms. Smith said DigitalGlobe does not model but monitors periodically. It is not a major issue, but the company is aware of the need to do more, Ms. Smith stated. Mr. Wilt added that GeoEye informs the U.S. Government when a satellite has a problem. A member of the public asked if there is a means to quantify the likelihood of collisions. Dr. Heidner referred to his slide on the Chinese ASAT test but noted there is no single answer since likelihood is a factor of altitude and time.

Dr. Heidner's briefing can be found on the NOAA website (www.licensing.noaa.gov).

U.S. Space Transportation Industry Outlook

A joint presentation by the Office of Space Commercialization, Department of Commerce, and the Office of Commercial Space Transportation of the Federal Aviation Administration offered a comprehensive overview of the U.S. space transportation industry. Supported by its National Space Policy, the U.S. has many strengths, including robust space capabilities, transparent strategy and policies, strong government and industry processes for space ventures, and strategic partnerships between government, industry and academia. There are three elements in the space transportation architecture: satellites, transportation, and spaceports. The U.S. has rebounded from a slump in the mid-2000s and is an international leader in satellite manufacturing today. Yet, there are challenges and overall U.S. satellite manufacturing has declined from its all-time high in the late 1990s. Furthermore, a flat global market in commercial orbital requirements is

projected through 2015, with foreign countries currently developing indigenous manufacturing capabilities.

U.S. space transportation systems continue to lift the most mass and volume to designated orbits and the U.S. has averaged 29% of the global market over the past five years. Yet it faces serious challenges from international competition, and orbital launches are decreasing from 37% in the late 1990s. Russia exceeds the U.S. in number of launches and remains a dominant commercial leader internationally. U.S. launch providers are struggling to compete with lower prices offered by an increasing number of foreign launch providers. With regard to spaceports, the U.S. has half of the world's launch sites. There are currently seven federal spaceports and seven non-federal, with another eight proposed. These spaceports offer access to numerous orbital inclinations.

The full presentation is available at the NOAA website (www.licensing.noaa.gov).

An official from FAA announced that further information is also available at www.ast.faa.gov.

Public Comments

Dr. Lewis asked for public comments or questions. There being none from the public, the Open Session adjourned at 3:05 pm.