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Hearing:

"How Space Technology and Data Can Help Meet State and Local Needs"

University of Kansas Medical School of Nursing
Room 4024, 3901 Rainbow Blvd
Kansas City, KS

1. Purpose of Hearing

On Monday, May 20, 2002 at 10:30 a.m. in Room 4024 of the University of Kansas Medical School of Nursing in Kansas City, Kansas, the Subcommittee on Space and Aeronautics will hold a hearing on applications of space technology and data to meet state and local needs. Specifically, the hearing will address some of the ways that data from space-based and aircraft-based remote sensing systems can help with land use planning, severe weather and natural disaster management, and transportation planning.

2. Issues for the Hearing

- The National Aeronautics and Space Administration (NASA) has been collecting large quantities of space-based and aircraft-based remote sensing data as part of its Earth Science research program. More recently, commercial remote sensing companies have launched satellites to gather specialized, mainly high-resolution data. Are there potential applications for such data that might help address the needs of state and local agencies?

- One of the most vexing issues facing local and regional planners is sprawl. In recent years there has been increased interest in planning for "smart growth". How might remote sensing data help manage land use in ways that lead to "smart growth" instead of sprawl?
- Natural disasters and severe weather events can take an enormous toll both human and economic terms. What can remote sensing data contribute to better disaster management by state and local authorities, and how can we maximize the benefits to be gained?
- In recent years, there has been some significant research into the ways in which remote sensing data and geospatial information systems (GIS) might be combined to improve transportation planning at the state and local level. What are some examples of this application, and how might it be improved?
- What needs to be done at both the Federal level and at the state and local level to ensure that the potential of remote sensing technology and data applications to help meet state and local needs is realized?

3. Witnesses

***Dr. Ray Williamson*, Research Professor, Space Policy Institute, George Washington University, Washington, D.C.** has been asked to address the following:

- How can investments in Earth science research benefit state and local authorities in their responses to natural disasters?
- What is the scale of socioeconomic benefits that can be achieved by continued investments in Earth science research and applications? How do these relate to state and local users?
- What are the major impediments to achieving the benefits of federal investments in remote sensing for state and local users, and how can they be effectively reduced?

***Dr. Edward Martinko,* Director, Kansas Biological Survey, Professor, Department of Ecology and Evolutionary Biology, University of Kansas, Lawrence, KS** has been asked to address the following:

- What are some of the ways that remote sensing and geospatial information systems (GIS) can help states, regions, and localities deal with growth, sprawl, and other land use issues?
- What are some of the most promising applications of remote sensing and GIS to address problems facing state and local authorities in Kansas?
- What should be done to improve the utilization of remote sensing data from governmental and commercial sources by state and local authorities in Kansas?

Mr. Ronald Birk, Director of the Applications Division, Office of Earth Science, National Aeronautics and Space Administration has been asked to address the following:

- What is the nature and scope of NASA's Earth Science Applications program?
- What are specific examples of how Earth Science data and information has assisted in addressing state and local needs?
- What are NASA's future plans in this area?

4. Background

Spacecraft from the nation's civil and military space programs have been observing the Earth from space since the dawn of the Space Age four decades ago. While the military has been interested in space-based remote sensing largely for its application to important national security missions, the civil space program has focused on the ways in which remote sensing can help to increase our scientific understanding of the Earth's atmosphere, oceans, land surface, and biosphere. The National Aeronautics and Space Administration (NASA), in particular, has had an ongoing role in the development of scientific spacecraft and instruments dedicated to Earth observations for research purposes. A notable example is the Earth Observing System (EOS)—a series of spacecraft intended to conduct research on the overall Earth system over a fifteen

year period. The most recent spacecraft in the EOS series, *Aqua*, was successfully launched just two weeks ago. A major scientific objective of *Aqua* is a better understanding of the Earth's water cycle, which could lead to improved weather forecasts as well as improved modeling of the climate. Operational remote sensing satellites such as the polar orbiting and geosynchronous meteorological satellites, on the other hand, have been the responsibility of the National Oceanic and Atmospheric Administration (NOAA).

While NASA's main focus for its Earth Science program has been scientific research by means of data collected from Earth observation satellites, there has long been a recognition that such data might also be used for practical applications. The first spacecraft developed by NASA to explore such applications was the Earth Resources Technology Satellite (ERTS), which was launched in 1972. It became the forerunner of the highly successful Landsat program, which has provided data for research into land use changes, forestry management, crop monitoring, and mineral mapping for the last thirty years.

Within the last several years, NASA's Earth observation satellites have been joined by spacecraft developed and launched by commercial entities. The first such commercial imaging satellite, IKONOS, owned by Space Imaging, Inc. was launched in 1999. In addition, a "value-added" industry has grown up over the last two decades or so. The "value-added" industry has specialized in the commercial development and use of software technologies to convert data gathered from spacecraft and aircraft remote sensing instruments into useful information to meet specific customer needs.

Another development in recent years has been a renewed interest on the part of NASA into the potential applications of the data collected through its Earth Science program. The Earth Observations Commercialization/Applications Program (EOCAP) was established within NASA in 1993, and an Applications Division was established in NASA's Earth Science program in 1998. Those actions were in part driven by the recognition that remote sensing data can be applied to a wide range of activities. For example, NASA has organized its Applications program around the following themes:

- *Resource Management*—including agriculture, forests, rangelands, fisheries, and energy
- *Disaster Management*—including severe storms, wildfires, floods, earthquakes, landslides and subsidence, and so forth
- *Community Growth and Infrastructure*—including transportation, urban planning, land use practices, conservation, utilities, and so forth
- *Environmental Assessment*—including air, water, and land environments

Nevertheless, progress in increasing the numbers of applied users of remote sensing data has been slow. This has been especially true in the governmental sector. There have been a number of reasons for this fact, including such things as the following: unfamiliarity with the technologies, lack of pilot projects to demonstrate the value of such data applications, and competition for funding at the state and local level with more established governmental priorities. NASA has established a program of pilot projects specifically aimed at state and local applications of remote sensing data obtained from governmental satellites or commercial sources. In addition, legislation has been introduced in Congress [H.R. 2426, the *Remote Sensing Applications Act of 2001*, introduced by Rep. Udall of Colorado] to encourage additional pilot projects, and in particular those that might help promote "smart growth" land use policies.

The witnesses at this hearing will examine the potential for space-based and aircraft-based remote sensing to help meet state and local needs in such areas as land use planning, severe weather and disaster management, agriculture, and transportation. They will examine the ways in which such applications could benefit states such as Kansas, and they will discuss what should be done to improve the utilization of remote sensing data by state, local, and regional authorities.