NOAA's Office of Oceanic and Atmospheric Research

Roundtable: Providing Vital Forecasts for Commerce & Transportation

On October 7, 2008, Dr. Richard Spinrad, Assistant Administrator for Oceanic and Atmospheric Research (OAR) brought together a diverse group of high-level constituents to provide input on NOAA's research priorities. The topic focused on NOAA's ability to support the Nation's commerce and transportation activities by providing information for safe, efficient, and environmentally sound transportation. Following is a summary of the major points discussed at the roundtable.

Opening Remarks

In his opening remarks, Dr. Spinrad welcomed the group and underscored the important role NOAA research plays in NOAA achieving its mission and goals. He stressed three messages – OAR supports preeminent research at all levels of the organization; OAR research provides value to society; and OAR operates in a culture of transparency, reaching out to constituents for input on research priorities and planning.

He discussed NOAA's efforts to create a National Climate Service to provide federal, state and local decision-makers with information on how a changing climate will affect their local environment.

Dr. Spinrad then highlighted several preeminent NOAA research projects that will be of value to the transportation industry, such as Next Generation Air Transportation System (NextGen). For NextGen, NOAA Research is leading the development of a four dimensional Weather Information Database - a 4-D cube – to create an integrated and nationally consistent common weather picture for observation, analysis, and forecast data available to all system users. NextGen will result in a system-wide transformation including the manner by which weather-related information is collected, managed, disseminated, and utilized in decision-making.

In addition, Dr. Spinrad highlighted the work of the 120 NOAA contributors to the Intergovernmental Panel on Climate Change (IPCC) which received the Nobel Peace Prize last year; Dr. Eddie Bernard who recently received the prestigious Service To America Homeland Security Medal for creating a tsunami detection system that has dramatically increased warning times and decreased the risk of catastrophic loss of life; and Dr. Alexander "Sandy" MacDonald who was a Service to America Science and Environmental Medal finalist for inventing Science On a Sphere® (SOS) an amazing tool that vividly illustrates the exciting world of Earth system science.

Dr. Spinrad discussed topics that "keep him up at night" including securing the resources required to carry out NOAA's mission, attracting and sustaining a preeminent scientific workforce, and supporting high-risk, high-payoff research.

Dr. Spinrad concluded by stating he's encouraged that both presidential campaigns have taken note of the need to use science and technology to address the challenges created for our Nation and the world as a result of global climate change, growing populations, and the expansion of the world's middle class.

Constituent Observations

Participants identified current and future areas where NOAA could focus resources and efforts to help them provide safe, efficient, and environmentally sound transportation particularly in a changing climate.

Four areas of common interest emerged: climate change; seamless data access, integration and interoperability; the future science and technology workforce; and transitioning research to operations.

Climate Change

Participants expressed concern about the implications of climate change and the importance of an improved understanding of the role of various transportation sectors in climate change mitigation and adaptation. Participants noted that different modes of transportation will both impact climate change and be impacted by climate change.

Participants were concerned about emission controls for mitigation and the impacts of climate change on infrastructure to plan adaptation strategies. For example, the public transportation industry continues to research the impacts of public transportation – buses, and heavy and light rail - in reducing emissions of harmful greenhouse gases.

Participants noted a cross-sectoral need for finer grain climate change data. They identified the need for improved temporal and spatial resolution of climate models to accurately predict future changes at the state and regional levels. In particular, participants mentioned the need for information on water availability, drought, wildfire risk, coastal erosion, and the frequency and intensity of storms and severe weather.

Participants noted that the transportation industry has difficulty separating climate and weather. Weather accounts for 60 percent of air travel delays, 25 percent of the 40,000 highway fatalities that occur in the U.S. each year, and also results in the diversion of freight flows. Participants were very interested in NOAA's efforts to develop NextGen. They noted that ability to accurately forecast weather days in advance would be of great benefit to all transportation sectors. Participants noted a potential climate change mitigation benefit – decreased weather delays would require less time spent circling and diverting aircraft which would reduce fuel needs.

In addition, participants noted that in order to continue improving surface weather predictions, NOAA needs to expand from atmospheric modeling to surface weather modeling at high resolutions.

Participants also stated the need for an honest broker of climate change information. They noted that a great deal of climate mitigation research is being undertaken on how to manage and reduce greenhouse gas emissions. One participant raised the example of biodiesel research noting that an honest broker, such as NOAA, perhaps in coordination with the National Academies of Science or the National Research Council, could effectively communicate the research results. They also stressed the value of a one-stop shop for climate change data and improved communications and cooperation across all sectors.

Data Access, Integration, & Interoperability

Participants identified seamless data access, integration, and interoperability as nearly universal needs and agreed all were necessary to ensure success across sectors.

Participants recommended creating quality control standards and ingest mechanisms that would allow for the expansion of observation systems by including data from ships, planes, and automobiles.

Several NOAA-U.S. Department of Transportation (DOT) initiatives discussed generated considerable interest among the participants.

- The *Clarus* Initiative to design, develop, and demonstrate a nationally available surface transportation weather observation network that assimilates, quality checks and disseminates the Nation's road weather observations. With 23 states and 3 Canadian provinces now contributing data, *NOAA and DOT* work with public and private partners to develop and evaluate value-added road weather information products.
- The NOAA Meteorological Assimilation Data Ingest System (MADIS), a data management system that collects data from surface surveillance systems, hydrological monitoring networks, balloon-borne instruments, Doppler radars, aircraft sensors, and other sources. The NOAA Surface Weather Program will transition MADIS into operations as they it develops the National Surface Weather Observing System (NSWOS). The NSWOS ultimately will include environmental sensor station data collected through the *Clarus* System.
- The DOT Federal Highway Administration Vehicle Infrastructure Integration (VII) Initiative also was well received. VII will involve collecting data, including weather and pavement condition data from passenger vehicles. Ultimately, decision support tools may assist state departments of transportation to improve road maintenance and traveler safety.

In addition, some participants noted the global nature of their industries – shipping, automobile manufacturing, etc. – is driving a need for aligned international standards for greenhouse gas emissions and ballast water and air quality. International standards should be based on scientific research and research should continue to measure the effectiveness of control measures. Furthermore, the implications of climate change must be considered when choosing between place-

based management strategies and dynamic area management strategies.

The efforts of the Committee on the Marine Transportation System (CMTS) also were discussed including work by the Navigation Technology and Integration task team, the Arctic task, and the Maritime Data working group. Of specific interest were trials to combine U.S. Coast Guard Automatic Identification System (AIS) information with NOAA Physical Oceanography Real-time Systems (PORTS®) to provide real-time current data and promote interagency coordination.

Science & Technology Workforce

Participants discussed the challenges of growing the future science and technology workforce. Some participants expressed concern about the ability, particularly of the federal government, to attract and retain the best and brightest. Concerns included how to make science and engineering attractive fields of study; how to make the federal government competitive with the private sector; and generational differences.

Participants suggested exploring mid-career hires; cross agency collaboration; and implementation of the America COMPETES Act as potential first steps to ensure a robust science and technology workforce for the future.

Transitioning Research to Operations

Ensuring smooth and efficient transitions from research to operations was a common theme. Three areas for improvement arose – increasing interagency collaboration, facilitating private sector involvement, and streamlining the process.

Participants noted that the Defense Advanced Research Projects Agency (DARPA), other Department of Defense and federal agencies, carry out a great deal of research that supports commerce and transportation. They recommended increased interagency collaboration and investigating ways to speed the transition from research to applications.

Furthermore, participants noted that NOAA should strive to maintain a balance with the private sector in transitioning research to applications and in developing or tailoring decision support tools. One example given was GIS mapping and the very serious need to develop specifications for data integration. A participant proposed that developing the specifications for data integration as an opportunity for the federal government to outsource in a non-exclusive way.

In addition, participants noted that NOAA's work can't stop with the weather or climate forecast. The information must be communicated in a way that is meaningful to the user. NOAA should continue to work

with the private sector to develop and deliver decisions support tools that serve the needs of various user communities.

Conclusion

Participants noted several key challenges that will impact the transportation industry including climate change, changing demographics, funding constraints, infrastructure needs, and the availability of a robust science and technology workforce. Participants indicated some of the areas where NOAA research can aid the transportation industry in meeting these challenges include:

- Improve the spatial and temporal resolution of climate change models
- Serve as an honest broker of climate change information
- Provide user-friendly decision support tools for weather and climate
- Enhance collaboration across federal, state and local agencies
- Facilitate national and international standards (e.g. ballast water) supported by science
- Streamline the transition from research to operations

Participants who completed surveys on the value of this roundtable generally gave it high marks for bringing together a mix of interests. The general consensus from survey respondents was that NOAA should hold more discussions like this so that partners and customers can exchange ideas, discuss needs and learn more about NOAA's priorities and plans on a given topic.