On behalf of the University Corporation for Atmospheric Research (UCAR) and the larger university community involved in weather and climate research, I submit this written testimony for the record of the House Committee on Appropriations, Subcommittee on Transportation, Housing and Urban Development, and Related Agencies.

UCAR is a consortium of 75 universities that manages and operates the National Center for Atmospheric Research and additional programs that support and extend the country’s scientific research and educational capabilities. UCAR is supported by the National Science Foundation and other federal agencies, including the U.S. Department of Transportation (USDOT)’s Federal Highway Administration (FHWA) and Federal Aviation Administration (FAA).

I want to thank the Subcommittee for its leadership in supporting research and development programs at the FAA and FHWA. I urge you to support the President’s commitment to ensuring safer, more efficient air and road travel. One essential piece of this commitment to modernizing air and surface travel is providing drivers, pilots, and other vehicle operators with access to real-time weather information. I urge you to support these relatively small but critically important R&D programs within the FAA and FHWA budgets.

**Federal Highway Administration (FHWA)**

The highest priority for the USDOT and the FHWA is transportation safety. Last month, the National Highway Traffic Safety Administration released a report projecting that traffic fatalities have declined for the 15th consecutive quarter, the lowest annual level since 1954. Still, 24 percent of weather-related vehicle crashes occur on snowy, slushy or icy pavement, causing 1,300 deaths and more than 116,800 injuries annually. There are also economic costs: snow and ice significantly increase road maintenance costs, and state and local agencies spend more than $2.3 billion on snow and ice control operations annually.

Since the late 1990s, researchers and engineers from several national labs and universities have played a pivotal role bringing the surface transportation and weather communities together to increase traffic safety, efficiency, and mobility. Applications of successful research and development supported by the Road Weather Research and Development Program (SAFETEA-LU Sec. 5308) have significantly reduced the cost of state DOT winter snow and ice control activities and are likely to have significantly reduced weather-related accidents. This program, authorized at $5 million per year, has proven quite successful. For example, the Winter Maintenance Decision Support System, which supports pavement snow and ice control
operations, was successfully developed, tested, and implemented by the private sector in more than thirteen states. The Road Weather Research Program is also developing advanced weather and road condition safety applications as part of the USDOT’s IntelliDrive Initiative.

In the absence of a new surface transportation reauthorization bill, the President’s FY 2011 request keeps funding for the Road Weather Research Program frozen at $4 million. It is imperative that this be increased to the authorized level of $5 million per year. A fully-funded Program would support the development of technologies that integrate weather and road condition information into traffic management centers, improve understanding of driver behavior in poor weather, develop in-vehicle information systems and wireless technologies that provide warnings to drivers when poor weather and road conditions exist, improve the understanding of the impact of weather on pavement condition, and develop new active control strategies optimized for poor weather and road conditions. I urge the Committee to fund the Road Weather Research and Development Program at its full authorized level of $5.0 million in FY 2011.

The Federal Aviation Administration (FAA)

Projections indicate that the demand for aviation will increase by a factor of two or three over the next two decades. Expansion of aviation is likely to continue and, as in the past, could outpace economic growth. To meet future aviation capacity needs, the U.S. is developing and implementing a dynamic, flexible and scalable Next Generation Air Transportation System (NextGen) that is safe, secure, efficient and environmentally sound.

I urge you to support the President’s overall FY11 request of $16.5 billion for the FAA, an increase of $476 million above FY10 enacted levels. This increase reflects the Administration’s recognition of future passenger growth and its commitment to safety and performance.

Integrating Weather into the Future Air Transportation System

The primary goal of NextGen is to address and meet the rapidly changing needs of the National Airspace System (NAS). Providing accurate, timely weather information required by aviation decision makers is fundamental to NextGen's success in achieving capacity, efficiency, and safety goals. Improved weather forecasts, plus a shared source of decision support information for NAS decision makers, are crucial elements of achieving the goal of reducing the weather impact. The first step, though, is establishing a clear understanding of the impacts that have the most effect on NAS efficiency and capacity. The most visible impact to us all is "delays," both airborne and ground, affecting both airplanes and people. Delay translates to operational cost for the airlines, and lost productivity for the users of the system—people and cargo.

Research, Engineering, and Development

The FY 2011 request of $190 million for the Research, Engineering, and Development (RE&D) line office at the FAA continues important work in current research areas, including
aviation weather research. This 7.6 percent increase over FY 2010 supports enhanced NextGen research and development efforts in the areas of air-ground integration, weather information for pilots, and environmental research for aircraft technologies and alternative fuels to improve aviation’s environmental and energy performance. The following programs can be found within the RE&D line office of the President’s FY11 FAA budget request.

Weather Program

Aviation weather research and applications are critical to the FAA’s safety, operations and efficiency record. A number of research projects are underway, through the Weather Program and in collaboration with industry representatives, which focus on in-flight icing, turbulence, winter weather and deicing protocols, thunderstorms, ceiling, and visibility.

One example system that translates a large amount of weather data into a significant safety and delay impact is the Weather Decision Support for Deicing Decision Making System (WSDDM). The accumulation of ice on aircraft prior to take off has long been recognized as one of the most significant safety hazards affecting the aviation industry today. Using WSDDM, airport snowfall rate in terms of liquid water content is translated into deicing fluid application procedures and aircraft holdover times.

While the goal of the Weather Program is to increase safety, capacity, and support NextGen, I am very concerned that the request of $16.5 million simply will not support the R&D needs of the program which is down almost two percent from last year’s level and operating with half the funding level of ten years ago. To address the challenges and meet the research needs of NextGen, the Weather Program must receive, at a minimum, $18 million for FY 2011.

Weather Technology in the Cockpit

The crash of an Air France jet last year over the Atlantic Ocean, killing all 216 passengers and twelve crew members, is an example of the limits of pilots’ ability to cope with severe weather. Pilots currently have little weather information as they fly over remote stretches of the ocean, which is where some of the worst turbulence occurs. Providing pilots with at least an approximate picture of developing storms could help guide them safely around areas of potentially severe weather.

The Weather Technology in the Cockpit Program leverages research activities with other agencies, academia and the private sector by enabling the adoption of cockpit technologies that provide pilots with hazardous weather information and improve situational awareness. It seeks to ensure the adoption of cockpit, ground, and communication technologies, practices, and procedures that will provide pilots with shared and consistent weather information to enhance common situational awareness, plus engage the aircraft as a "node" that autonomously exchanges weather information with surrounding aircraft and ground systems. One system being developed combines satellite data and computer weather models with cutting-edge artificial intelligence techniques to identify and predict rapidly evolving storms and other potential areas of turbulence, and alert pilots and air traffic controllers to storms and turbulence over the continental U.S.
I am very disappointed that the FY11 request for this small but life-saving program was reduced almost 3 percent from FY10 to $9.3 million. I urge you to fund the Weather Technology in the Cockpit program at $10 million, at a minimum.

Facilities and Equipment

In the FAA’s Facilities and Equipment line office, I would like to call your attention to two very important programs, NextGen Network Enabled Weather (NNEW) and Reduce Weather Impact, and ask you to support the FY11 request for both.

NextGen Network Enabled Weather (NNEW)

Exploring, identifying, and employing methods and techniques that will help facilitate the flow of operation-specific weather-related data and information to end users is critical. The NextGen Network Enabled Weather project is dedicated to using and developing technologies and standards for NextGen that will support effective dissemination of weather data. The concept of a 4-D Weather Data Cube is a foundational element of NextGen. It is envisioned that this virtual data cube will comprise weather data and information from disparate data contributors and locations. From this Cube, end users (e.g., air traffic managers, pilots, etc.) will be able to obtain a common weather picture of the NAS. The FY 2011 request for NNEW is $28.25 million, an $8 million increase over FY10. To develop the NextGen weather dissemination system smoothly and efficiently, I urge you to support this request.

NextGen Reduce Weather Impact

The goal of the NextGen Reduce Weather Impact Program is to provide increased capacity in U.S. airspace to reduce congestion and meet projected demand in an environmentally sound manner. The Program addresses implementation of improved forecasts and provides weather forecast information tailored for integration into traffic management decision support systems. Some of this work starts with identification of the air traffic management impact of interest, and then translating weather into metrics associated with that impact.

The current weather observing network is inadequate to the needs of NextGen. Improvements will be central to the Reduce Weather Impact Program. Working with appropriate scientific, modeling and user communities, current sensor information and dissemination shortfalls will be identified and evaluated. Investigating technologies for optimizing and improving automated aircraft weather reporting will also be conducted. To continue this work, I urge you to support the President’s FY11 request of $43.2 million for the NextGen Reduce Weather Impact Program, an increase of $7.6 million above FY10.

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On behalf of UCAR, as well as all U.S. citizens who use the surface and air transportation systems, I want to thank you for the important work you do in supporting the country’s scientific research, training, and technology transfer. We appreciate your attention to the recommendations of our community concerning the FY 2011 FHWA and FAA budgets and your concern for the safety of the nation’s transportation systems.