On behalf of the University Corporation for Atmospheric Research (UCAR), I submit this written testimony to the House Committee on Appropriations, Subcommittee on Transportation, Housing and Urban Development, and Related Agencies, for the Committee record. UCAR is a consortium of over 100 research institutions, including 77 doctoral-degree granting universities, which manages and operates the National Center for Atmospheric Research (NCAR). I respectfully urge the Subcommittee to support:

- FAA’s Research, Engineering and Development account – $180 million including $18 million for the Weather Program and $10 million for Weather Technology in the Cockpit.
- FAA’s Facilities & Equipment account – $285 billion which includes $57.2 million for System-Wide Information Management (SWIM) and $23.8 million for Common Support Services.
- FHWA’s Intelligent Transportation Systems (ITS) program – the full request of $110 million which includes $46.1 million for IntelliDrive V-V and V-I Communications for Safety and $15.5 million for Dynamic Mobility Applications.

Life and property could be spared, and economic performance improved across the nation, if weather information were utilized more effectively by decision makers such as airline pilots, personal vehicle drivers, and the trucking industry. Over the past two and a half decades, the Department of Transportation (DOT), in partnership with NCAR and the academic community, has creatively and economically developed technologies to foresee weather-related problems and mitigate the effects of meteorological hazards, including wind shear, icing, and turbulence. Leveraging the expertise of the research community, the FAA and FHWA depend on their partners to develop weather-resilient systems and infrastructure. I would like to comment on the following programs that support continued collaborative partnerships between the DOT, FAA, and FHWA and the atmospheric science community:

**Federal Aviation Administration**

Current and projected growth in the volume, complexity, and economic importance of air transportation clearly demonstrates the need for a new paradigm supporting air traffic services in the 21st century. Many new factors compound the new century’s challenge to safe and efficient air operations. For example, aircraft passenger and freight load requirements will be 2-3 times higher,
increasing use of polar routes will introduce new hazards to crews and passengers, and new navigational technologies that allow more flexible routing and separation of aircraft are not fully compatible with the current air traffic control system. Capacity will become an increasingly limiting factor at many airports. Efficiency of flight operations en-route will become more critical. Since weather conditions seriously affect air traffic operations (the cost to divert a flight, for example, is upwards of $150,000), the manner by which weather is observed, predicted, disseminated and used within air traffic decision processes and systems is of critical national importance. Thus, it is critical to invest in federal research and development efforts that will help mitigate these costs and increase safety.

**FAA Research, Engineering, and Development (RE&D)**

The FY13 request continues important work in current research areas, including aviation weather research. The proposed budget supports enhanced Next Generation Air Transportation System (NextGen) research and development efforts in the areas of air-ground integration, weather information for pilots, and environmental research for aircraft technologies as well as alternative fuels to improve aviation’s environmental and energy performance. The following programs can be found within the RE&D section of the FY13 FAA budget request.

**Weather Program.** The goal of the Weather Program is to increase safety and capacity, and to support NextGen. A number of aviation weather research projects are underway, in collaboration with industry representatives, focusing on in-flight icing, turbulence, winter weather and deicing protocols, thunderstorms, ceiling, and visibility. One example of a system that translates a large amount of weather data into significant safety and delay improvements is the Aviation Digital Data Service (ADDS). This strong collaboration between the FAA and the National Weather Service provides the latest forecasting breakthroughs to the entire aviation community to help reduce significant safety hazards and major causes of system delays. Using ADDS, accurate forecasts of aviation weather can be translated into probable impacts to the system. This allows for improved decision making, resulting in improved safety and reduced delays.

I am very concerned that the budget request will not support the R&D needs of the Weather Program. The request for this program is down from the FY10, FY11, and FY12 funding levels and is operating at half the level of funding of ten years ago. Yet our skies have become more crowded, with more than 87,000 flights in each day according to the National Air Traffic Controllers Association, and the need for this research greater. **To address the challenges and to meet the research needs of NextGen, I urge you to support $18 million, at a minimum, for the Weather Program for FY13.**

**Weather Technology in the Cockpit.** Pilots currently have little weather information as they fly over remote stretches of ocean where some of the worst turbulence is encountered. At the very least, providing pilots with an approximate picture of developing storms could help guide them safely around areas of potentially severe turbulence.

In addition, the most vulnerable pilots, those engaged in General Aviation activities, are forced to make critical weather decisions in the cockpit without support of a ground-based dispatcher for assistance. **Weather Technology in the Cockpit is launching a project to develop a mobile meteorological capability for use by this community.**
Weather Technology in the Cockpit 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. *I am very disappointed that the President’s FY 2013 request of $4.8 million for this small but life-saving program was reduced almost fifty percent from FY 2012 levels. I urge the Subcommittee to fund the Weather Technology in the Cockpit program at $10 million, at a minimum.*

**FAA Facilities and Equipment**

Within Facilities and Equipment, I would like to call your attention to the following extremely important programs:

**NextGen Network Enabled Weather (NNEW).** Delays in the National Airspace System (NAS) are primarily attributable to weather. According to the FAA, over the last five years more than 70 percent of delays of 15 minutes or more, on average, were caused by weather. Weather also affects safety. Between 1994 and 2003, weather was determined to be a contributing factor in over 20 percent of all accidents. Currently, most operational decision tools do not utilize weather information effectively or at all. Exploring, identifying, and employing better methods for data collection and communication will help facilitate the flow of operation-specific weather data and information to end users. The NNEW multiagency project is dedicated to using and developing technologies and standards for NextGen that will support effective dissemination of weather data. NNEW will develop the FAA’s portion of the 4-Dimensional Weather Data Cube. This will provide standardized information from disparate contributors and locations, to a variety of end-users such as air traffic managers and pilots.

In the FY13 request, the NNEW activity is listed under System-Wide Information Management (SWIM). Funding for the R&D work contributing to the 4-D Weather Data Cube will come from Common Support Services within SWIM, requested at $23.8 million. These services disseminate aviation weather information in a network enabled environment. From FY08 to FY12, UCAR helped the FAA frame and establish this effort under the name NextGen Net-Enabled Weather (NNEW). *I strongly urge the Subcommittee to support the $23.8 million request for Common Support Services within System-Wide Information Management (SWIM) and recommend that Congress retain the NextGen Network Enabled Weather (NNEW) title.*

**NextGen Reduce Weather Impact.** The current weather observing network of the National Airspace System is inadequate to meet the needs of NextGen. The NextGen Reduce Weather Impact program will increase network capacity, reducing congestion and meeting projected demand in an environmentally sound manner. Working with appropriate scientific, modeling and user communities, current sensor information and dissemination shortfalls will be identified and evaluated. Technologies for optimizing and improving automated aircraft weather reporting will be investigated to meet NextGen requirements. The Reduce Weather Impact portfolio will leverage the NNEW transformational program that will interface with NOAA’s 4-D Weather Data Cube, for universal common access to weather information. *To continue the work of NextGen Reduce Weather Impact, I urge the Subcommittee to increase the FY13 funding for the program from the requested $16.6 million to $43.2 million.*
Federal Highway Administration

According to the National Highway Traffic Safety Administration, there are over six million vehicle crashes on average each year. Twenty-four percent of these crashes—over 1.5 million—are weather-related. Weather-related crashes are defined as those crashes that occur in adverse weather (i.e., rain, sleet, snow, and/or fog) or on slick pavement (i.e., wet pavement, snowy/slushy pavement, or icy pavement). On average, 7,130 people are killed and over 629,000 people are injured in weather-related crashes each year. The FHWA Road Weather Management Program seeks to better understand the impacts of weather on roadways, and promote strategies and tools to mitigate those impacts. UCAR and its partners are key contributors the FHWA’s vision of "Anytime, Anywhere Road Weather Information" for road users and road operating agencies. Central to this commitment is the FHWA’s Intelligent Transportation Systems program within its Research, Technology and Education Program.

Intelligent Transportation Systems (ITS) within the Department of Transportation’s Research and Innovative Technology Administration (RITA)

The Connected Vehicle Technology (formerly IntelliDrive) program remains the centerpiece of the DOT ITS 2010-2014 Strategic Research Plan. This program creates partnerships between government, industry, academia and others to specify, develop and produce the necessary technology to continuously gather and broadcast information about a moving vehicle, including its surrounding weather conditions.

An example of leading edge applications and services supported by ITS is the Vehicle Data Translator, a prototype tool being developed at UCAR that will give drivers near-immediate information about unforeseen hazards. The system, which underwent field testing this past winter in Minnesota and Nevada, will inform drivers of what weather conditions they can expect to encounter in the next few seconds and minutes, giving them a critical opportunity to slow down or take other action. Once the system is operational, an onboard digital memory device will collect weather data such as temperature, and indirect indications of road conditions such as windshield wipers being switched on, or the activation of antilock brakes. The processed data will then be used to warn motorists about upcoming hazards—everything from icy roads to a nearby vehicle that is being driven erratically—and suggest alternate routes, if appropriate. The system will also alert emergency managers to hazardous driving conditions and help road crews clear snow more efficiently.

To meet its core research and technology transfer mission, and support projects like the Vehicle Data Translator, I urge the Subcommittee to support the requested amount of $110 million for ITS, which includes $46.1 million for IntelliDrive V-V and V-I Communications for Safety and $15.5 million for Dynamic Mobility Applications.

On behalf of UCAR, I want to thank the Subcommittee for its leadership in supporting research and development and technology transfer programs within the FHWA and FAA and for your commitment to ensuring safer, more efficient air and road travel. I urge you to support these relatively small, but critically important R&D programs within the FHWA and FAA FY 2013 budgets.