

Testimony prepared by
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Submitted 16 April 2009, to the
Subcommittee on Transportation, Housing and Urban Development, and Related Agencies
U.S. House of Representatives Committee on Appropriations
Regarding FY 2010 Appropriations for the
Federal Highway Administration (FHWA) and the Federal Aviation Administration (FAA)

On behalf of the **University Corporation for Atmospheric Research (UCAR)** and the larger university community involved in weather and climate research and development activities, 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 73-university member consortium that manages and operates the National Center for Atmospheric Research (NCAR) and additional programs that support and extend the country's scientific research and educational capabilities. Our mission is to better understand the behavior of the atmosphere and related global systems and to help communities, states, and nations use this information to sustain and improve life on Earth. UCAR is supported by the National Science Foundation (NSF) and other federal agencies including the Federal Highway Administration (FHWA), and the Federal Aviation Administration (FAA).

I want to thank the Subcommittee for its leadership in supporting research and development programs within the FAA and FHWA in the FY 2009 appropriations; *I urge you to support the Administration's commitment to ensuring safer, more efficient air and road travel. One essential piece to this commitment of modernizing air and surface travel will be the ability to access real-time weather information. I urge you to support these relatively small, but critically important R&D programs within the FAA and FHWA budgets.*

The Federal Highway Administration

The FY 2010 budget request for the USDOT should support the Administration's and the country's commitment to a safe, efficient, and modern surface transportation system.

Weather research and intelligent transportation system (ITS) technology significantly contributes to this commitment. According to the National Academy of Sciences, adverse weather conditions obviously reduce roadway safety, capacity and efficiency, and are often the catalyst for triggering congestion. In the U.S. each year, approximately 7,000 highway deaths and 450,000 injuries are associated with poor weather-related driving conditions. This means that weather plays a role in approximately 28 percent of all crashes and accounts for 19 percent of all highway fatalities.

Road Weather Research and Development Program

Bad weather contributes to 15 percent of the nation's congestion problems; the economic toll of weather-related deaths, injuries and delays is estimated at \$42 billion per year. The Road Weather Research and Development Program (Section 5308 in the SAFETEA-LU authorization bill) funds the collaborative work of surface transportation weather researchers and stakeholders. This work is potentially life saving for the users of the national surface transportation system. Much has been accomplished already in understanding and developing decision support systems to address the impact of poor weather on the surface transportation

system including congestion. For example, 23 State Departments of Transportation (DOTs) have already benefitted from the development and implementation of real world decision support solutions, including the Winter Maintenance Decision Support System, and the recently developed *Clarus* System, that provides easy access and quality checking capabilities for DOT road weather datasets. To date, 30 State DOTs are utilizing the *Clarus* System and the number is growing. However, additional resources are required to develop technologies that will support improvements in traffic, incident, and emergency management to develop, test, and implement solutions nationally that will save lives, reduce congestion and improve the environment.

A fully funded USDOT Road Weather Research and Development Program at the \$5M level would support the development of technologies that would integrate weather and road condition information in traffic management centers, improved understanding of driver behavior in poor weather, develop in-vehicle information systems and wireless technologies (e.g., IntelliDrive) 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 (e.g., signal timing and ramp metering) optimized for poor weather and road conditions.

SAFETEA-LU (Section 5308) contains language that established the Road Weather Research and Development Program within the USDOT ITS Research and Development Program, with annual authorized funding at \$5.0 million (significantly less than the National Research Council's recommendation of \$25.0 million). This road weather research program is well supported by numerous organizations including the American Association of State Highway and Transportation Officials (AASHTO), the Intelligent Transportation Society of America (ITSA), the Transportation Research Board (TRB), the National Research Council (NRC), State Departments of Transportation (DOTs), numerous commercial weather service companies, and the American Meteorological Society (AMS). Improved safety, capacity, efficiency and mobility, of the national roadway system will benefit the general public, commercial trucking industry, State DOT traffic, incident and emergency managers, operators and maintenance personnel. Environmental benefits will be realized due to improved efficiency in the use of anti-icing and deicing chemicals for winter maintenance, reduced congestion, and improved mobility. I strongly recommend this program be reauthorized, at the very least, at the current level in the pending transportation authorization bill. ***I urge the Committee to fund the Road Weather Research and Development Program at the authorized level of \$5.0 million, at a minimum, in FY 2010.***

Federal Aviation Administration (FAA)

“Modernizing our air transportation system is a national priority. The historic funding levels authorized will accelerate the implementation of air traffic control modernization and the Next Generation Air Transportation System.” Chairman Oberstar, Transportation and Infrastructure Committee March 5, 2009.

Last month, the Transportation and Infrastructure Committee approved HR 915, the FAA Reauthorization Act of 2009. I urge the Committee to refer to this bill when marking up the FY10 FAA appropriations bill. I am pleased that HR 915 provides \$70 billion to the FAA and federal aviation infrastructure programs for the next four years, and I ask that you pay particular attention to the following R&D programs authorized in HR 915, that are focused

on developing useful aviation applications heavily oriented toward real-time operational systems:

Weather Program

According to the FAA, 70 percent of flight delays are caused by weather. FAA's Weather Program is a research program focused on improved forecasts of atmospheric hazards such as turbulence, icing, thunderstorms and restricted visibility. Improved forecasts enhance flight safety, reduce air traffic controller and pilot workload, and enable better flight planning and productivity. Enhanced research and improved technologies will result in longer forecast lead times, increased accuracy and ultimately, more efficiency and safer skies. The FAA funds the development of experimental products. The Aviation Digital Data Service (ADDS) is an excellent example of the FAA's R&D program working at an operational level. Through the National Weather Service, ADDS makes available to the aviation community text, digital and graphical forecasts, analyses, and observations of aviation-related weather variables.

Weather Technology in the Cockpit

Weather, according to the FAA, is more than twice as likely to cause general aviation fatalities as any other factor and is also the largest cause of general aviation fatalities in the United States, equating to 200 deaths annually. Weather uplinks in the cockpit, when combined with a thorough preview of the weather during pre-flight planning and other cockpit weather avionics, will help ensure that general aviation pilots increase awareness and reduce accidents. *Weather Technology in the Cockpit*, a new and innovative program, will provide a common weather picture to pilots, controllers, and users, and will expedite flight planning and decision-making. "Cockpit weather" applied research will focus on hardware and software standards, integrate weather information, and prototype forecasting products for the flight deck.

Next Generation Air Transportation System Joint Planning and Development Office

According to the FAA report, "Flight Plan 2009-2013," the total number of commercial passengers in U.S. airspace is approaching 800 million per year, which makes it imperative the FAA continue with its plans to launch "NextGen," the Next Generation Air Transportation System. The multi-agency Joint Planning and Development Office (JPDO) has been tasked by Congress to coordinate and manage six agencies focused on bringing NextGen online by 2025. JPDO has evolved from its focus from long-term planning to near-term implementation of NextGen. The UCAR community is playing a significant role in formulating weather-related R&D that must be accomplished to support NextGen.

Wake Turbulence

Aircraft in flight create wake turbulence, dangerous swirling air masses that trail from aircraft wingtips. As air traffic increases and air corridors draw closer, the wake turbulence becomes more and more of a safety factor during cruise flights. This commercial problem is strongly related to technical and scientific issues. Different ways have been explored in order to decrease the separation distances between aircraft. Better detection and forecasting of wake turbulence is a key element in the FAA's safety program. To accomplish this, a higher-resolution forecast model will be required to forecast wake vortex decay. The Weather Research and Forecasting (WRF) model, a collaboration of agencies and universities, has the potential to meet this requirement in the necessary time frame and is expected to be field tested this year.

Atmospheric Hazards/Digital System Safety

In-flight icing is both an aviation safety and efficiency issue: icing is a cause or factor in numerous fatal aircraft accidents; current official forecasts typically cover more space and time than needed and thus deny use of aircraft or airspace unnecessarily. Avoidance of icing conditions would be possible with improved operationally-available, high-resolution, accurate diagnoses and forecasts. The FAA’s Atmospheric Hazards/Digital System Safety Research Program focuses on reducing the number of accidents or potential accidents associated with aircraft icing. The program promises to develop and test technologies that detect icing, predict anti-icing fluid failure, and ensure safe operations both during and after flight in icing conditions.

NextGen Network Enabled Weather (NNEW) and Reduced Weather Impact

The current weather dissemination system is inefficient to operate and maintain. Information gathered by one system is not easily shared with other systems. This leads to redundant and inconsistent information, and in many cases information not being universally available or used leading ultimately to suboptimal decisions. The complementary goals of NNEW and RWI are to integrate tens of thousands of global weather observations and sensor reports from ground-, airborne-, and space-based sources into a single national (eventually global) weather information system, constantly updated as needed. This integration will be enabled by system-wide availability of observational and forecast weather information to all NextGen users, service providers, military planners, security personnel, and the flying public. The key word is "information." No longer will it be necessary to manually gather and integrate diverse weather data to realize a coherent picture of the weather situation -- that will be accomplished with automation assistance prior to dissemination to interested parties. This will enable “common situational awareness” of the weather, and rapid dissemination of any changes.

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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 the Committee for the important work you do that supports the country’s scientific research, training, and technology transfer. We understand and appreciate that the nation is undergoing significant budget pressures at this time, but a strong nation in the future depends on the investments we make in research and development today. We appreciate your attention to the recommendations of our community concerning the FY 2010 FHWA and FAA budgets and your concern for safety within the nation’s transportation systems.