

# Department of Transportation

*The Department of Transportation's Arctic and cold weather programs cover transportation issues in the air, on land, and at sea and are conducted by the Federal Aviation Administration, the Federal Highway Administration, and the Maritime Administration.*

## *Federal Aviation Administration*

The FAA's Capstone Program is an urgent initiative to improve commercial flight safety in western Alaska. It is a joint industry and FAA Alaskan Region effort to improve aviation safety and efficiency by putting cost-effective, new-technology avionics equipment into aircraft and providing the supporting ground infrastructure.

The demonstration areas are non-radar environments where most of the air carrier operations have been limited to visual flight rules. Capstone is equipping aircraft used by commercial operators in the area with a government-furnished avionics package that uses a global positioning system (GPS). In addition to the avionics suites, Capstone is deploying equipment for weather observation, data link communications, surveillance, and flight information services.

Capstone has also increased the number of airports served by an instrument approach and now enables radar-like instrument flight rule (IFR) air traffic control services. A significant number of mid-air collisions, controlled flight into terrain, and weather-related accidents can be avoided with new technologies incorporated into the Capstone avionics package.

The University of Alaska Anchorage is conducting training for Capstone participants and is performing an in-depth safety study and assessment of the Capstone program.

Phase II of Capstone will move to southeast Alaska, a more environmentally challenging area of the state. As with Phase I in the Yukon-Kuskokwim Delta, Capstone plans to equip aircraft used by commercial operators and deploy a ground system that will support a usable IFR infrastructure and improve communications.

## *Federal Highway Administration*

The Federal Highway Administration (FHWA) coordinates a number of activities aimed at improving safety, mobility, productivity, environmental quality, and national security on the nation's highways with respect to weather threats. It includes research to advance the state of the art concerning road weather management tools, as well as documentation and promotion of the best practices.

The Road Weather Management Program has documented the best practices of maintenance managers, traffic managers, and emergency managers in response to various weather threats. In May 2003, FHWA released Version 2.0 of the *Best Practices for Road Weather Management* CD-ROM. This resource contains 30 case studies of systems in 21 states that improve roadway operations in adverse weather, a listing of over 200 publications related to road weather management, and an overview of environmental sensor technologies, as well as online resources. Each case study has six sections, including a general description of the system, system components, operational procedures, resulting transportation outcomes, implementation issues, and contact information and references.

One example of successful road weather management was when the maintenance division of the Montana's Department of Transportation (DOT) used mobile anti-icing and de-icing strategies to proactively respond to winter storms. When performance was compared to a maintenance division that used reactive treatment after storms, it was found that average labor, materials, and equipment costs for the proactive division were 37% lower. Additionally the level of service was higher on

*For more information on Capstone, visit <http://www.alaska.faa.gov/capstone> or call James Call at 907-271-3771.*

road sections treated by the proactive division, resulting in safety and mobility improvements.

The Maintenance Decision Support System (MDSS) project is a multi-year effort to develop and field test decision support components for winter maintenance managers. The MDSS was designed by a consortium of national laboratories, based on requirements articulated by maintenance managers, to help the managers improve the level of service on roadways during winter weather and to minimize road treatment costs by optimizing the use of labor, materials, and equipment. This data management tool has advanced weather and road condition prediction capabilities, including air and pavement temperatures, precipitation start and stop times, precipitation types, and accumulation amounts. These predictions are fused with customized maintenance managers' rules of practice to generate route-specific treatment recommendations, such as strategy, timing, and material application rates.

From February to April 2003 the MDSS prototype was demonstrated and evaluated in three Iowa DOT maintenance garages. The main display of the demonstration prototype includes predicted weather and road conditions, a weather parameter selection menu, a map of roads and weather alerts, and forecast animation controls.

Lessons learned from the preliminary demon-

stration will be used to enhance the prototype prior to a second demonstration planned from December 2003 to March 2004. Version 2.0 of the MDSS software will be released in the fall of 2003. Such products support the FHWA deployment strategy, which consists of the private sector building end-to-end products based on the core MDSS functionality. These products will be procured by public agencies such as state DOTs, enabling both the private and public sectors to benefit from millions of dollars of high-risk research.

## *Maritime Administration*

MARAD is the advocate for commercial shipbuilding in the Federal government, and it provides expertise and support services to other Federal agencies in this technical area. In 2003 the NSF signed a Memorandum of Agreement with MARAD for the conduct of a number of technical studies related to a new-generation polar research vessel. Prior to this, however, two workshops were held to determine the scientific and operational requirements for the vessel for possible operations in the first half of the 21<sup>st</sup> century in the Antarctic. Those requirements are being translated into a set of technical criteria to assess the size and characteristics of the vessel.

*Additional information on the MDSS project can be found at [http://www.rap.ucar.edu/projects/rdwx\\_mdss](http://www.rap.ucar.edu/projects/rdwx_mdss).*