Next Generation to Fix Air Transportation System

CSUN Receives Four-Year Grant to Participate In Developing Air Traffic Operational Upgrades

By Mark R. Madler

Researchers at California State University, Northridge received a $277,000 grant to modernize the nation’s air traffic control system and cut down on delays.

The funding is part of a larger $3 million program involving multiple universities and Boeing Co. that will make the system more efficient without building new airports.

This comes at a time when 2007 is shaping up to be the worst in on-time arrivals and departures for major commercial air carriers since the Department of Transportation started keeping data in 1995.

In the first nine months of the year, more than 24 percent of flights arrived late. One of the most infamous examples occurred in February when passengers aboard JetBlue planes were left stranded up to 10 hours.

President Bush addressed the problem by opening up military airspace on the East Coast for flights during the Thanksgiving holiday flying period.

Domestic carriers were expected to fly roughly 27 million passengers worldwide over 12 days beginning Nov. 16, with planes about 90 percent full, according to the Air Transport Association.

Through the four-year grant, CSUN will support the goals of addressing traffic growth, environmental impact and security of the Next Generation Air Transportation System under development by the Federal Aviation Administration and NASA.

Instructors and students will look at ways of measuring situational awareness and to better operate the system, said Nhut Tan Ho, an assistant professor in mechanical engineering.

“In particular, we want to equip aircraft with new capabilities and assign new roles and responsibilities to the pilot,” Ho said.

Knowledge of situation

Situational awareness is the knowledge a pilot or air traffic controller has about what is taking place in the cockpit or the control station and outside the aircraft in terms of other planes, weather and limitations in the airspace that affect maneuverability.

Adding more automation to the on-ground control system will play more of a role in monitoring air traffic and allow the pilot more decision-making ability in route selection, Ho said.

If the pilot is making more decisions, the air traffic controller becomes more of an air traffic manager with a reduced workload, said Barry Berson, a part-time CSUN psychology professor working with Ho on the project.

“As long as the pilot is not doing anything to violate anything in the airspace, they have the freedom to maneuver in the airspace,” said Berson, who works on cockpit design for Lockheed Martin in Palmdale.

University research along will not make for a more efficient air traffic system.

This is why the FAA wants to replace its current radar-based equipment with satellite-based technology that gives pilots and controllers real-time information.
In the short term, however, modifications have been made to airspace in the Northeast, the most congested in the nation, that reduce delays, in particular out of Kennedy International Airport in New York City.

The decision by President Bush to allow commercial jets in military airspace is a start as well, said David Castelveter, a spokesman for the Air Transport Association, the trade group representing the commercial airline industry.

“We have to be doing these things not only at Thanksgiving and Christmas but permanently and that requires a suite of actions,” Castelveter said.

The most important action, according to the ATA, would be fast-tracking improvements to the air traffic control system.

To say the radar-based equipment used throughout the United States comes from the Stone Age may not be much of an exaggeration, considering that Mongolia has a satellite-based air traffic system.

A controller using a radar-based system watches a beacon that goes around once every 12 seconds. To ensure the safety, 3 to 5 miles is put between aircraft flying on a limited number of flight paths. Weather problems require even further distances between planes.

Satellite-based technology provides real-time information and allows controllers to put less distance between planes, even allowing aircraft to land on parallel runways at the same time, Castelveter said.

With more aircraft in the sky – both commercial jets and private planes – there is an urgency to update the equipment controlling the airspace.

“If we don't get the technology, it is like pouring glue on the system,” Castelveter said.