Boeing ATM Demonstrates Technology Leading to More Precise In-Flight Aircraft Surveillance, Identification

Potential benefits include improved security, reduced air traffic congestion, greater system efficiency.

Boeing [NYSE: BA] Air Traffic Management has demonstrated flight surveillance technology that could lead to more precise aircraft monitoring and identification with the potential to increase both air traffic control efficiency and airspace security.

The technology uses processors that combine radar and satellite-derived location and identity data for display on a single screen. Once in the system, this information has the potential for selective, multi-user distribution on a secure network.

"Rather than three potentially confusing blips representing the same airplane appearing separately on the radar screen, our demonstration flights show we can fuse signals to provide more accurate tracking," said Dave Jones, Boeing's Global Communications, Navigation and Surveillance System (GCNSS) program manager.

"This demonstration is the foundation for further research and development that will enable radar and related information, once captured in the air traffic control system, to be distributed instantly and securely to multiple authorized users," Jones said. Additional users could include security agencies, the military, airlines, weather centers and potentially other aircraft.

During two February demonstration flights with specially equipped aircraft operating in the Maryland-Virginia Potomac region, an air traffic control work station displayed a radar image of the aircraft transmitted from a series of long- (250 miles) and short- (60 miles) range radar sights.

Simultaneously, the display captured a third signal, showing the aircraft's location determined by global positioning system (GPS) satellites.

The two radar and one GPS-derived signals were combined for display as a single blip showing location and identity. Without the fusing, the display would have shown potentially confusing multiple targets at varying intervals for each aircraft,

Helping make this more accurate tracking and identification possible is Automatic Dependent Surveillance-Broadcast (ADS-B) technology, which the Federal Aviation Administration is developing and demonstrating under its SafeFlight 21 program. Aircraft-based processors using ADS-B derive the aircraft's position and broadcast it to special ground stations. Boeing is using ADS-B under its GCNSS contract with the FAA.

"The demonstration showed ADS-B technology, combined with the fused signals, could also lead to reducing aircraft separation to three from five miles in general, en route airspace. This could increase system capacity," Jones added.

Sensis Corporation of DeWitt, N.Y., developed the signal-fusing technology.

The GCNSS contract calls for Boeing to develop communications, navigation and surveillance concepts to support the next-generation air traffic management system.

Earlier in the program, Boeing and the FAA used satellites to provide precise monitoring in areas without radar. That occurred during a November demonstration flight over the heart of the Gulf of Mexico.

Before that, the company and agency used satellites to carry a variety of additional digital communication, navigation and surveillance information not currently exchanged between aircraft and ground receivers.

Also participating in the most recent flight demonstrations and receiving data were Boeing ATM, Seattle, Wash.; CNS Aviation, Leesburg, Va.; Embry-Riddle Aeronautical University, Daytona Beach, Fla.; Maryland Advanced Development Laboratories, Greenbelt, Md.; Massachusetts Institute of Technology's Lincoln Laboratories, Lexington, Mass.; and Mitre CAASD, McLean, Va.

Boeing established its Air Traffic Management unit in November 2000 to dramatically improve air traffic systems throughout the world. Its aims are to make flying even safer and more secure; significantly reduce delays, congestion and environmental impact; keep aviation affordable and accessible for commercial, military, business and general aviation users; and enable seamless global aviation operations.

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