



Flight Deck-Based Merging and Spacing

A concept termed Flight Deck-Based Merging and Spacing (FDMS) is under development by a joint government/industry team led by the Federal Aviation Administration (FAA) Surveillance and Broadcast Services Program Office. With participation from the National Aeronautics and Space Administration (NASA), the Air Line Pilots Association (ALPA), Aviation Communication & Surveillance Systems (ACSS), UPS, Boeing, Honeywell, MITRE, and others, the team is conducting collaborative research and development to ensure the viability and safety of the FDMS concept. Based on past research and development done in the United States and Europe, FDMS gives flight crews the ability to use speed management derived from on-board equipment to achieve and maintain in-trail spacing. This operation is intended to reduce the need for air traffic control (ATC) interventions and provide for the delivery of accurate, low-variance spacing for merging and arriving aircraft.

The FDMS procedure utilizes the FAA's cornerstone future surveillance system known as Automatic Dependent Surveillance – Broadcast (ADS-B) for the aircraft-to-aircraft broadcast of precise position and velocity information. This information allows pilots to track the movement of their own and other aircraft on a cockpit display. FDMS permits flight crews aboard properly equipped aircraft to assist the controller in maintaining spacing within aircraft pairs. During Continuous Descent Arrival (CDA) operations, FDMS can help maintain capacity by optimizing the overall spacing among a stream of aircraft.

MITRE recently conducted a series of pilot and controller human-in-the-loop evaluations in simulated en route and terminal flight environments so that the FDMS procedure could be iteratively tested and refined. Our simulations affirmed that FDMS can minimize the need for controller interventions with traffic, reducing time and distance flown as well as the voice communications load. This research, coupled with demonstrations to key FAA officials, helped mature the concept and support its introduction to the field. ACSS has recently gained FAA approval to install FDMS equipment on Boeing 757s, and UPS has applied for FAA's permission to conduct the FDMS operation.

The fielding of spacing concepts such as FDMS, enabled through advances in technology such as ADS-B, is a necessary initial step to realization of the FAA's Next Generation Air Transportation System (NextGen) and Europe's Single European Sky Air Traffic Management (ATM) Research (SESAR). These visions are intended to increase the safety, security, and capacity of future air transportation operations to address the expected public demand.



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