



Collaborative Air Traffic Management

The United States air transportation system is a complex environment in which the actions of thousands of people, combined with acts of nature, ultimately determine the behavior of the system as a whole. Human decision making is involved in system operations at all levels, from the piloting of individual aircraft to the planning and management of air traffic flows regionally and nationally. In making decisions and taking the appropriate actions, decision makers draw on their own knowledge and expertise, as well as on information available to them on the current and predicted state of the air transportation system.

The MITRE Corporation's Center for Advanced Aviation System Development (MITRE/CAASD), a federally funded research and development center sponsored by the Federal Aviation Administration (FAA), is exploring new ways to increase information sharing among decision makers. MITRE/CAASD is also investigating alternative concepts for interactive decision making and for sharing decision-making authority to take better advantage of available information, experience, and operational perspectives.

The overall goal of air traffic management (ATM) is to ensure safe, orderly, and expeditious air traffic flows. There are two groups of decision makers: those who provide system services and those who use these services. The actions of these participants are based on the information available to them and on their individual goals. While all participants share the goal of a safe, efficient air transportation system, individual goals and definitions of what is efficient will vary and may sometimes conflict. For example, a controller's primary goal is to safely separate air traffic. A traffic manager is concerned with keeping smooth traffic flows within safe capacities in the National Airspace System (NAS). An airline dispatcher is concerned with safety, airline operating efficiency, and profitability.

While the goal of ATM remains the same, the underlying philosophy has been changing. Recently, emphasis has been placed on collaborative ATM, which

will integrate the role of flight planners, airline dispatchers, and aircrews into the decision-making process. The FAA and the users will work collaboratively to meet the overall goal of ensuring safe, orderly, and expeditious air traffic flows. In a collaborative ATM system:

- Service providers are focused on safety and equity.
- Airspace users are focused on their own operational and business objectives.

Current MITRE/CAASD research into collaborative ATM is focused on improving the decision-making process through better information sharing and decision support automation. Aspects of this new approach are already evident in today's NAS operation. The FAA's Enhanced Traffic Management System (ETMS), for example, provides real-time and predicted information about national air traffic flows and is currently used at FAA and international air traffic facilities. This information is also used by airline operational control centers. This tool provides a shared understanding of national traffic flows among a broad range of decision makers. In pursuing its collaborative ATM research, MITRE/CAASD is expanding the ETMS capabilities to provide for broader information sharing between service users and providers as well as additional decision support systems. These decision support systems will provide for more effective collaboration in the identification of flow problems and development of flow problem resolution strategies.

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