Implementing Traffic Flow Management Reroutes: An Integrated Approach

As part of the effort to improve National Airspace System (NAS) operations, The MITRE Corporation’s Center for Advanced Aviation System Development (MITRE/CAASD) has led the development of an integrated concept for airborne rerouting that decreases the associated time and workload to implement, and improves communications between the Federal Aviation Administration’s (FAA’s) Traffic Flow Management (TFM) and en route Air Traffic Control (ATC) systems.

Airborne rerouting is initiated when there is a need to change a flight’s planned route of flight to avoid a constraint (like a thunderstorm) or to solve a demand-capacity imbalance. Currently, this is a manual, labor-intensive process to coordinate between TFM and ATC personnel, as the associated automation systems do not have an integrated capability to implement the reroutes.

MITRE/CAASD provided cross-domain engineering and operational expertise to define the initial implementation of airborne rerouting, building on the predeparture rerouting capability currently under development. The MITRE/CAASD effort included the development of a concept of operations, storyboarding activities, requirements development, and evaluation of a high fidelity, integrated, cross-domain prototype in MITRE/CAASD’s Aviation Integration Demonstration and Experimentation for Aeronautics Laboratory (IDEA Lab).

Multiple technical and operational reviews and assessments meetings were conducted by MITRE/CAASD over a two year period, involving a wide range of stakeholders, including the FAA TFM and en route operations specialists, development contractors for both the TFM and en route systems, and the John A. Volpe National Transportation Systems Center. The resulting technology transfer package has enabled the FAA to complete the definition of the integrated capability.

Airborne rerouting is a multi-step process that requires a high level of coordination. It is initiated with the creation of a reroute Traffic Management Initiative by TFM in response to a predicted or current constraint. Flights that need reroutes are identified by TFM personnel using TFM automation, which then sends flight-specific reroutes electronically to the en route ATC automation.

Reroute notifications will appear on the en route ATC controller’s display for affected flights. The controller will issue the reroute clearance by voice to the pilot and, upon acknowledgement from the pilot, will
amend the flight's route in automation using the electronically-provided reroute.

The individual flights are then monitored by TFM for conformance to the reroute.

In the future, the airborne rerouting capability can be enhanced in a number of ways. With the implementation of data link communications, reroutes can be sent directly to the cockpit, eliminating the need for lengthy and potentially misunderstood verbal clearances. Further evolution can provide even more levels of integration to facilitate the coordination required between TFM and en route.

En Route ATC Flight-specific Rerouting Capability