



Performance-Based Air Traffic Management: Validation Activities Toward OEP/NextGen

Aviation is a critical part of the U.S. economy. Increases in air traffic volume and complexity, combined with projected budget constraints over the coming years, will create challenges for our nation's Air Traffic Management (ATM) system. The safety, capacity, and productivity of the National Airspace System (NAS) can be significantly improved through the Operational Evolution Partnership (OEP) that comprises an integration of enhanced ground and air automation technologies and procedures, enabling operational demands on the NAS to be met in a safe and more efficient manner.

In partnership with the Federal Aviation Administration (FAA), The MITRE Corporation's Center for Advanced Aviation System Development (MITRE/CAASD), has developed an operational concept as a subset of the OEP evolution to NextGen, known as Performance-Based ATM. This concept introduces



fundamental shifts in the use of automation capabilities across the NAS that increases operational productivity while still maintaining a human-centered operation. This shift is based on a cross-domain set of capabilities, procedures, and concepts that will revolutionize the way the FAA operates its air traffic system. The Performance-Based ATM validation activities focus on a set of operational changes that can be achieved in an evolutionary manner through OEP.

Under the Performance-Based ATM concept, many routine air traffic control tasks will be automated. Terminal operations will leverage a network of highly precise



RNAV/RNP routes. These routes would be designed to increase flexibility, efficiency, and capacity. The flight deck automation would enable aircraft to fly these routes and altitude profiles precisely while exchanging flight status and intent information with the ground system. In En Route operations, responsibility for problem prediction would migrate from controllers to ground automation, and controllers would solve problems

using automated resolution assistance. The integration of advanced automation with air/ground data communications would assist the controllers in accommodating pilot requests and providing more efficient maneuvers when resolving predicted conflicts.

The Performance-Based ATM concept provides for better management of uncertainty with capabilities that support enhanced decision-making and efficient execution of flight-specific initiatives. The reduction in execution time, along with improved tools for defining and monitoring the initiatives, would allow for better traffic flow planning and provide the opportunity to implement initiatives incrementally and only when necessary. In this highly-predictable operational environment, user preferences would be better accommodated through collaborative ATM activities. The Performance-Based ATM portfolio of capabilities can provide vastly improved air traffic services that promote increased safety, capacity, efficiency and operational productivity.

The FAA and CAASD are validating the Performance-Based ATM concept through human-in-the-loop laboratory experiments. FAA En Route and Terminal Front Line Managers from all around the country have actively participated in assessing both the quantitative benefits as well as the operational feasibility of this concept. The FAA Vice Presidents from across the Air Traffic Organization lines of business (including Terminal Services, En Route and Oceanic Services, System Operations, and Operations Planning) and the Joint Planning and Development Office have been the primary sponsors for this research as they plan for the future.



The Performance-Based ATM research and validation activities will continue to inform OEP activities for transforming air traffic operations toward NextGen and changing the controllers' roles and responsibilities in order to safely and efficiently meet the future demand on the NAS.

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