

Automatic Dependent Surveillance-Broadcast (ADS-B) In-Trail Procedures (ITP)

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Aircraft in oceanic and remote non-radar airspace frequently fly for extended periods of time in the same direction, at the same time, along similar flight paths as other aircraft. Since there is no radar surveillance, controllers use procedural separation to ensure that aircraft remain separated. Procedural separation distances are typically larger than radar separation distances and as a result aircraft operating in oceanic airspace are sometimes held at non-optimal flight levels due to conflicting traffic at intervening flight levels.

Automatic Dependent Surveillance-Broadcast (ADS-B) In-Trail Procedures (ITP) were developed to enable flight level change maneuvers that would otherwise not be possible with current procedural separation standards. Aircraft operators choosing to equip with an ADS-B transceiver and an appropriate onboard decision support system would be able to take advantage of these procedures when operating in proximity to aircraft equipped with a suitable ADS-B transmitter (“ADS-B Out”). The ability to perform in-trail maneuvers to achieve more time at optimum altitudes could result in more efficient and predictable flight profiles thereby saving fuel and in some cases allowing operators to make beneficial operational decisions.

NASA first began developing ADS-B ITP in 2003 as a result of a desire to develop methodologies, concepts, and procedures to reduce separation requirements for future air transportation systems using airborne ADS-B. The objectives were to provide insight into the details necessary to reduce separation requirements for the future and to develop applications that could provide incentives for operators to voluntarily equip with transformational technologies. From 2003 to 2008, NASA conducted research that supported the development of ITP including batch simulations, human-in-the-loop experiments and avionics and separation standards development.

This research showed enough maturity and benefit that in 2008, the FAA Surveillance and Broadcast Services (SBS) program adopted ADS-B ITP as one of their three key, near-term applications to make use of ADS-B-In. The FAA developed an agreement with NASA to transition the technology and established an FAA project for the purpose of performing an operational trial of ADS-B ITP in revenue service in the summer of 2011. The objectives of the project are to a) validate the operational performance and economic benefits of ITP; and b) develop and validate ADS-B ITP Minimum Operational Performance Specifications (MOPS) material. As a part of this project, the FAA established agreements with United Airlines and Honeywell. The agreements include the work necessary for the development, certification and installation of onboard systems for twelve United Airlines 747-400s. ITP system development is nearly complete and certification activities are underway.

The FAA project has also been working with Oakland Oceanic Control Center (ZOA) and the FAA’s Oceanic and Offshore Operations Office to develop controller procedures and safety analyses that are required to support the flight trial. The FAA has also been working on the development of an ITP Operational Specification that should be approved this April.

The presentation will cover some of the key aspects of the development, challenges, and integration required to successfully transition ADS-B ITP from a concept in 2003 to flight trials in revenue service in 2011.