

Surveillance & Broadcast Services

Advanced Surveillance Enhanced Procedural Separation (SBS ASEPS)

Status Update

Presented to: Informal South Pacific ATC
Coordinating Group (ISPACG)

By: FAA Project Management Organization

Date: 27-28 July 2021



Federal Aviation
Administration



Purpose

- Provide an update on the current SBS ASEPS program activities, including the following:
 - Status of the Operational Evaluation (OpEval) of Space-based ADS-B (SBA) surveillance data in the Caribbean
 - Plan for SBA evaluations in the Oceanic environment
 - The FAA's exploration of non-operational SBA data
 - Next Steps



SBA Evaluations of Space-Based ADS-B

- The FAA has launched 3 evaluations to determine the benefits of space-based ADS-B (SBA) in the oceanic and offshore airspace, and an evaluation of non-operational SBA data for agency-wide use cases
 - In **March 2020**, the FAA launched a one-year evaluation of SBA in the Caribbean, providing an opportunity to assess performance and benefits of this technology
 - In **September 2020** the FAA initiated a non-operational SBA data evaluation looking at benefits across the agency, including accident investigation, search and rescue, environmental impact analysis, and tracking of commercial space activities
 - The FAA is also undertaking SBA data evaluations with all three of the U.S. oceanic Air Traffic Control facilities: Anchorage Center (ZAN); New York Center (ZNY); and Oakland Center (ZOA). This evaluation will provide insight into which applications the FAA will pursue



Caribbean Overview and Summary of Objectives

Overview

- Operational evaluation of Space-Based ADS-B (SBA) in Miami Air Route Traffic Control Center (ARTCC) Caribbean airspace
- Focused in Sectors 62 and 63 of Miami ARTCC (ZMA) airspace where only one radar, Grand Turk (GDT), is providing surveillance without backup

Summary of Objectives

- Evaluate SBA technical performance for 5nm separation, including:
 - Update rate
 - Latency
 - Impact of aircraft antenna placement
 - Satellite outage durations
 - Other aspects critical to air traffic operations
 - SBA data merged with terrestrial ADS-B for improved system performance



Initially Expected Outcomes

- Generate a report and recommendations to address:
 - Continued use for contingency and resiliency
 - Safety enhancements
 - Airspace and operations efficiency
 - Controller workload impacts
 - Expansion to other geographic areas



Caribbean Update

- **In April 2021, the FAA completed a successful first look at SBA in the Caribbean**
- **Based on performance limitations the FAA was not able to bring the service operational however, this effort yielded valuable information about SBA performance in a complex airspace:**
 - High traffic volume
 - Varying levels of equipage
 - Proximity to congested terrestrial airspace
- **SBA Constraints:**
 - SBA works only with 1090ES equipped aircraft
 - Limited usability in NAS airspace due to mixed equipage picture
- **The FAA found the following factors influenced SBA performance:**
 - Spectrum congestion
 - Aircraft with bottom antenna only (no diversity)
 - Single satellite coverage at lower latitudes
 - Low power top antenna
 - Unknown transponder performance issues that are more pronounced due to radio frequency characteristics



Next Steps

- **Utilize lessons learned from the Caribbean and focus FAA resources towards Oceanic use**
- **Continue to monitor SBA performance in the Caribbean using non-operational data**
- **SBS Program Office to investigate the possibility of a terrestrial based solution**



EVALUATION PROJECTS USING SBA IN THE OCEAN

GOAL: IDENTIFY FUTURE OCEANIC CONCEPTS

Phase I – Implement technical changes to incorporate SBA data on the ATOP automation system

Phase II – Implement three Near-Term Initiatives to prove out the technology and identify additional use cases:

ZAN: SBA on ATOP supporting 5NM separation near Shemya Island and supporting procedural separation in Oceanic airspace

ZOA: SBA on ATOP supporting procedural separation at 12+ islands in South Western Pacific

ZNY: SBA on ATOP supporting procedural separation and on ERAM in Bermuda supporting 5NM separation

Phase III – Identify ATOP enhancements supporting reduced Oceanic separation enabled by SBA



Oceanic Evals: Challenges and Opportunities

Challenges

- **Technical:**
 - Need for engagement with ICAO on SBA performance requirements and socialize FAA's understanding of SBA performance limitations
- **Operational:**
 - Pairing SBA performance limitations with current ATOP operational requirements have created suitability concerns for ATOP controllers
- **COVID-19:**
 - Continues to delay the planned execution of the Oceanic Evaluations and impacts the ability to deliver Oceanic benefits until the 2028-2029 timeframe.

Opportunities

- **Based on the current challenges there is an opportunity to shift project scope and evaluate SBA performance and benefits**
 - Continue SBA analysis and engage with ICAO on performance limitations
 - Work to strengthen the benefits pool by creating requirements for additional SBA applications
 - Work towards a timeline that delivers these benefits in 2025-2026 timeframe

Bottom line: the FAA remains committed to SBA and continues to look for opportunities to utilize SBA to provide benefits for airspace users



Next Steps

- **Return to the FAA Joint Resources Council (the primary acquisition governance board) in October to get permission to proceed with re-scope**
- **Continue SBA performance analysis in all of the U.S. delegated Oceanic airspace**
- **Develop ConOps and requirements for additional SBA applications**
- **Engage with ICAO on requirements interpretation**



Non-Operational SBA Data Evaluation Overview

- **Agency priority**
- **Evaluating non-operational SBA data will**
 - Advance FAA understanding of SBA data use
 - Ensure Return on Investment (ROI)
 - Show value across FAA & use in investment planning
- **FAA leadership expressed that Agency should identify use cases that will benefit FAA and NAS users**
- **Evaluation being conducted from September 1, 2020 – August 31, 2021**
- **Received 21 proposed use cases, submitted by 16 FAA Offices, that encompass multiple Lines of Business**



Initial Use Cases

Airport Safety

- Airport Surface Anomaly Investigation Capability (ASAIC)
- Anomaly detection and replay at US airports



SAR

- Obtain flight data quicker
- Narrow search area – data nearer to time of crash



Safety & Risk Monitoring

- Aviation Risk Identification and Assessment (ARIA) tool
- Falcon – replay capability



TBFM/TFMS

- Better ETAs entering US airspace (i.e., Cuba)



Aircraft Airworthiness

- Fleet performance monitoring
- Conformance monitoring: Ability of each aircraft type to meet RVSM requirements




Safety Analysis

- Accident/incident investigations



 – US Terrestrial

 – Global (non-US)

 – US Oceanic

