ATO Program
Management Organization

ADS-B Program Status

Presented to: A4A CNS Task Force
By: Doug Arbuckle
Date: December 12, 2018
ADS-B Out Rulemaking

January 1, 2020, the FAA Final Rule for ADS-B Out equipage

- Published on May 27, 2010
- This rule applies to aircraft that desire to access certain airspace (14 CFR 91.225)
- This rule mandates performance requirements for ADS-B avionics that fly in certain airspace (14 CFR 91.227)
- ADS-B Out transmits location information received from the Global Navigation Satellite System (GNSS) out of the aircraft to ADS-B receiver stations and to other aircraft equipped to receive ADS-B broadcasts. The rule does not preclude other navigation source methods.
- This rule applies to all airspace that requires a transponder today
- This rule does not mandate ADS-B In
Required ADS-B Airspace

Visit https://www.faa.gov/nextgen/equipadsb/research/airspace/
Exemption 12555 Summary

• **not an extension** of the rule compliance date
• a **five year limited exemption only from 91.227(c)(1)(i) & (iii)** – the NIC and NACp requirements – under the following conditions and limitations:
  
  ➢ Each operator seeking exemption must have sent their application to FAA by 1-Aug-2018

  ➢ Operators of SA-Aware equipped aircraft with the Exemption are not required to conduct preflight verification; such operators are exempted from the performance requirements in 14 CFR §91.225 when their ADS-B Out equipment is not predicted to meet the requirements of §91.227(c)(1)(i) and (iii)

  ➢ Operators of SA-On equipped aircraft must conduct preflight verification; operators with the Exemption may operate in airspace specified in §91.225 when their ADS-B Out equipment does not meet the requirements of §91.227(c)(1)(i) or (iii) and the FAA determines there is a backup means of surveillance
    
    o FAA will make this determination available through the Service Availability Prediction Tool (SAPT)
Service Delivery Points for ATC Separation Services

<table>
<thead>
<tr>
<th></th>
<th>FY10-FY12</th>
<th>FY13</th>
<th>FY14</th>
<th>FY15</th>
<th>FY16</th>
<th>FY17</th>
<th>FY18</th>
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<tr>
<td>En Route</td>
<td>6</td>
<td>4</td>
<td>12</td>
<td>2</td>
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<td>N/A</td>
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<tr>
<td>Terminal</td>
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<td>13</td>
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<td>133 of 155</td>
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<tr>
<td>Surface (Advisory)</td>
<td>16</td>
<td>10</td>
<td>9</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>38 of 43</td>
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<tr>
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<td>1</td>
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<td>N/A</td>
<td>N/A</td>
<td>3 of 3</td>
</tr>
</tbody>
</table>

ATC Spacing Services

Ground-Based Interval Management - Spacing (GIM-S) (En Route only)

Flight Deck Based Interval Management - Spacing (FIM-S)

In Trail Procedures (ITP)

Traffic Situation Awareness with Alerts (TSAA)

Pilot Advisory Services

<table>
<thead>
<tr>
<th>TIS-B</th>
<th>FIS-B</th>
<th>ADS-R</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FY14-FY18</td>
<td>FY19</td>
</tr>
<tr>
<td>Alaska Expansion Deployment</td>
<td>Complete</td>
<td></td>
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<tr>
<td>Service Expansion Deployment (ASSC and Gulf of Mexico* Service Volumes)</td>
<td>5</td>
<td>2 of 4</td>
</tr>
</tbody>
</table>

*Pilot services not provided in Mexican Service Volumes

As 12-01-2018


U.S. ADS-B In Avionics Equipage: 50,449

Pilot Applications

GIM-S Develop → GIM-S Deploy → GIM-S Test → GIM-S IOC
ADS-B Service Volumes: EnRoute, Terminal, and Surface

35 EnRoute SVs (CONUS)
241 Terminal SVs (CONUS)
36 Surface SVs

CONUS & GOMEX

ALASKA

HAWAII

As of 1-Dec-18
December 2018 Equipage(good installs)
Rule Driven ADS-B Out Aircraft Detected by FAA network

<table>
<thead>
<tr>
<th>Category</th>
<th>As of 1-November 2018 (ATAT)</th>
<th>As of 1-December 2018 (ATAT)</th>
<th>Monthly Increase</th>
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<tr>
<td>All Link Version 2</td>
<td>60,290</td>
<td>62,142</td>
<td>1,852</td>
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<td>1090ES</td>
<td>52,454</td>
<td>54,161</td>
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<td>UAT</td>
<td>6,866</td>
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<tr>
<td>Dual</td>
<td>968</td>
<td>973</td>
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<tr>
<td>US General Aviation (includes EXP &amp; LSA)</td>
<td>48,757</td>
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<td>US Air Carrier</td>
<td>3,215</td>
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<tr>
<td>Intl General Aviation*</td>
<td>3,599</td>
<td>3,732</td>
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<tr>
<td>Intl Air Carrier</td>
<td>1,200</td>
<td>1,249</td>
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<tr>
<td>U.S. Military &amp; U.S. Special Use</td>
<td>618</td>
<td>677</td>
<td>59</td>
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</tbody>
</table>

*Aircraft incorrectly reporting outside US ICAO block are included in Intl GA count.
US Air Carrier Equipage & Avionics Performance

Number of Aircraft

- 1-Jul-18: 2,569
- 1-Aug-18: 2,727
- 1-Sep-18: 2,823
- 1-Oct-18: 3,071
- 1-Nov-18: 3,293
- 1-Dec-18: 3,550

* Flight ID Issues
Equipped Operations – Heat Maps
Percent ADS-B Out V2 Compliant Jun 2018 to Sep 2018

Class A

Percent Equipped
50+ 40-49 30-39 20-29 10-14 0-9 No data

Class E Rule Airspace

Class E Non-Rule Airspace
Equipped Operations – Heat Maps
Sep 2018 (Class B with Mode C Veil and Class C airports) V2 compliant
Equipped Operations – Heat Maps
Percent ADS-B IN
Jun 2018 to Sep 2018

Class A

Class E Rule Airspace

Class E Non-Rule Airspace

Percent Equipped
50+
40-49
30-39
20-29
10-14
0-9
No data

San Juan
Arctic Coastal
Anchorage
Honolulu
San Juan
Arctic Coastal
Anchorage
Honolulu
San Juan
Arctic Coastal
Anchorage
Honolulu
San Juan
Arctic Coastal
Anchorage
Honolulu
## Equipped Operations
### Summary Sep 2018

<table>
<thead>
<tr>
<th>September 1 - 15, 2018</th>
<th>Class</th>
<th>ADS-B Out V2 %</th>
<th>ADS-B Out V2 Compliant %</th>
<th>ADS-B IN %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal Rule-Airspace</td>
<td>Class B</td>
<td>41.2%</td>
<td>39.9%</td>
<td>15.0%</td>
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<tr>
<td></td>
<td>Class C</td>
<td>41.6%</td>
<td>40.3%</td>
<td>17.2%</td>
</tr>
<tr>
<td>Terminal Non-Rule-Airspace</td>
<td>Class D</td>
<td>44.6%</td>
<td>41.7%</td>
<td>27.2%</td>
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<tr>
<td>En-Route Rule-Airspace</td>
<td>Class A</td>
<td>42.3%</td>
<td>41.4%</td>
<td>8.1%</td>
</tr>
<tr>
<td></td>
<td>Class E</td>
<td>40.4%</td>
<td>39.4%</td>
<td>10.0%</td>
</tr>
<tr>
<td>En-Route Non-Rule-Airspace</td>
<td>Class E</td>
<td>47.8%</td>
<td>43.3%</td>
<td>35.2%</td>
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</table>

<table>
<thead>
<tr>
<th>June 2018</th>
<th>Class</th>
<th>ADS-B Out V2 %</th>
<th>ADS-B Out V2 Compliant %</th>
<th>ADS-B IN %</th>
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</thead>
<tbody>
<tr>
<td>Terminal Rule-Airspace</td>
<td>Class B</td>
<td>35.8%</td>
<td>33.0%</td>
<td>13.3%</td>
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<tr>
<td></td>
<td>Class C</td>
<td>35.5%</td>
<td>31.4%</td>
<td>13.1%</td>
</tr>
<tr>
<td>Terminal Non-Rule-Airspace</td>
<td>Class D</td>
<td>44.3%</td>
<td>34.0%</td>
<td>30.6%</td>
</tr>
<tr>
<td>En-Route Rule-Airspace</td>
<td>Class A</td>
<td>36.0%</td>
<td>32.1%</td>
<td>6.8%</td>
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<tr>
<td></td>
<td>Class E</td>
<td>34.4%</td>
<td>30.8%</td>
<td>8.5%</td>
</tr>
<tr>
<td>En-Route Non-Rule-Airspace</td>
<td>Class E</td>
<td>38.7%</td>
<td>32.6%</td>
<td>23.1%</td>
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</table>
# Equipped Operations

## Summary Sep 2018 Top Performing SVs by Percent equipped

<table>
<thead>
<tr>
<th>Sep 1 - 15, 2018</th>
<th>Class</th>
<th>ADS-B Out V2 %</th>
<th>ADS-B Out V2 Compliant %</th>
<th>ADS-B IN %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal Rule-Airspace</td>
<td>Class B</td>
<td>54.2% Memphis, TN</td>
<td>52.4% Charlotte, NC</td>
<td>31.9% Memphis, TN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>53.2% Charlotte, NC</td>
<td>51.5% Memphis, TN</td>
<td>25.6% Atlanta, GA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>48.9% Boston, MA</td>
<td>48.0% Boston, MA</td>
<td>23.9% Phoenix, AZ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>48.5% Atlanta, GA</td>
<td>46.8% Pittsburgh, PA</td>
<td>23.2% St. Louis, MO</td>
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<tr>
<td></td>
<td></td>
<td>47.8% Pittsburgh, PA</td>
<td>46.6% Atlanta, GA</td>
<td>22.9% Boston, MA</td>
</tr>
<tr>
<td></td>
<td>Class C</td>
<td>99.6% St. Thomas, VI</td>
<td>94.9% San Juan, PR</td>
<td>73.9% St. Thomas, VI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>99.4% San Juan, PR</td>
<td>93.8% St. Thomas, VI</td>
<td>54.7% Daytona Beach, FL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>73.3% Asheville, NC</td>
<td>68.5% Asheville, NC</td>
<td>49.3% Billings, MT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>65.4% Billings, MT</td>
<td>58.9% Daytona Beach, FL</td>
<td>45.7% San Juan, PR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>60.4% Daytona Beach, FL</td>
<td>55.6% Billings, MT</td>
<td>40.0% Asheville, NC</td>
</tr>
<tr>
<td>Terminal Non-Rule Airspace</td>
<td>Class D</td>
<td>76.6% Bakersfield, CA</td>
<td>74.8% Bakersfield, CA</td>
<td>60.5% Lynchburg, VA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>74.3% Casper, WY</td>
<td>67.0% Lynchburg, VA</td>
<td>50.3% Casper, WY</td>
</tr>
<tr>
<td></td>
<td></td>
<td>67.8% Lynchburg, VA</td>
<td>62.7% Rockford, IL</td>
<td>42.5% Bakersfield, CA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>64.0% Rockford, IL</td>
<td>57.8% Mesa, AZ</td>
<td>41.6% Mesa, AZ</td>
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<tr>
<td></td>
<td></td>
<td>59.8% Nantucket, MA</td>
<td>56.7% Casper, WY</td>
<td>41.1% Otis AFB</td>
</tr>
<tr>
<td>En-Route Rule-Airspace</td>
<td>Class A</td>
<td>98.2% San Juan</td>
<td>94.0% San Juan</td>
<td>19.3% AK Peninsula</td>
</tr>
<tr>
<td></td>
<td></td>
<td>54.3% AK Peninsula</td>
<td>44.7% Salt Lake City</td>
<td>17.9% Honolulu</td>
</tr>
<tr>
<td></td>
<td>Class E</td>
<td>98.5% San Juan</td>
<td>96.5% San Juan</td>
<td>27.3% Southeast AK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50.4% Arctic Coastal</td>
<td>48.8% Arctic Coastal</td>
<td>19.9% Salt Lake City</td>
</tr>
<tr>
<td>En-Route Non-Rule-Airspace</td>
<td>Class E</td>
<td>97.3% San Juan</td>
<td>92.0% San Juan</td>
<td>81.6% Southeast AK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>87.2% Southeast AK</td>
<td>77.9% Yukon - Kuskokwim Delta</td>
<td>67.9% Yukon - Kuskokwim Delta</td>
</tr>
</tbody>
</table>
FAA currently tracked ADS-B avionics problems

- Baro/Geo Altitude Spikes
- Missing Baro Altitude
- Missing Flight ID
- Missing Mode 3/A
- Kinematic Issues (aka, “position jumping”)
- Duplicate & Wrong ICAOs
- Air/Ground determination issues
- Incorrect Emitter Category
- Flight ID Error (includes Partial Flight ID)

- B787 and TSS-4100 (Rockwell ProLine TCAS/transponder unit) erroneous position (Airworthiness Directives issued)
- E170 position jumping
- A380 Flight ID change on Surface
- A380 Geo Altitude (SB available)
- B777-300ERs delivered with wiring error, resulting in non-compliant NACv/SDA/EmitCat/Length-Width Code (SB available)
- Airbus single aisle missing Length-Width Code due to production wiring error (SB available)
Issue

• 11-Jun-2016, UAL33, on downwind for final approach at LAX (see picture, right)
• B787 Integrated Surveillance System (ISS) extrapolated position along a straight line based on current track, while sending “good” quality parameters
• Problem detected by SBS validation after radar and ADS-B positions differed by 0.56nm (where green line becomes red)
• FAA ADS-B Performance Monitor observed multiple additional arrival & departure events on different B787s in 2016-2017
• Problem has not reoccurred yet on same aircraft

Solution(s)

• Boeing/Rockwell determined root cause; Boeing implemented fix for production aircraft starting with Line# 542; Service Bulletin B787-81205-SB340036-00 available
• FAA implemented tighter position validation within 15nm of airports with an SSR and implemented a No Services Aircraft List (https://www.federalregister.gov/documents/2017/12/20/2017-27202/change-to-automatic-dependent-surveillance-broadcast-services)
• FAA issued Airworthiness Directive 2017-NM-118-AD, effective 10-Dec-2018, which requires application of above listed Boeing SB within one year
Issue

- In late October 2016, a Skywest E170 was detected exhibiting “track jumping”
  - FAA Air Traffic personnel notified Flight Standards, who contacted operator and ordered replacement of the transponders
  - Unfortunately, these transponders were returned to a service center without notification to Honeywell engineering, and no debugging testing was performed

- In late July 2017, early August 2017, and mid-January 2018, FAA detected E170 aircraft from two different airlines exhibiting “track jumping” behavior
  - FAA notified both operators and Honeywell engineering, and the transponders were removed from the aircraft and sent to Honeywell engineering for testing. Bench testing revealed no apparent issues.

- In all cases to date, removing and replacing transponders cleared issue – problem has not reoccurred on same aircraft
  - Bench testing of removed transponders has revealed no anomalies
  - FAA has decided that next E170 aircraft detected with this issue will be immediately placed on No Services Aircraft List (NSAL); simultaneously, FAA will notify Embraer and Honeywell and request that appropriate engineering personnel be sent to inspect and test affected aircraft

Solution(s)

- Use NSAL as “defense”
- Avionics root cause TBD
Issue

• On 21 Dec 2017, FAA monitoring observed a track extrapolation by an Embraer business jet equipped with a Rockwell Collins TSS-4100 transponder
  – track extrapolation lasted for over 450nm

• TSS-4100 shares software with B787 ISS, so software defect in B787 ISS also exists in TSS-4100

Solution(s)

• Rockwell Collins reported TSS-4100 TSO noncompliance to FAA once the B787 ISS software issue was diagnosed; TSS-4100 shipments were stopped until software defect was corrected

• Airworthiness Directive (AD) 2017-22-14 was issued on 20 Dec 2017 and can be found online at:
  http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgad.nsf/0/f2fd0b259d98ea
  a4862581d9004fa2d1/$FILE/2017-22-14.pdf

• Compliance date for this AD is 20 Dec 2018 (or 750 hours in service, whichever occurs first)

Solution(s), continued

• FAA determined that actions required by AD had not been performed

• After communicating with operator, FAA placed this aircraft on No Services Aircraft List (NSAL) until actions required under AD 2017-22-14 were completed; aircraft has since been removed from NSAL
ADS-B In Future Applications

• ADS-B In applications are an integral part of the future National Airspace System (NAS)
• ADS-B In supports increased pilot situational awareness, traffic alerting, and operational efficiencies in the NAS today
• Current challenges facing future applications include benefits demonstration, funding requirements, and industry consensus
• FAA continues to support when possible
  – Currently leveraging opportunity to assess benefits including a public-private partnership to demonstrate operational feasibility and value of an ADS-B In (see upcoming slide 24)
TSO-C195b ADS-B-In Applications

In Trail Procedures (ITP)

Traffic Situation Awareness with Alerts (TSAA)

Cockpit Display of Traffic Information-Assisted Visual Separation (CAVS)

SURF

AIRB
Advanced Interval Management (A-IM)
Arrivals & Approach | Flight-deck Integration | DataComm

Description: Develop advanced applications to enable relative spacing ground and airborne capabilities for implementation into the NAS in the mid-term environment.

Goals: Maximize airspace throughput and reduce delays in the NAS.

Objective: Publish A-IM SPR, MOPS (avionics standards)
Integrate A-IM ConOps

Partners: FAA, RTCA SC-186/WG-4, SC-214/WG-78, SC-227

Key Project Milestones

- Draft Revised Functional Requirements Oct 2017
- A-IM ConOps Oct 2017
- A-IM Initial Rqmts (iPR) Apr 2018
- Initial FIM MOPS v2 Oct 2018
- A-IM Paired Approach HITL Report Q2 FY19
- MOPS Integrated Test Procedures Q1 FY20
- Final SPR/MOPS publication FY20
# FAA-AAL-ACSS ADS-B In Retrofit Spacing Evaluation

**Description:** Operational evaluation of partial IM spacing capabilities and CAVS for arrivals into PHX using certified ACSS equipment on AAL A321 aircraft (entire fleet)

**Goal:** Demonstrate operational feasibility and value of an ADS-B In retrofit solution that could enable early adoption of IM, CAVS and other ADS-B In applications

**Objectives:**
- Promote adoption of ADS-B In applications
- Support ADS-B In industry initiatives by gathering data in an operational environment
- Gather insight for building FAA business case for IM

**Partners:** FAA, NATCA, ACSS, AAL

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**Key Project Milestones**

- Signed Planning MOA: Jul 2016
- Signed Funding MOA: Sep 2017
- AAL Funding Approval: Nov 2017
- Avionics TSOA & STC: Q1 FY19
- Initiate CAVS Operations: Q4 FY19
- Adequate AAL Equipage for Spacing: Projected Q4 FY20
- Initiate ZAB/PHX Spacing Ops: Projected Q4 FY20
- Complete Benefits Analysis: Q4 FY21

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**Operational evaluation proposed for AAL westbound arrivals through Albuquerque Center to PHX**
What Has Changed for ASEPS

- Original Scope for ASEPS: Reduced oceanic separation service below 30 nautical mile (NM) lateral and 30 NM longitudinal separation (30/30) to enhance operations in U.S. oceanic airspace using Space-based ADS-B (SBA) and/or ADS-C with an increased update rate
- FAA recognizes the benefits of SBA and its potential for the future in the U.S. and internationally
- FAA also has a need to better prove out the SBA technology before committing to a long-term investment, due largely to operational constraints and a current lack of operational need
  - ANSP handoff coordination is efficient today
  - No capacity issue exists today or is expected in the future
  - Reduced separation is constrained by convective weather
  - FANS 1/A equipage is too low in certain airspace (e.g. FANS 1/A equipage in WATRS is projected to be 76% by 2020)
  - Communication latency and controller reaction time limit how oceanic airspace can be managed
  - Unmitigated safety hazards exist
- This led FAA to a strategic shift (Pivots), identifying short-term opportunities to leverage work done to date that contribute to a long-term solution in the future
New Strategy / Pivot Overview

### Pivot Overview Table

<table>
<thead>
<tr>
<th>Pivot</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022 - beyond</th>
<th>Outcome</th>
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<tr>
<td>ASEPS Now with ATOP Reduced Separation</td>
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<td>IOC, Full ADS-C Capability</td>
<td>23/20 reduced oceanic separation for suitably equipped aircraft pairs</td>
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<tr>
<td>SBA Operational Evaluation</td>
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<td>SBA for 5NM separation (ERAM)</td>
<td>Near term benefits of SBA</td>
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<tr>
<td></td>
<td>Caribbean</td>
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<td></td>
<td>Integration of Existing Functionality</td>
<td>Leverage continued development of ATOP for future oceanic operations</td>
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<tr>
<td></td>
<td>Expanded ADS-B Coverage</td>
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<td>3</td>
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<tr>
<td>Continued ATOP SBA Testing</td>
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<td>Evaluate Route Structure Optimization</td>
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<td>Prototyping to evaluate future use of SBA</td>
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<tr>
<td>ASEPS Future (Further analysis of SBA in Ocean)</td>
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<td></td>
<td>ConOps</td>
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<td></td>
<td>Automation (\text{ATOP/Other})</td>
<td>Further reduction in oceanic separation supported by more efficient Communications</td>
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<td>Communications i.e. PTT</td>
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<td>SBA Partial Disaster Recovery</td>
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<td>Timeframe is dependent on scope and whether the current Harris contract will be modified in the near term</td>
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<td>Surveillance on-demand when ground surveillance infrastructure becomes unavailable</td>
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<td>Pivot #5 is contingent upon completing near term Pivot #2 activities (e.g. automation upgrades, SRMP, etc.) in addition to ingesting SBA data into STARS</td>
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- **FAA Milestone**
ASEPS Path Forward

SBS ASEPS has been approved to proceed with the following activities:

- **Pivot #1**: Proceeding to a Final Investment Decision (FID) on ADS-C 23/20 in February 2019
- **Pivot #2**: Initiating near-term Operational Evaluation (Op Eval) of space-based ADS-B (SBA) in the Caribbean on ERAM
- **Pivot #3**: Maturing and continuing ATOP SBA testing activities
- **Pivot #4 and #5**: Exploring and maturing long term strategies for future analysis of SBA in the ocean and a partial disaster recovery capability
FAA-managed Caribbean Airspace

Figure 1: Caribbean Airspace Sectors

Figure 2: Grand Turk Surveillance Gap
Caribbean Airspace Optimization and Potential VHF Communications Coverage

Key:

Potential VHF Comm Coverage (shaded area)

Proposed shortcut route
Discontinuing FAA Services to LV1 aircraft

- Aircraft equipped with ADS-B Out Version 1 will no longer receive the following services after January 1, 2020
  - ATC surveillance services using ADS-B (impacts Alaska and Gulf of Mexico only)
  - ADS-SLR (impacts all airports with ASDE-X and ASSC)
  - TIS-B and ADS-R Client services (NAS-wide impact)
- Also, requirement that NACv>0 to receive TIS-B/ADS-R Client services will be reinstated (see 2016 TIS-B Service Change Summary posted in RGL on TSO-C195b page)
- FAA will begin making above changes on January 2, 2020
  - Since changes require implementation of software revisions and some require changes at multiple locations NAS-wide, all changes will not be completed on January 2, 2020, but sometime soon thereafter

- Notice FAA-2018-0914 appeared in the Federal Register on 5-Nov-2018
FAA Next Steps

- Continue rollout of Air Traffic Control Separation Services
- Monitor avionics compliance and work with industry on the *Equip 2020* initiative
- Prepare for JRC requests
  - Various ASEPS Pivot Strategy decisions (slide 26)
  - A-IM Strategy decision
  - Final Investment Decision for the Next Segment of the “Baseline” SBS Program (FY20-25 funding)
Operator Next Steps

• Considerations for the U.S. ADS-B mandate
  • Version 2 ADS-B transmitter
  • Compliant position source approved to “pair” with V2 ADS-B transmitter
  • Aircraft wiring as needed

• 1 year, 20 days to go!
Acronyms

ADS-B: Automatic Dependent Surveillance – Broadcast
ADS-R: Automatic Dependent Surveillance – Rebroadcast
AML: Approved Model List
APB: Acquisition Program Baseline
ASSC: Airport Surface Surveillance Capability
ATC: Air Traffic Control
ATOP: Advanced Technologies and Oceanic Procedures
ConOps: Concept of Operations
ES: Extended Squitter
FIM-S: Flight Deck Based Interval Management – Spacing
FIS-B: Flight Information Services - Broadcast
GIM-S: Ground-Based Interval Management – Spacing
GOM: Gulf of Mexico
IOC: Initial Operating Capability
ISAT: Implementation Service Acceptance Test
ITP: In Trail Procedures
MFD: Multi-Function Display
MHz: Megahertz
MOPS: Minimum Operational Performance Standards
NCT: Northern Cal TRACON

NM: Nautical Mile
O&M: Operations and Maintenance
PED: Portable Electronic Device
RIO: Risks, Issues, and Opportunities
SBS: Surveillance and Broadcast Services
SFO: San Francisco International Airport
STC: Supplemental Type Certificate
SVR: Service Volume Rollout
TAMR: Terminal Automation Modernization and Replacement
TIS-B: Traffic Information Services - Broadcast
TRACON: Terminal Radar Approach Control
TSAA: Traffic Situation Awareness with Alerts
UAT: Universal Access Transceiver