Very High Frequency Omnidirectional Range (VOR) Minimum Operational Network (MON) Implementation Program Overview
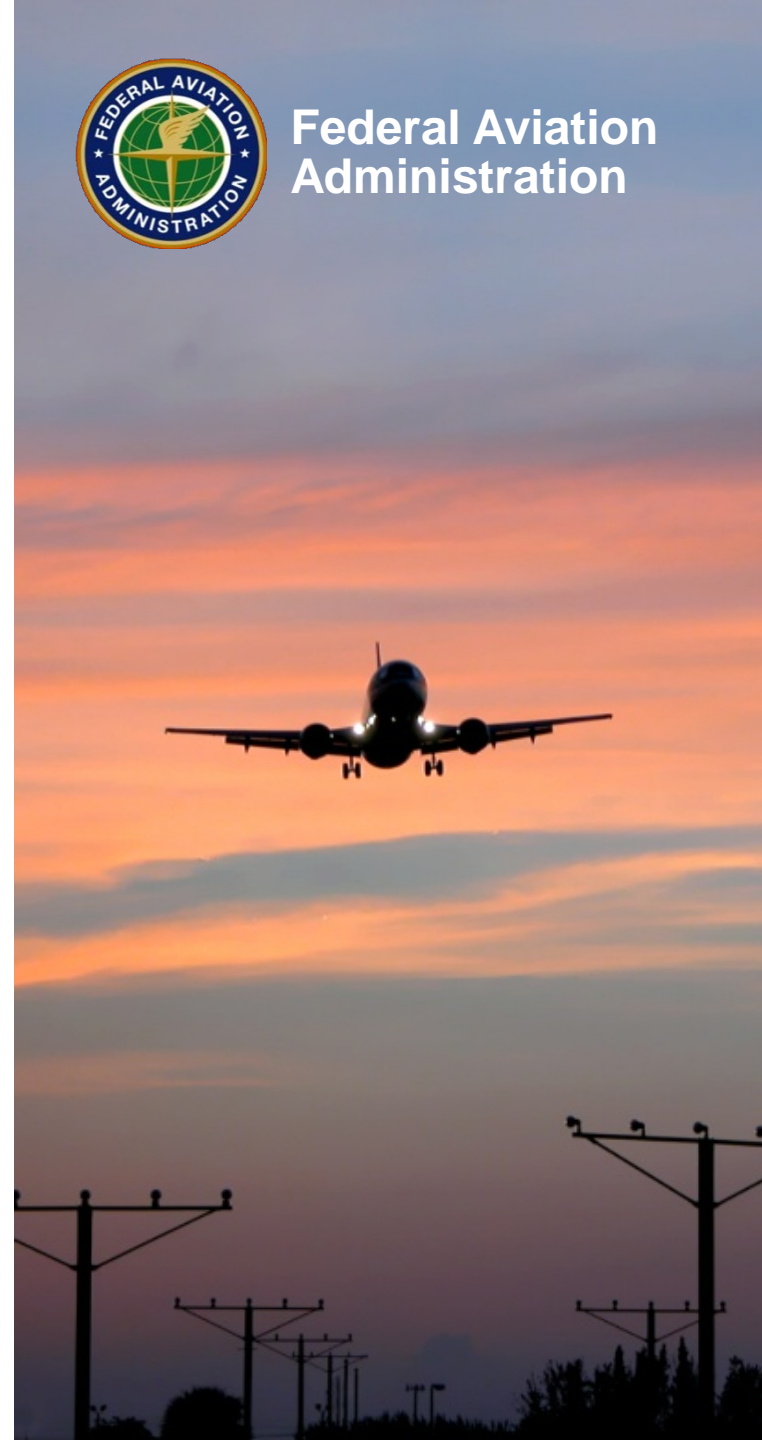
Federal Aviation Administration

Presented to: ACF

Date: April 24, 2013
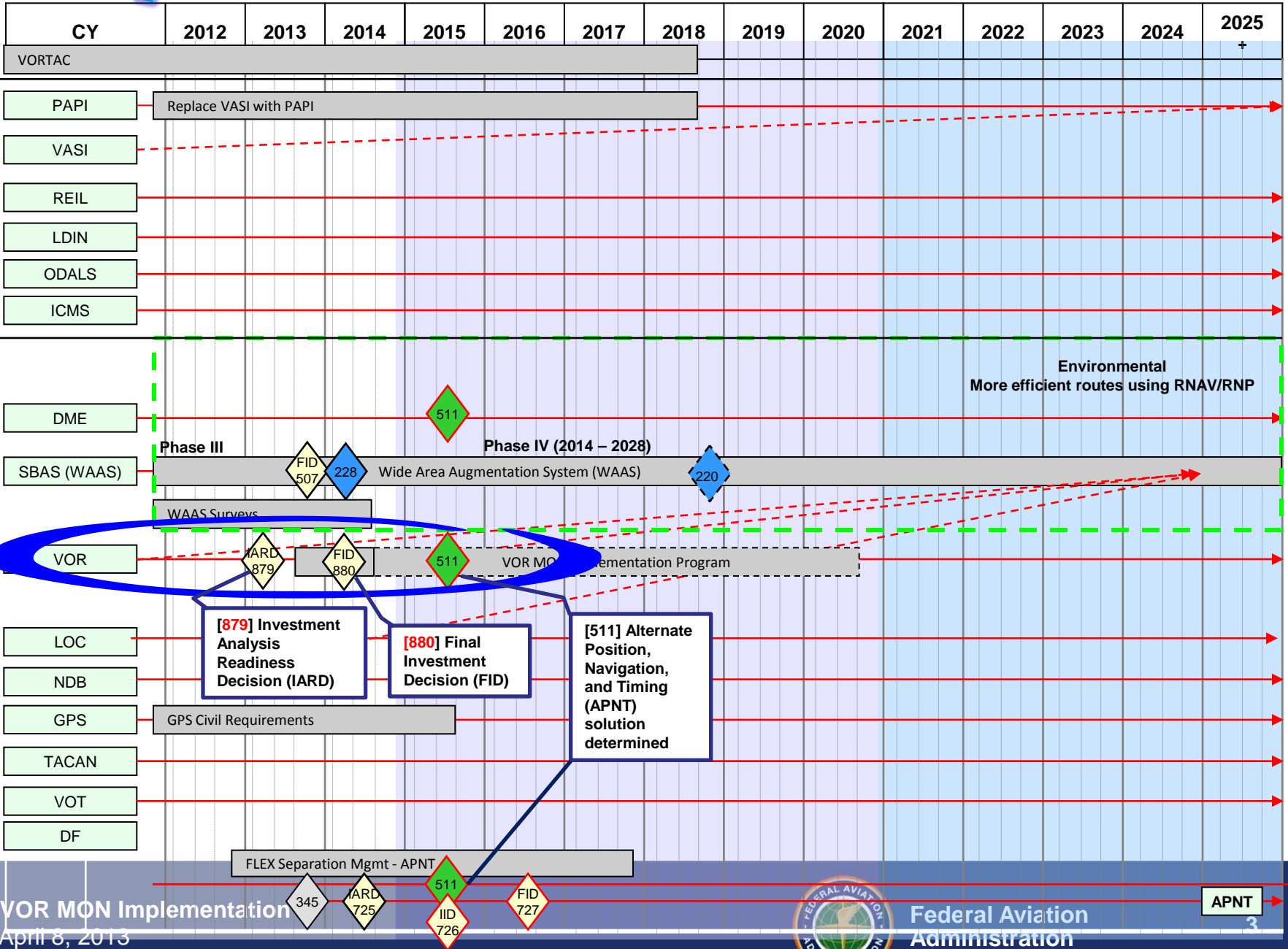
Agenda

- **Background**
  - Current and target operating environments
- **Changing Environment**
- **Description of VOR MON capability**
- **Selection criteria for discontinued VORs**
- **Coverage Provided**
  - Approaches and Landings
  - En route
- **VOR MON Implementation**
- **AMS Highlights**
- **Next Steps**

APPROVED

Current Operating Environment
VOR-Based Federal Airways
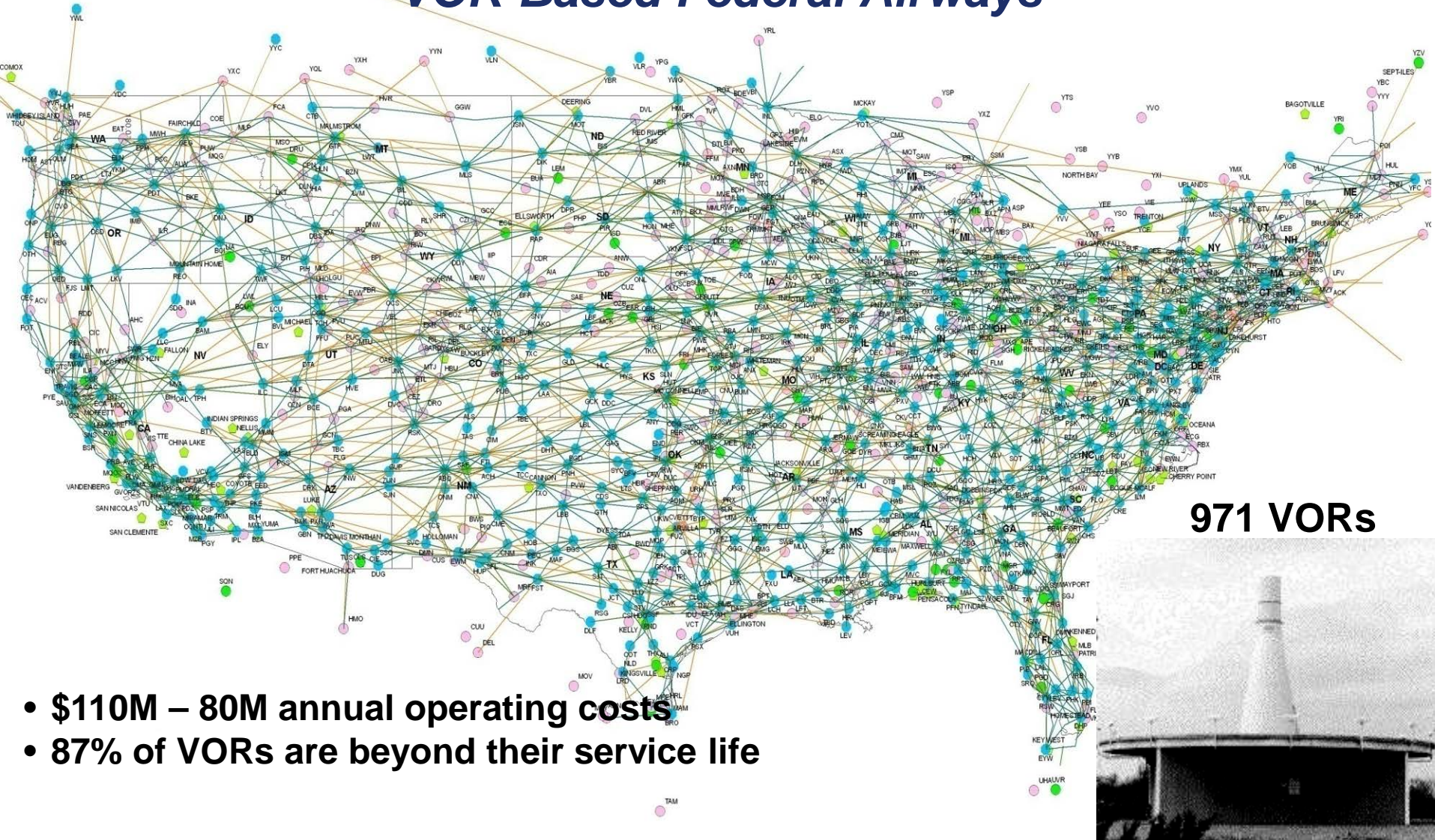
971 VORs

- **$110M – 80M annual operating costs**
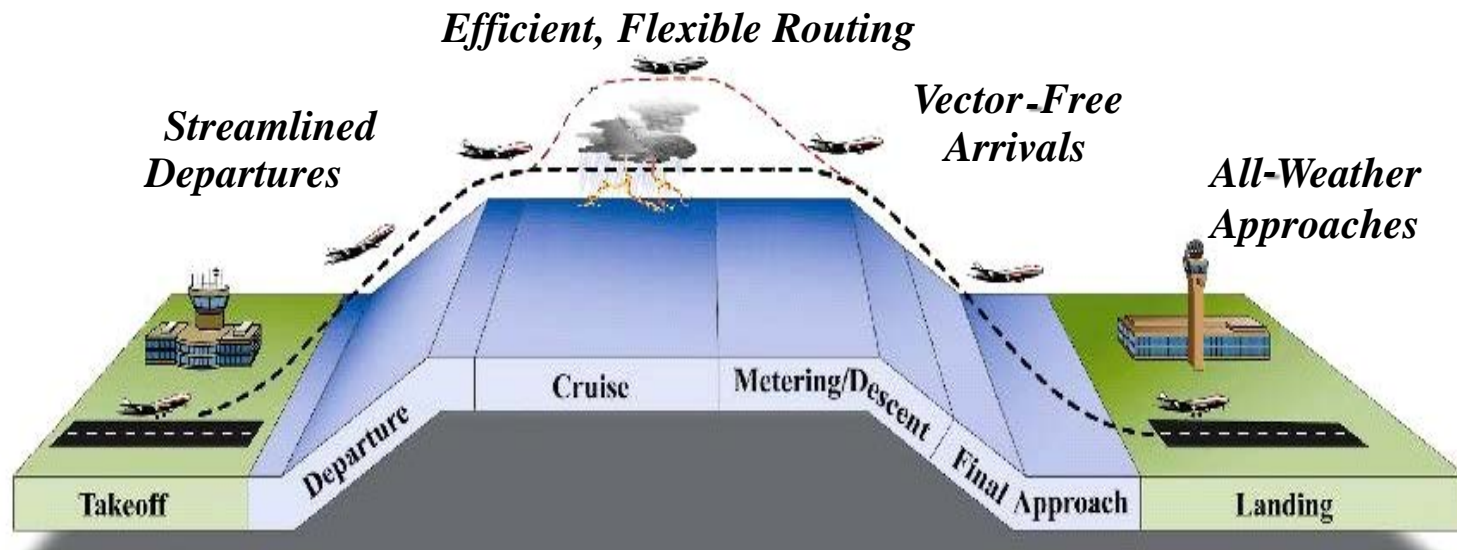- **87% of VORs are beyond their service life**

Target Operating Environment

- **The FAA will transition to Performance Based Navigation (PBN) providing:**
  - **Area Navigation (RNAV) everywhere; and,**
  - **Required Navigation Performance (RNP) where beneficial**

Changing Environment

- **Most Aircraft will have Performance Based Navigation (PBN) capability by 2020:**
  - **Majority of Aircraft will have GPS and/or WAAS capability**
  - **Air Carrier/Cargo/High-end GA will have DME/DME/Inertial Capability**
  - **Low-end GA/Military may need VOR for backup when GPS is unavailable**

Efficient, Flexible Routing

Streamlined Departures

Vector-Free Arrivals

All-Weather Approaches

Takeoff — Departure — Cruise — Metering/Descent — Final Approach — Landing

VOR Minimal Operational Network (MON)

- **MON is initial step to reducing dependency on VORs**
  - Based on discontinuing approx. half of existing VORs by 2020
- **MON will principally consist of VOR coverage at 5000 ft AGL outside of Designated Mountainous Areas (DMAs), plus**
  - VOR approaches would be provided where needed
  - All VORs in DMAs, Territories, Alaska and Hawaii retained
  - Atlantic, Pacific and Caribbean international arrival and departure VORs retained
- **Non-DME/DME aircraft will**
  - Navigate VOR to VOR (77 nm) or to a safe landing within 100 nm at 5000 ft AGL or higher
  - Use ILSs and localizers where possible for approach
  - Use VOR approaches where no ILS is available
- **MON planned to be achieved by January 1, 2020**
  - Waterfall based on FAA and user priority

Criteria for Selecting VORs for the MON

General:

- **Retain VORs outside of CONUS**
- **Only FAA owned/operated VORs will be considered**
- **DMEs and TACANS will generally be retained (and/or enhanced)**
  - If VOR service is removed from a site, any DME or TACAN at the site would, in general, be retained

Coverage for Approaches and Landings:

- **Retain sufficient VOR ground stations to enable aircraft to proceed safely to another VOR or to a suitable destination with a GPS-independent approach (ILS, LOC or VOR) within 100 NM of any location within CONUS**
- **Retain VORs to support international arrival airways from the Atlantic, Pacific, the Caribbean, and at the Core 30 airports**

Notional MON Airports

Coverage for Approaches and Landings
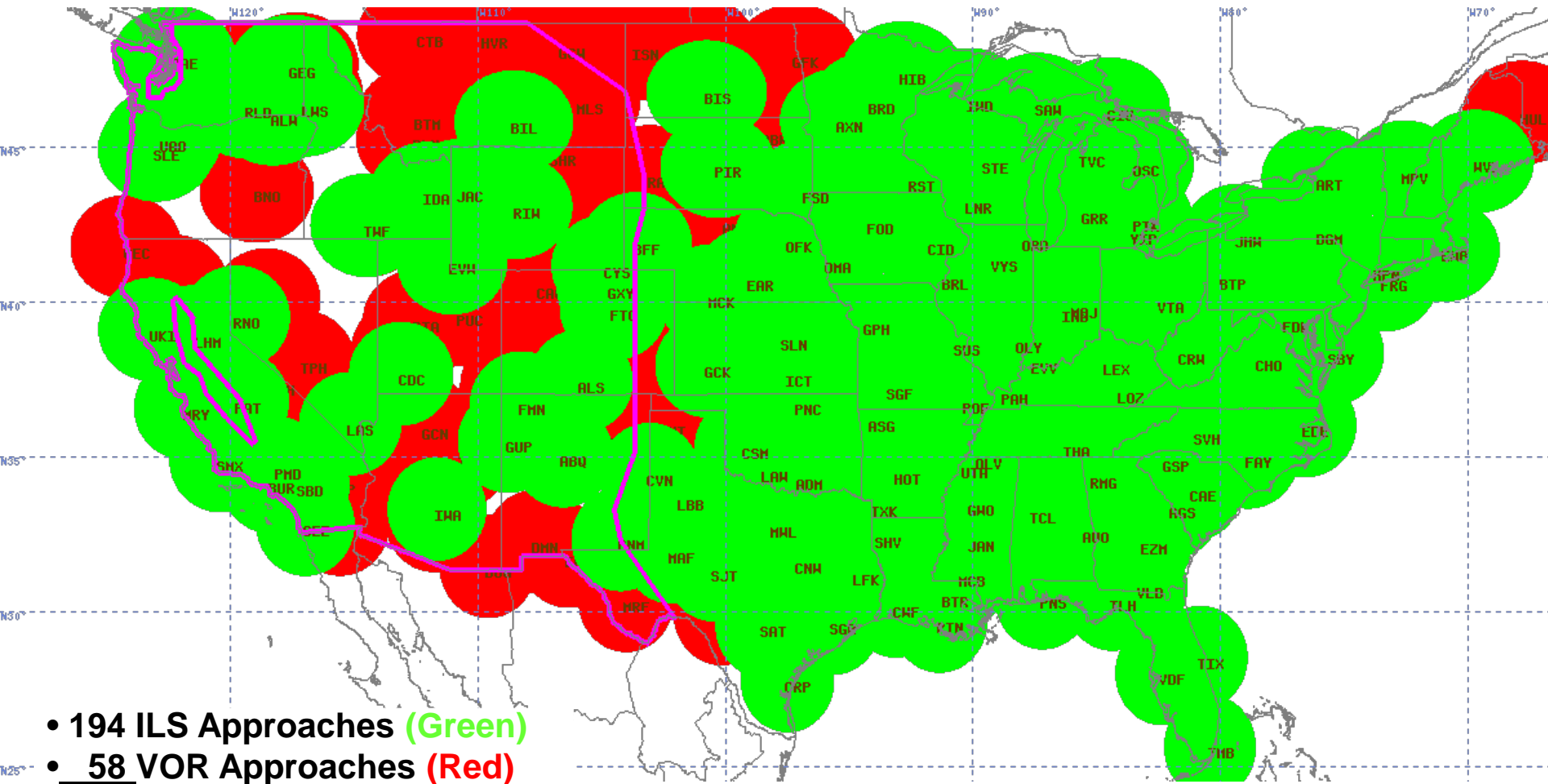
- **194 ILS Approaches (Green)**
- ** 58 VOR Approaches (Red)**
- **252 airports provide an ILS or VOR approach within 100nm of any location in CONUS**

Criteria (continued)

En route Coverage:

- **Retain VORs in designated mountainous areas to maintain adequate coverage during a GPS outage due to higher risk in those areas**

- **High-altitude "gap-filler" VORs are retained for en route navigation to provide coverage at 5,000 ft AGL and above**

VOR MON at 5000 ft AGL
En route Coverage

Attributes of VOR MON Capability

- **The VOR Minimal Operational Network (MON) will provide:**
    - **A backup capability for lower end GA IFR aircraft in the event of a widespread GPS outage**
    - **An operational contingency, and not the robust network of current VORs**
    - **A transitional network of VORs to allow users time to equip with new avionics to transition to RNAV and RNP**

VOR MON Implementation

- **Approximately half of the VORs will be retained for MON**

- **Candidate lists to be vetted with FAA stakeholders before being distributed to the public**

- **Develop Discontinuance Plan**

- **Procedures replaced/service requirement removed**

- **Implementation will be accomplished with inputs from FAA service centers/areas and other stakeholders**
  - **Implementation may require adjustment of the list of retained VORs**

Acquisition Management System (AMS) Program Highlights

- **Federal Register Notice (FRN) published: Dec 2011**
    - Follow-on FRN with comment dispositions published: Aug 2012
- **Acquisition Category (ACAT) Approval for 4VQ: Jun 2012**
    - IARD: CY13Q2 (Target: June)
    - FID: CY14Q2
- **Concept & RQMTS Definition (CRD) Kick-off Brief: 23 Aug 2012**
- **FAM Meeting with Finance: 25 Sep 2012**
- **NAS Enterprise Architecture (EA) Kick-off Brief: 14 Jan 2013**
- **SAs Briefings completed, preliminary MON list vetted**

AMS Program Highlights (cont.)

- **PMs (JoAnn Ford (Acting Manager)) will be briefing the VPs on a monthly basis at HQ.**

- **Project Manager Ernesto Etienne**

- **Currently working on several CRD/IARR and PM requirements & documents:**

  - VOR MON Implementation Program Charter:
    - AJE-3 concurred with Charter based on co-chairmanship
  - Program Management Plan (PMP)
  - Integrated Master Schedule (IMS)
  - Operational Safety Assessment (OSA)
  - Concept of Operations (CONOPS):
  - Shortfall Analysis:
  - Business Case Analysis (BCA):
  - PM Action Item (AI) Tracker
  - Modified RQMTS Doc (RD)

Next Steps

- **Provide FAA internal stakeholders with list of VOR MON sites for planning purposes**

- **Finalize identification of VOR MON sites**
  - Provided updated list to DoD
  - External stakeholders will be engaged via the RTCA Tactical Operating Committee (TOC).

- **Work with Service Areas, Service Centers, and external stakeholders to finalize implementation plan and waterfall.**
  - Numerous Internal and External Stakeholder Briefings have been completed:
    - Int: FAA VPs, HQ service units/LOBs, Service Area Directors and others
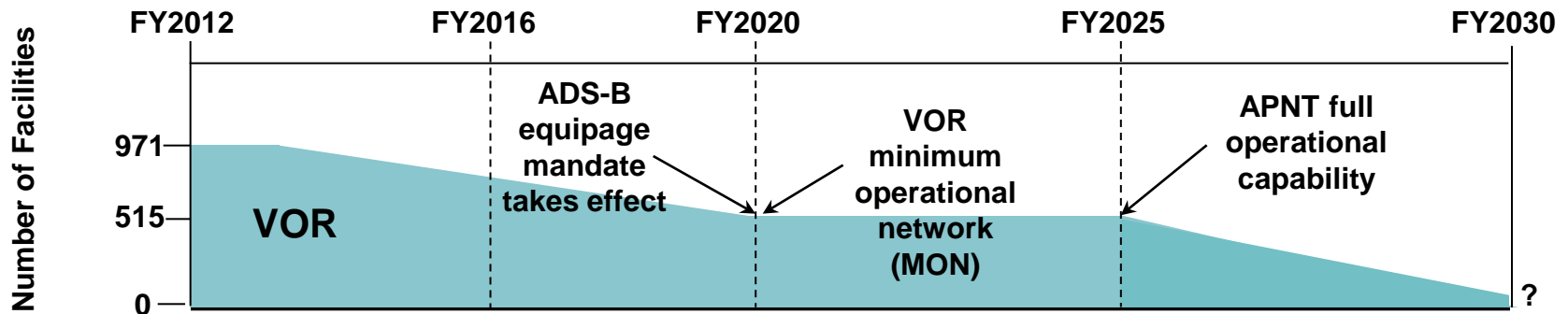   - Ext: AOPA, ALPA, PASS, DOD, NATCA, NASAO

Questions?

Back-up Slides

VOR MON Implementation

- **Goal: Significantly reduce dependence on VORs**
  - **Discontinue approximately half of the VORs to a Minimum Operational Network (MON) by 2020**

VOR Discontinuance Process

- Service Area evaluates the need for retention
- Flight Procedures Team (FPT) allocate remaining VORs
- PMO recommends discontinuance to Mission Support
- Perform a non-rulemaking study
- Service Area coordinate with Technical Operations, FPT, Airports, Flight Standards and the regional military representative
- Circularize proposal to stakeholders
- Ensure airspace is revoked or modified.
- Cancel appropriate instrument approach procedure