

# Very High Frequency Omnidirectional Range (VOR) Minimum Operational Network (MON) Program

## Program Update

Presented to: Aeronautical Charting Forum (ACF)

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Prepared by: VOR MON Program Office, AJM-324

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Federal Aviation  
Administration



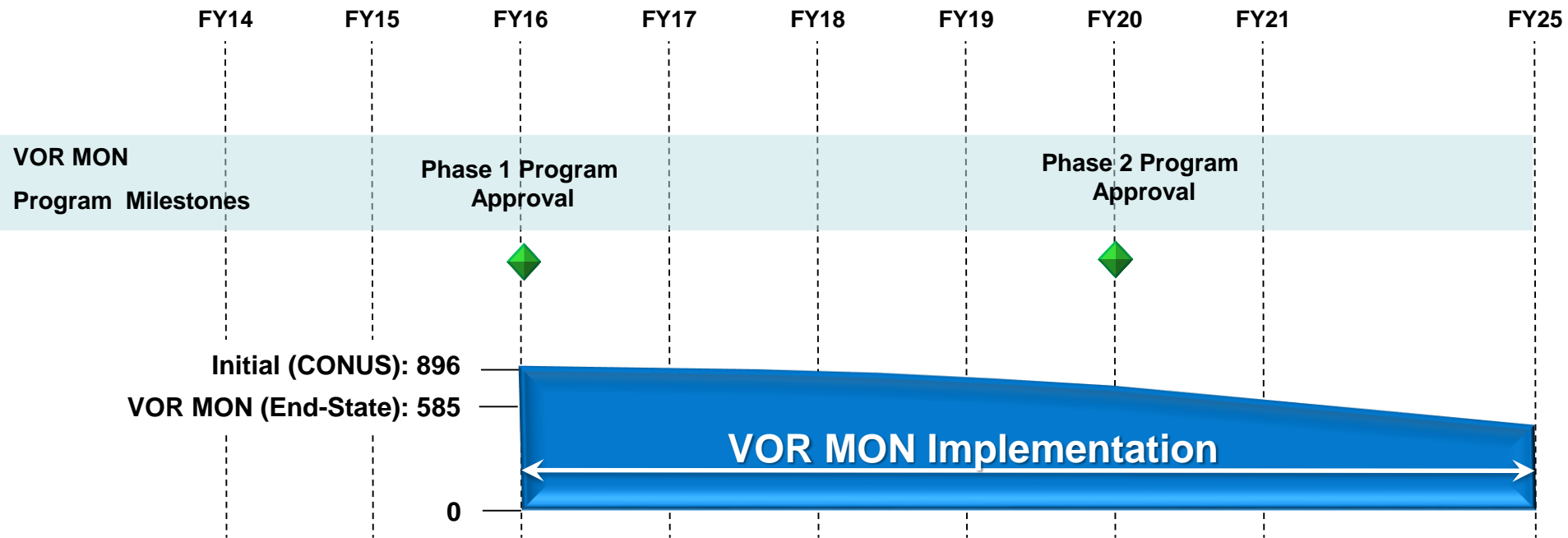
# Agenda

- VOR MON Program Objectives
- Program Timeline
- Candidate Discontinuance VORs & MON Airports
- Program Accomplishments
- Charting of MON Airports
- Two New VOR Standard Service Volume (SSV) Classes
- Initial 2016 FAA VOR Network
- Planned VOR MON
- VORs Planned for Discontinuance in the Next 6 Months
- Next Steps

# VOR MON Program Objectives

- Support the NAS transition from VOR based routes to a more efficient Performance Based Navigation (PBN) structure consistent with NextGen goals
- Within the contiguous United States (CONUS), enable pilots to:
  - Revert from PBN to conventional navigation in the event of a GPS outage;
  - Tune and identify a VOR at an altitude of 5,000 feet above site level and higher;
    - Conduct VOR navigation through a GPS outage area
    - Navigate to a MON airport within 100 nautical miles to fly an Instrument Landing System (ILS), Localizer (LOC) or VOR instrument approach without GPS, DME, Automatic Direction Finder (ADF), or radar
    - Navigate along VOR Airways, especially in mountainous terrain, where Minimum En-route Altitudes (MEAs) make direct-to navigation impracticable
- Approximately 30% (311) of CONUS VORs are planned for discontinuance
  - Discontinuance process is in accordance with FAA Order 7400.2, Procedures for Handling Airspace Matters

# Program Timeline



The VOR MON Program will be completed in 2 phases:

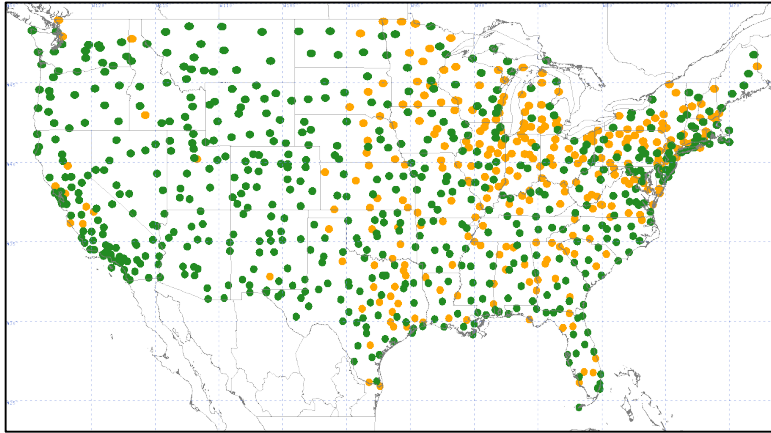
Phase 1: FY16 – FY20  
Phase 2: FY21 – FY25

- | Phase 1   | Phase 2   |
|---|---|
| <ul style="list-style-type: none"> <li>• Publish Final Policy FRN: “Provision of Navigation Services for the Next Generation Air Transportation System (NextGen) Transition to Performance Based Navigation (PBN)”</li> <li>• Remove, Replace, Amend affected Instrument Flight Procedures (IFPs)</li> <li>• Discontinue Phase 1 VORs (74)</li> </ul> | <ul style="list-style-type: none"> <li>• Continue IFP work</li> <li>• Discontinue Phase 2 VORs (237)</li> </ul> |

As of September 7, 2018



# Candidate Discontinuance VORs & MON Airports

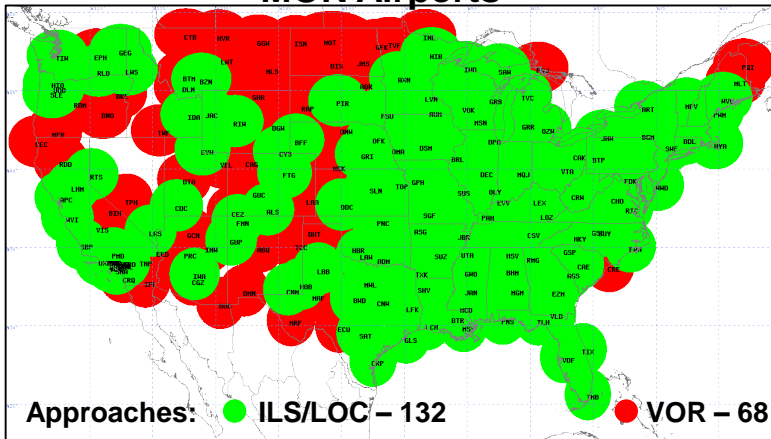


● Retained VORs (585)

● Candidate Discontinuance VORs (311)

Candidate Discontinuance VORs	
Service Area	VOR #
Western	15
Central	163
Eastern	133
<b>Total</b>	<b>311</b>

## MON Airports



MON airports ensure that an aircraft is within 100 nm of a location where an LOC, ILS or VOR approach may be flown.

VOR Configurations (as of September 20, 2018)				
	Retention #	Discontinuance (Remaining) #	Current Total	Total Discontinued
VOR	17	8	25	4
VOR/DME	215	139	354	17
VORTAC	353	130	483	13
<b>Total</b>	<b>585</b>	<b>277</b>	<b>862</b>	<b>34</b>

# Program Accomplishments

(34 of 74 Phase 1 VORs Discontinued)

1. [EDS] Edisto, in Orangeburg, SC – February 4, 2016
2. [BUA] Buffalo, in Buffalo, SD – July 21, 2016
3. [PNN] Princeton, in Princeton ME – July 21, 2016
4. [PLB] Plattsburgh, in Plattsburgh, NY – September 15, 2016
5. [AOH] Allen County , in Lima, OH – September 15, 2016
6. [ABB] Nabb in Nabb, IN – January 5, 2017
7. [SYO] Sayre in Sayre, OK – April 27, 2017
8. [ENW] Kenosha in Kenosha, WI – June 22, 2017
9. [BTL] Battle Creek in Battle Creek, MI – June 22, 2017
10. [HRK] Horlick in Racine, WI – June 22, 2017
11. [HUW] Hutton in West Plains, MO – August 17, 2017
12. [RIS] Riverside in Kansas City, MO – September 14, 2017
13. [DDD] Port City, in Muscatine, IA – October 12, 2017
14. [JKS] Jacks Creek, in Jacks Creek, TN – October 12, 2017
15. [MXW] Maxwell in Maxwell, CA – October 12, 2017
16. [STE] Stevens Point in Stevens Point, WI - October 12, 2017
17. [GHM] Graham in Centerville, TN – December 7, 2017

As of September 13, 2018



# Program Accomplishments cont'd

## (34 of 74 Phase 1 VORs Discontinued)

19. [DKK] Dunkirk in Dunkirk, NY – December 7, 2017
20. [DUC] Duncan in Duncan, OK – February 1, 2018
21. [AOO] Altoona in Altoona, PA – March 29, 2018
22. [MMJ] Montour in Pittsburg, PA – March 29, 2018
23. [HZL] Hazleton in Hazelton, PA – March 29, 2018
24. [ECA] Manteca in Stockton, CA – March 29, 2018
25. [BRD] Brainerd, in Brainerd, MN – July 19, 2018
26. [DAK] Drake, in Fayetteville, AR – September 13, 2018
26. [FLP] Flippin, in Flippin, AR - September 13, 2018
27. [HLL] Handle, in Panama City, FL - September 13, 2018
28. [HVN] New Haven, in New Haven, CT - September 13, 2018
29. [IJX] Jacksonville, in Jacksonville, IL - September 13, 2018
30. [LAN] Lansing, in Lansing, MI - September 13, 2018
31. [LJT] Timmerman, in Milwaukee, WI - September 13, 2018
32. [LWV] Lawrenceville, in Lawrenceville, IL - September 13, 2018
33. [PNE] North Philadelphia, in North Philadelphia, PA - September 13, 2018
34. [PSI] Pontiac, in White Lake, MI - September 13, 2018

As of September 13, 2018



# Charting of MON Airports

- MON airports will be identified on FAA En Route charts, the airport entry of the FAA Chart Supplements, and included in the National Airspace System Resource (NASR) Subscriber File data set

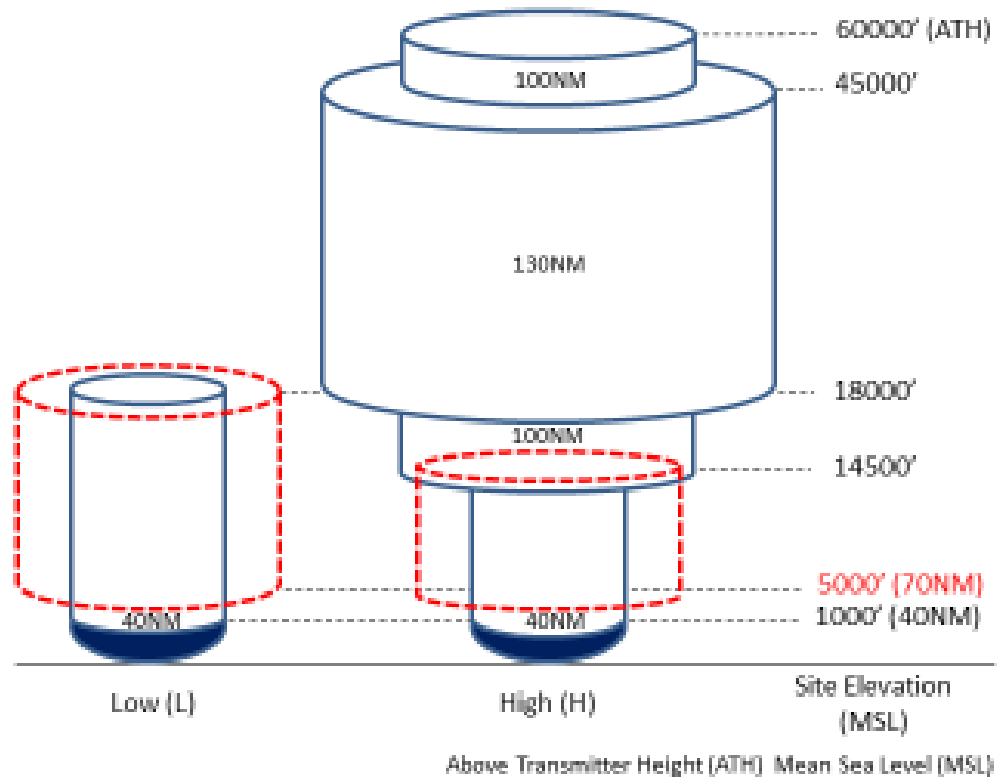




# Two New VOR Standard Service Volume (SSV) Classes

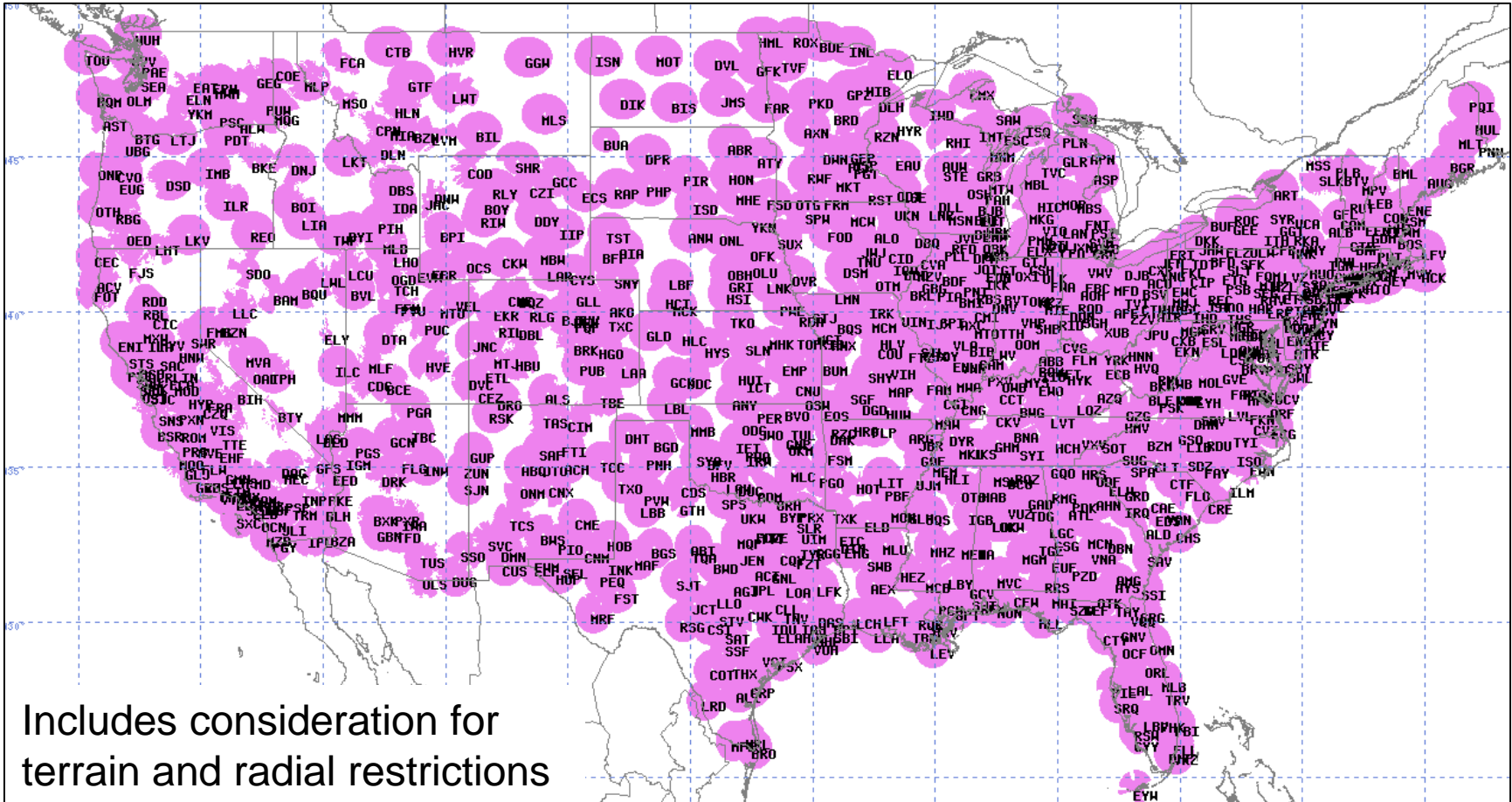
- A key aspect of the VOR MON operational plan is the requirement to implement geometrically larger SSVs than the current legacy SSV classes of Low (L) and High (H)
- Geometrically larger SSVs take advantage of current Radio Frequency (RF) signal-in-space without modification to existing ground-based equipment
- This allows for the overall reduction of ground-based equipment as fewer ground-based stations are required to cover the same area with RF signal-in-space
- The new VOR SSV classes can be technically described by their geometric increase of the legacy L and H classes from 40NM to 70NM beginning at 5,000' Above Ground Level (AGL)
- The two new VOR SSV classes are designated “VOR Low (VL)” and “VOR High (VH)”

# Two New VOR SSV Classes cont'd



# Initial 2016 FAA VOR Network

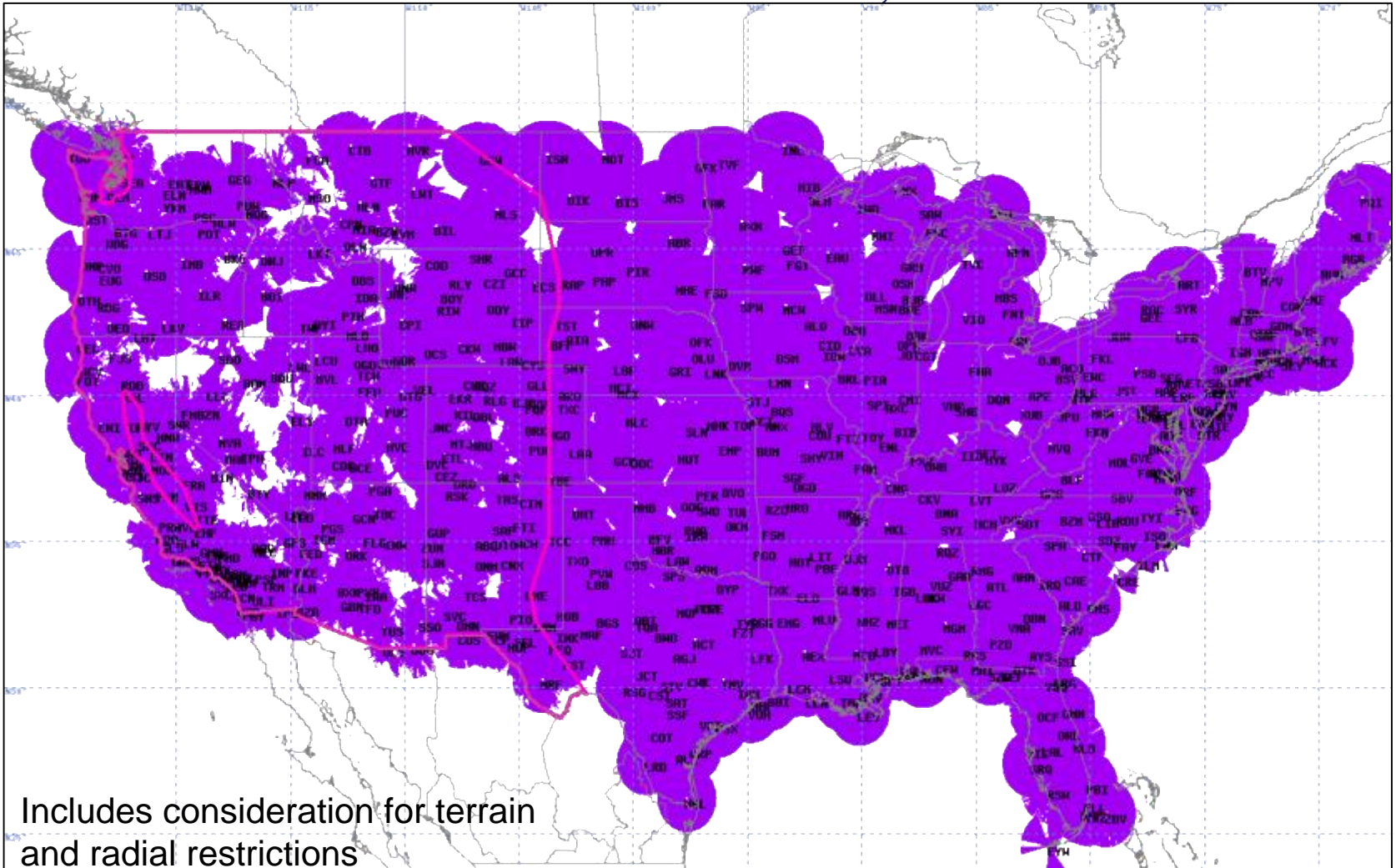
40 NM Service Volume at 5,000' AGL



Includes consideration for terrain and radial restrictions

# Planned VOR MON

*70 NM Service Volume at 5,000' AGL*



# VORs Planned for Discontinuance in the Next 6 Months

1. [BUU] Burbun, in Burlington, WI – Nov. 8, 2018
2. [RUT] Rutland, VT – Nov. 8, 2018
3. [VNN] Mount Vernon, IL – Nov. 8, 2018
4. [TVT] Tiverton, OH – Nov. 8, 2018
5. [CSX] Cardinal, in St. Louis, MO – Jan. 3, 2019
6. [ISQ] Schoolcraft County, in Manistique, MI – Jan. 3, 2019
7. [MTO] Mattoon, IL – Jan. 3, 2019
8. [ORD] Chicago O’Hare, IL – Jan. 3, 2019
9. [RID] Richmond, IN – Jan. 3, 2019
10. [FRM] Fairmont, MN – Feb. 28, 2019
11. [GNP] Glenpool, in Tulsa, OK – Feb. 28, 2019
12. [LSE] La Crosse, WI – Feb. 28, 2019
13. [MTW] Manitowoc, WI – Feb. 28, 2019
14. [GTH] Guthrie, TX – Apr. 25, 2019
15. [HUB] Hobby, TX – Apr. 25, 2019
16. [CZQ] Clovis, in Fresno, CA – Apr. 25, 2019



# Next Steps

- Continue coordinating with Metroplex, other PBN development projects, and Instrument Flight Procedure (IFP) removal teams to develop an aligned process to discontinue VORs
- Continue VOR discontinuance



# Contacting the VOR MON Program Team

- Website: [www.faa.gov/go/VORMON](http://www.faa.gov/go/VORMON)
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