FAA Informational Briefing:

Proposed Enhancements to Aeronautical Charting of Wind Turbine Farms

Presented to: Aeronautical Charting Meeting, Charting Group 22-01
By: Mike Rauchle and Shawn Smith, Aviation Safety Inspectors, AFS-420
Date: April 26, 2022
Introductions

• Mike Rauchle
Aviation Safety Inspector, Flight Technologies and Procedures Division, Flight Procedures and Airspace Group (AFS-420)

• Shawn Smith
Aviation Safety Inspector, Flight Technologies and Procedures Division, Flight Procedures and Airspace Group (AFS-420)
Purpose

• Provide an Informational Briefing to ACM's Charting Group regarding:
  – The proliferation of Wind Turbine Growth and Size over time has driven the need for VFR Aeronautical Charting enhancements to improve visual conspicuity
  – For wind turbines >499’ AGL, there is increased safety risk in the NAS for unlit wind turbine blade tips that affect flight operations in:
    • Class-G (uncontrolled) Airspace
    • Class-E (controlled) Airspace
  – Charting Improvements = Safety Risk Mitigation
Overview / Agenda

• Review current VFR charting depictions of Wind Turbine Farms
• Review 2011 ACM charting proposal for history/perspective
• Review Wind Turbine data and trends
• Share FAA’s new proposal - VFR charting improvements (2x options)
• ACM Charting Group - Feedback opportunity
• Q&A
Current Wind Turbine Farm Depictions:
Albuquerque, NM Example

CAUTION: Not To Be Used For Navigation
Current Wind Turbine Farm Depictions: Palm Springs, CA Example

CAUTION: Not To Be Used For Navigation
Historical 2011 ACM Proposal:

FAA Control Number: 11-01-236

AERONAUTICAL CHARTING FORUM
Charting Group

RECOMMENDATION DOCUMENT
FAA Control # (11-01-236)

Subject:
New symbol for VFR Sectional Charts.

Background/Discussion:
At the request of many pilots in Michigan, we recommend that a new symbol be developed to differentiate between radio towers and wind turbines.

Recommendations:
Utilize a new symbol to depict wind turbines on VFR charts.

Comments:
Provide better landmarks for pilots to increase situational awareness.

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Date:  03-10-2011
The 2011 Proposal Highlights:

- 25,000 Wind Turbines at that time (now >75,000)

- PREVIOUS:  CURRENT:
USGS Wind Turbine Map (2022):

SOURCE: https://www.sciencebase.gov/catalog/item/57bdfd8fe4b03fd6b7df5ff9
Wind Turbine Data and Trends

1ST QTR 2022 1,141
2021 5,544
2020 8,583
2019 3,912
2018 6,738
2017 5,398
2016 4,153
2015 5,255
2014 5,514
2013 5,061
2012 4,709
2011 1,984
2010 1,371
2009 485
2008 696
2007 439
2006 915
2005 152
2004 15
2003 181
2002 68
2001 92
2000 1
1998 1
1996 1

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000

Federal Aviation Administration
Wind Turbine Data and Trends

~ A Trend in Wind Turbine Height Increase ~
AVERAGE OF AGL Throughout the Years
1997-2021

[Bar graph showing the trend in wind turbine height increase from 1997 to 2021.]
Wind Turbine Growth (>499ft AGL)
Wind Turbine Growth (>599ft AGL)

Number of 600'+ Wind Turbines Built Per Each Year

- 2021 TOTAL: 578
- 2020 TOTAL: 378
- 2019 TOTAL: 381
- 2018 TOTAL: 2
- 2016 TOTAL: 1
Current Wind Turbine Farm Depictions:

Albuquerque, NM Example

CAUTION: Not To Be Used For Navigation
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CAUTION: Not To Be Used For Navigation
Current Wind Turbine Farm Depictions: Palm Springs, CA Example

CAUTION: Not To Be Used For Navigation
Proposed Chart Example #2a

CAUTION: Not To Be Used For Navigation
CAUTION: Not To Be Used For Navigation
KPSP with Dotted Border (Alternate Proposal #2b)

CAUTION: Not To Be Used For Navigation
KPSP (Alternate Proposal #2b, Enlarged)
FAA Requests Stakeholder Feedback:

- **ACM Charting Group Feedback Opportunity**
  - 9-AMC-AVS-ACM-INFO@faa.gov
  - In the SUBJECT LINE please state:
    - “Wind Turbine Charting Proposal Feedback”

- **Timeline**
  - 90 Days (Deadline August 1, 2022)

- **Next ACM CG Meeting - October 2022**
  - FAA will brief the group on feedback consensus and inform the group of the final decision
Questions & Answers

• THANK YOU!
BACKUP SLIDES
Proposed Charting Spec. Changes:

- Propose to change the outline border of the wind turbine farm from dashed lines to segmented dots (zipper).
- Propose to chart the wind turbine symbol in pairs.
- Propose to add 45 degree (diagonal), parallel lines for interior fill, .075 line spacing.
- Propose to chart a new Caution Note (Only for wind turbines taller than 499’ AGL.)
- Retain existing color palate (aeronautical blue)
Charting a taller obstruction within the wind turbine farm:
Canadian Example For Comparison:

Canada

- Canada is ranked #9 in terms of installed wind power capacity (MW)
- Considerable low altitude General Aviation
- Not ICAO compliant charting; difference isn’t noted in AIP

Reference: Canada VNC
Implementation

• Inter-Agency Air Committee (IAC) meeting (FAA, NGA)

• Aeronautical Charting Publication Schedule
  – FAA Aeronautical Information Services (AIS) Charting Team's internal process

• Update the Aeronautical Chart Users Guide

• ICAO Difference (AIP)
  – 2.4.1 "Symbols do not universally conform"
Albuquerque, NM
Albuquerque, NM Zoomed In
Palm Springs, CA Zoomed In
SW Kansas
SW Kansas Zoomed In