Washington Dulles International Airport (IAD) Aircraft Noise Overlay Update

Scenario Development
2nd Working Group Briefing
For Publication on MWAA Website
4/20/18
Meeting Purpose

• Discuss airfield activity scenarios to model in the Airport Environmental Decision Tool (AEDT)
• Discuss methodology to calculate ultimate operational activity input into the AEDT
Agenda

• Study Purpose
• Background
• Discussion
  – Scenario Identification
  – Annual Service Volume (ASV)
  – Potential Fleet Mix
  – Potential Operations By Time Of Day
• Conclusion
• Project Timeline/Next Steps
Study Purpose

Update the Dulles Airport noise contour map to incorporate changes in the aviation environment so that the future vision reflects these changes:

- Flight tracks and overall utility of the airfield have evolved
- Evolution will continue with implementation of NextGen
- Flight procedures will soon allow for triple simultaneous runway operations during low visibility conditions (IFR)
- Airport operational forecast changes
Background

New Noise Contours Maps will:

• incorporate changes since the 1993 update critical to the region and the Airport
  – Significant tool the airport uses to assist local governments with their off-Airport land planning and zoning decisions

• continue to ensure compatibility between the Airport and local jurisdictional land use and ensure local jurisdictions have the latest information available to make land use decisions

• be based on Ultimate Build Scenarios
Discussion
Scenario Identification

- Identify up to three scenarios reflecting ultimate runway capacity for:
  - Current four-runway airfield
  - Future five-runway full-build airfield
- Account for increased nighttime activity including passenger and air cargo aircraft
- Consider future locations for on-Airport development
- Develop various future runway use scenarios to ensure recommended overlays include areas potentially affected by long-term aircraft noise exposure
Discussion – Scenario Identification
Current 4-Runway Configuration

Source: aerial photograph: USDA-FSA-APFO Aerial Photography Field Office, Virginia 1m NAIP Imagery, 2016
Discussion - Scenario Identification

Future 5-Runway Configuration

Discussion - Scenario Identification
Recommended Scenarios

• Scenario 1
  – Four-runway airfield
  – Most effective use of runways during daytime
  – Runway 1L-19R operational efficiency utilization for nighttime activity

• Scenario 2
  – Five-runway airfield
  – Most effective use of runways during daytime
  – Runway 1C-19C operational efficiency utilization for nighttime activity

• Scenario 3
  – Five-runway airfield
  – Most effective use of runways during daytime
  – Runway 12L-30R operational efficiency utilization for nighttime activity
Discussion Scenario Identification - Scenario 1

Source: aerial photograph: USDA-FSA-APFO Aerial Photography Field Office, Virginia 1m NAIP Imagery, 2016; on-airport land use: MWAA, April 2018
Discussion – Scenario Identification
Scenario 1

• Four-runway configuration
• Most effective runway use for safe and efficient operations during daytime periods
• Reflects primary runway use associated with on-Airport development west of Runway 1L-19R during nighttime periods
Discussion – Scenario Identification

Scenario 2

Source: aerial photograph: USDA-FSA-APFO Aerial Photography Field Office, Virginia 1m NAIP Imagery, 2016; on-airport land use: MWAA, April 2018; new runway: MWAA, April 2018.
Discussion – Scenario Identification
Scenario 2

• Five-runway configuration
• Most effective runway use for safe and efficient operations during daytime periods
• Reflects primary runway use associated with on-Airport development south of the existing terminal during nighttime periods
Discussion Scenario Identification - Scenario 3

Source: aerial photograph: USDA-FSA-APFO Aerial Photography Field Office, Virginia 1m NAIP Imagery, 2016; on-airport land use: MWAA, April 2018; new runway: MWAA, April 2018.
Discussion – Scenario Identification

Scenario 3

• Five-runway configuration
• Most effective runway use for safe and efficient operations during daytime periods
• Reflects primary runway use associated with on-Airport development south of the existing terminal or between Runways 12L-30R and 12R-30L
Discussion – Annual Service Volume

Maximum Sustainable Throughput

• The number of aircraft operations that can reasonably be accommodated over a period of continuous demand (FAA Advisory Circular 150/5060-5)

• Most common time intervals are hourly and annual

• Maximum sustainable throughput is based on runway dimensions, airfield design standards, air traffic control rules/procedures, and aircraft capabilities
Discussion
Annual Service Volume

• *Annual Service Volume* - an estimate of how many aircraft operations the airport runway system can accommodate in a year
• Accounts for differences in throughput related to runway use, fleet mix, and weather conditions that would be encountered over the year
• Serves as the basis for the potential number of annual operations at IAD
• Based on a specified level of average annual delay
Discussion – Annual Service Volume
Factors Affecting Airfield Capacity

• Runways
• Taxiways
• Runway exit taxiways – runway occupancy time
• Fleet mix
• Weather
• Air traffic control procedures
  – Wake turbulence separation
  – Radar separation
  – Procedure separation
  – Buffers to separation requirements
  – Divergent headings
Discussion – Potential Enhancements to IAD Airfield Capacity – 5th Runway

The fifth runway at IAD would provide:

• capability to accommodate additional landings and takeoffs.

• adequate separation from existing Runway 12-30 to allow simultaneous dual instrument arrivals in all weather conditions.

• increased throughput when wind and weather require aircraft to land/depart only in a westerly direction.
Discussion – Potential Effects on IAD Airfield Capacity – NextGen

NextGen initiatives that could potentially affect IAD include:

• triple simultaneous instrument approaches during all weather conditions.

• wake turbulence recategorization for aircraft that would reduce the required separation between aircraft landing or departing on the same runway.

• Equivalent Lateral Spacing Operations (ELSO) could increase the number of departure routes from individual and parallel runways.
Discussion
Potential Daily Operations Level Development

• Calculate ASV and average annual day (AAD) based on 4-Runway and 5-Runway scenario and foreseeable FAA NextGen improvements
• Develop potential AAD fleet mix
• Distribute AAD operations by time of day
• Add potential cargo and international operations to nighttime hours
• Prepare AEDT daily operations file representing AAD
Discussion – Annual Service Volume Calculation Methodology

• Objective: Calculate ASV for the 4- and 5-runway airfield

• Assumptions:
  – Taxiways adequate to expedite movement onto and off of all runways will be in place
  – Other facilities (terminals, gates, cargo and general aviation) will be available to accommodate demand
  – Airspace and procedures available to accommodate maximum sustained throughput
  – Airport operation level of service is tolerable up to capacity constrained levels
Discussion - Annual Service Volume Calculation Methodology Continued

- Apply FAA methodology to calculate maximum sustainable hourly throughput rate

- Apply historic weather conditions, historic and expected runway use, runway configuration throughput weighting

- Extrapolate ASV to account for average delay per operation equivalent to capacity constrained airport thresholds (FAA, FACT3: Airport Capacity Needs in the National Airspace System Study) = Potential ASV
Discussion
Potential Fleet Mix

• Begin with existing aircraft types

• Identify aircraft subject for replacement based on:
  – Age (e.g., older Boeing 737 models, Boeing 757, Boeing 747-400)
  – Airline orders
  – Airline announcements (e.g., American Airline’s recent announcement to replace Boeing 767 and Airbus 300 with Boeing 787 models)

• Assess potential replacement of smaller regional jets (e.g., Embraer 145) with larger regional jets (e.g., Embraer 190) and larger regional jets with new 100-seat mainline jets (e.g., Canadair C-Series)
Discussion
Potential Operations by Time of Day

• Day-Night Average Noise Level (DNL) reflects AAD and applies 10-dBA factor to nighttime operations

• Not sensitive to hourly peaks

• Daytime will reflect maximum sustainability hourly throughput levels

• Nighttime will reflect:
  – maximum sustainable hourly throughput levels for “shoulder” hours (6:00 am to 6:59 am and 10:00 pm to 11:00 pm)
  – potential cargo operations
  – potential international operations between 11:00 pm and 6:00 am
Progress and Next Steps

Inventory
- Evaluate current and future plans (MWAA and FAA)
- Assess existing operation conditions

Forecast
- Determine full-build scenario(s)
- Determine maximum potential operations
- Determine potential aircraft runway use and flight tracks

Noise Modeling
- Calculate existing aircraft noise levels
- Calculate potential aircraft noise levels for full-build scenario(s)
- Determine appropriate composite of potential scenarios, if appropriate

Conclusions
- Recommend potential aircraft noise contours for land use planning

- In Process
- Completed
- Upcoming
Conclusion

• Schedule next working group meeting
• Feedback from Working Group