Air Traffic Organization

Wake Vortex in the Context of NextGen & Status of WakeNet-USA and Global WakeNet

Federal Aviation Administration

Presented to: WakeNet3 Europe

By: FAA Wake Turbulence Research Program

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Outline

- NextGen at a glance
- Wake Turbulence Research and Development Fit Within NextGen
- Overlap with SESAR
- Transition to Performance Based Operations
- Wakenet USA

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NextGen Solutions

Envisions a trajectory based separation management system that requires precise management of the aircrafts current and future position. The separation function of today, relying heavily on the cognitive skills of the air traffic controller to visualize aircraft trajectories on the radar display and issue resolutions via voice instructions to pilots would be replaced by a distributed system of separation components, ground and air, **"allowing a reduction in performance-based separation standards for different aircraft categories"**. This future system would rely heavily on enhanced automation with conflict resolutions that are communicated digitally between air and ground and between aircraft.

NextGen Solutions

→ NextGen requires improvements be developed that reduce the wake turbulence effects on aircraft operations both in the terminal and en route environments, resulting in reduced spacing and increased capacity which directly contribute to the ability to achieve NextGen capabilities.

→ These improvements require solutions that support the reduction of wake-based separation requirements using improved, new or modified procedures; aircraft structural configurations to reduce wake turbulence; development of ANSP decision support tools; and ground-based wake vortex advisory systems.

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Wake Turbulence R&D Fit with NextGen

✧ **Flexible Airspace**
  ➢ **Flexible Terminal Airspace**
    ⊃ **Static Reduction of Diagonal Separation**
      ↳ **7110.308**
      ↳ **Wake Turbulence Mitigation for Arrivals (Procedures) (WTMA-P)**
    ⊃ **Static Reduction of Single Runway Separation**
      ↳ **Recat Phase I**
      ↳ **Recat Phase II**
    ⊃ **Dynamic Reduction of Diagonal Separation**
      ↳ **Wake Turbulence Mitigation for Departures**
      ↳ **Wake Turbulence Mitigation for Arrivals (System) (WTMA-S)**
    ⊃ **Dynamic Reduction of Single Runway Separation**
      ↳ **Single Runway Departure and Arrival**
      ↳ **Recat Phase III**

✧ **Separation Management**
  ➢ **Climb Through and Descend Through**

✧ **Trajectory Based Operations**
  ➢ **Wake Turbulence Separation (static and dynamic) are enabling as they provide separation minima**

✧ **Communications/Navigation/Surveillance/Automation**
  ➢ **ADS-B serves as enabler for**
    ⊃ **WTMA-S**
    ⊃ **Single Runway Departure and Arrival**
    ⊃ **Climb Through and Descend Through**
  ➢ **RNAV/RNP serves as enabler for**
    ⊃ **All CSPR solutions**
    ⊃ **Climb Through and Descend Through**

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# Overlap With SESAR and other International Efforts

- **7110.308 Safety Case Draws from FRAPORT's Reduced Diagonal Separation**

- **WIDAO Safety Case Draws from 7110.308**

- **Single Runway Departure Solution Draws from CREDOS**

- **Single Runway Arrival Solution is Similar to CROPS**

- **Recat Joint Effort**

- **Automated Terminal Proximity Alert Draws from Time Based Separation work**

ATPA Phase 1 Monitor Cones

One of Several Diagonal Separation Options

Option 1A
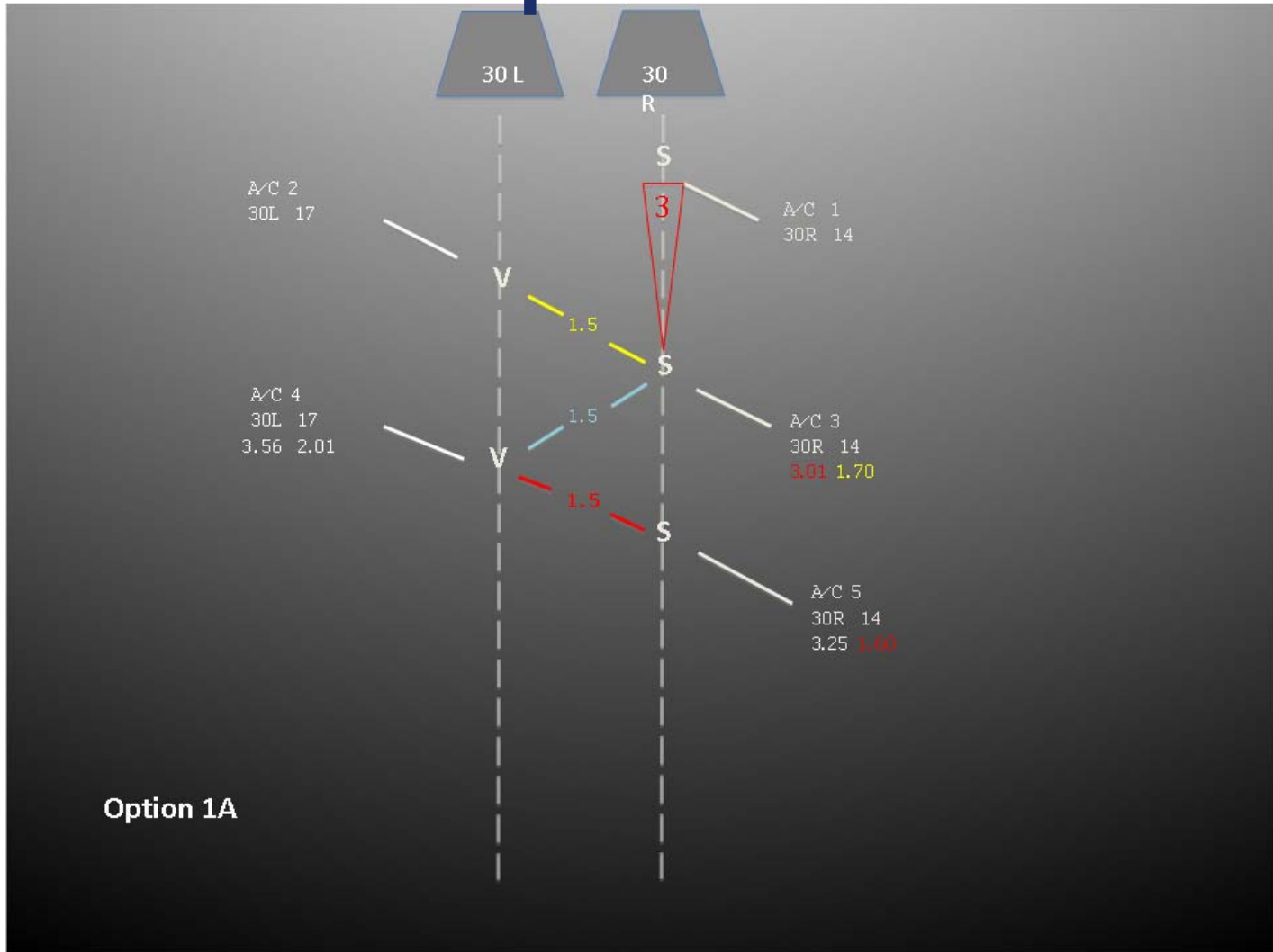
Transition to Performance Based Operations

- WTMA and 7110.308
  - Now: Slightly increased ILS glide path or Displaced Landing Thresholds trailing aircraft
  - Performance Based (RNAV/RNP): 3 degree glide path and lesser or no displaced landing threshold
- WTMD, WTMA-S, Single runway Departure and Arrival
  - Now: Conservative crosswind thresholds accounting for lateral and vertical path dispersion as well as ground based wind sensors
  - Performance Based (RNAV/RNP and ADS-B): Less conservative crosswinds and higher availability of reduced separation operations
- Recat
  - Now: Static wake categories
  - Performance Based (Roll Moment of Inertia): Static pairwise separation
  - Performance Based (ADS-B): Dynamic Pairwise Separation

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WakeNet USA and Global WakeNet

➤ **WakeNet USA Fall 2010 Meeting**

➢ Tentatively scheduled October 13th-15th

- Probable location Boston Massachusetts

➤ **Global WakeNet 2010 Meeting**

➤ Tentatively scheduled December 1st and 2nd in North America

➤ Probable location San Diego California

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