Joint Planning and Development Office (JPDO)
Weather Integrated Product Team (IPT)

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What is this all about?

• An opportunity we can’t afford to pass up
  – Perhaps the first time since FAA stood up to totally resynchronize aviation weather services (government and industry)
  – Buy-in from senior leadership across both government and industry

• Making tough decisions
  – Transformation, not evolution
    • Human versus automation
    • Government and industry roles/costs
  – Eliminate the “not invented here” philosophy
    • Shared input/consensus where possible
  – 2025 system—yes
    • But begin to impact FY06 activities
Weather IPT History

- Started September 2003
- Membership primarily government, but expected to change
- Work to date has been taken “out of hide”
- **Recognition for team members**
2025 NGATS Concept

Operating Principles
• “It’s about the users…”
• System-wide transformation
• Prognostic approach to safety assessment
• Globally harmonized
• Environmentally compatible to foster continued growth

Key Capabilities
• Net-Enabled Information Access
• Performance-Based Services
• Weather-Assimilated Decision Making
• Layered, Adaptive Security
• Broad-Area Precision Navigation
• Trajectory-Based Aircraft Operations
• “Equivalent Visual” Operations
• “Super Density” Operations
“It’s about the Users”

A major shift in the information paradigm...

From

- Supplier dominated
- Owner pushes controlled info
- Sequential info flow

Gather, Process, Use, Disseminate

To

- User (consumer) dominated
- Owner posts info for appropriate classes of users
- Parallel information flow

Gather, Post, Process, Use

Payoffs

- Better, Faster Decision Making (due to greater information base)
- Increased Collaboration, Reliability & Accuracy
- Greater Security
System-Wide Transformation
Innovation Across All Lines of Development

Policy Change/Creation
Organizational Innovation
Culture Acceptance

Organization

Technology

Culture

Policy

Technology

Organization

Culture

Policy

Technology

Innovation
Information Sharing: Foundation to Capabilities
Aircraft Trajectory-Based Operations

Adjust airspace configuration to meet user needs

- 4D trajectories (including taxi and roll-out) are basis for planning and execution
- Machine-based trajectory analysis and separation assurance
- Includes environmental performance throughout all phases of aircraft operations
- Airspace configuration driven by: DoD/DHS requirements, domestic & international user needs, requirements for special-use airspace, safety, environment, overall efficiency
- Airspace reconfigurable during day of operations
- Users “contract” for airspace access and service
Aircraft Trajectory-Based Operations: Management-by-Trajectory

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<th>Strategic Domain</th>
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<th>Separation Mgmt Domain</th>
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<td><strong>Airspace User Operations</strong></td>
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Key Issues are functional allocation between:
- Automation and humans
- Aircraft operators and service provider
Aircraft Trajectory-Based Operations: "Evaluator"

- Integrates/communicates weather, security, defense, environmental, safety, international considerations, other information
- Users “post”/update desired 4D trajectories in common system that continuously evaluates mutual compatibility
- Predicts potential “over demand” situations, in multiple “capacity dimensions”—traffic density, environmental, security, etc.
- Works across all time horizons from days/weeks/months prior to flight up to separation management (20 minutes or less)
- Supports distributed decision-making environment where players have clear, agreed-upon roles and interactions
Weather Assimilated into Decisions

*Common weather picture across NGATS*

- Fuse global weather observations and forecasts into single information system, dynamically update as needed
  - Tens of 1000’s of sensors (airborne & ground) feed 100’s of forecast models

- Learning automation accounts for weather and its uncertainties in managing aircraft trajectories

- Identify hazardous weather real-time

- Assimilated into NGATS “decision loops”
  - Total integration via machine-to-machine
  - Critical decision system time scales using both probabilistic and deterministic weather info
  - Optimized to maximize available weather-favorable airspace
  - Terminal weather impacts including ground/ramp ops and adaptability due to wind shift changes
Conclusion

• JPDO weather IPT is badgeless (for now)
  – Not easy, but essential
• We’re reinvigorating and updating an “old” concept of operations
  – Intend to see it through
• We’re working closely with other IPTs to ensure weather does not again become a stovepipe
  – Likely to cause significant change to existing government weather programs
• Challenge the concepts you see today