Friends and Partners Meeting: Vision for Weather Information Integration

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Agenda

- Objectives and Scope of "Integration"
- Recent focus areas/progress
  - Identification of key research and early analysis needs
  - Development of NGATS weather concept of operations/scenarios
    - Driven by an initial look at NGATS Curb-to-Curb Concept weather implications
- 2025 NGATS Concept & Weather Implications
- Discuss high level plans for Integration:
  - Present to 2008
  - 2008-15
  - 2015+

Objectives and Scope

- **The objectives of the Integration Team of the JPDO Weather IPT are to provide the leadership and proactive advocacy for the:**
  - **Timely identification, development and integration of:**
    - **NGATS-relevant weather information, and**
    - **Weather savvy decision making (and supporting automation)**
  - **Utilization of weather information to enhance air transportation decision making, including:**
    - **Development of operational concepts that define appropriate utilization of weather information in making operational decisions for all phases of flight**
    - **Utilizing these proposed concepts to drive discussions with the other JPDO IPTs on the utilization of enhanced weather information in evolving NGATS concepts**
    - **Also utilizing these concepts to coordinate with stakeholders outside of the JPDO in developing a consensus on the way forward**
    - **Working within the Weather IPT to accomplish key weather objectives for advancing NGATS (e.g. net-centric weather capability)**

Objectives and Scope (Concluded)

- **Integration scope includes the operational uses of weather information:**
  - **In applicable air transportation decision making situations**
  - **By all service providers**
  - **By all customers**
  - **Display and direct automation integration**
  - **Ground systems and in aircraft**
  - **Etc.**

Key Focus Areas / Progress (Cont'd)

- **Identification of recommended, priority "integration" research and trade studies, e.g.**
  - **Studies to determine NGATS-relevant weather information**
  - **Concept development for weather-ATM automation integration (including laboratory prototyping)**
    - **Nearer-term concepts for weather integration with today's**
      - **TFM, En route and Terminal capabilities**
      - **NGATS user capabilities (air and ground)**
    - **Longer-term automation concepts such as TFM decision support enabled by probabilistic weather information**
  - **Interface standards for 4-D, net-centric weather capability, including product generation responsibility**

Key Focus Areas / Progress (Cont'd)

- **Recommended studies (cont):**
  - **New weather information requirements posed by future vehicles, including UASs and Very Light Jets**
  - **Assess transportation security needs for weather information, e.g. bio-hazard dispersion**
  - **Metrics / Business case-**
    - **How do identify what "NGATS–relevant" weather information is the most critical?**
    - **What is the benefits pool?**
    - **Where do we spend the money?**
  - **Definition of terms such as "shared situational awareness" from a weather standpoint**
- **Studies documented, with first order costs, for consideration in JPDO future (next 3 year) planning**

Key Focus Areas / Progress
(Concluded)

- **Development of NGATS Weather Concept of Operations**
  - **Emphasis on operational uses of weather information**
  - **Goals:**
    - **Seek to define a flexible weather system that could support "multiple futures"**
    - **Set stage for planned transition capability roadmap**
    - **Drive development of functional and system requirements**
  - **Status:**
    - **Annotated outline in review, and sections being drafted**
    - **Target of December 2005 for initial version**
    - **Assessment of NGATS 2025 Concept of Operations in progress to:**
      - **Understand possible weather system implications**
      - **Drive development of the Weather concept of operations**

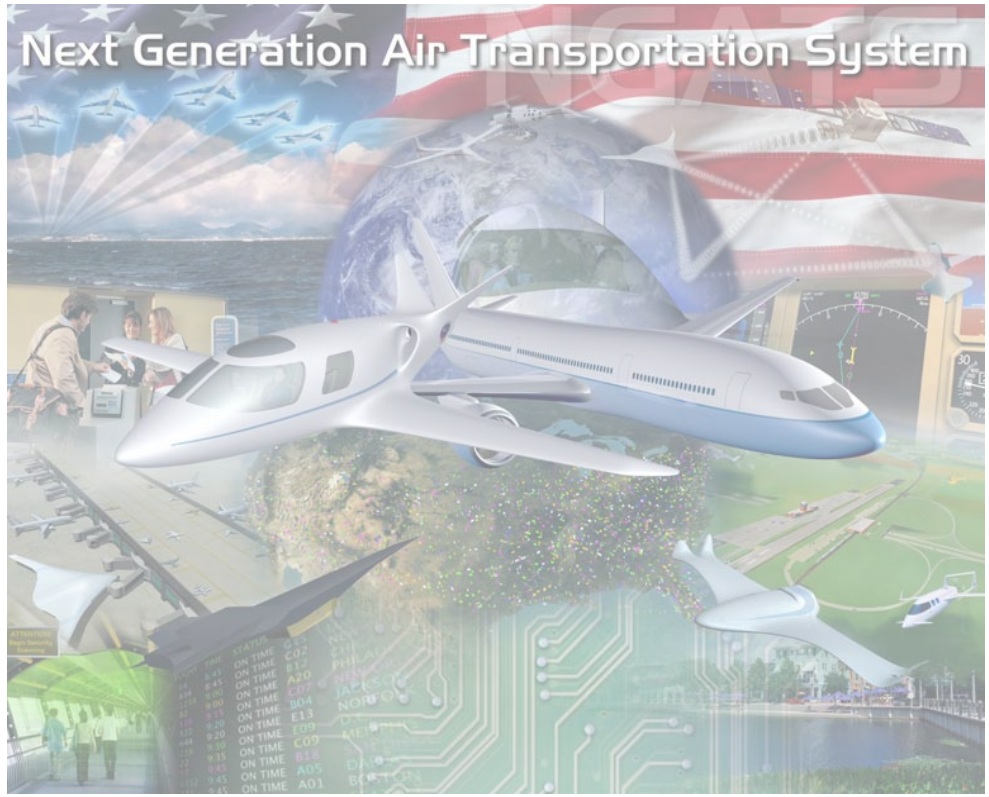
2025 NGATS Concept

Design Principles

- "It's about the users…"
- System-wide transformation
- Prognostic approach to safety management
- 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



Example NGATS Concept Weather Implications

- ATC separates aircraft from weather, especially for limited or non-equipped aircraft
- Role of UASs from the weather observation gathering and weather user perspectives
- 4-D weather information system is primary source
  - Vendors can provide tailored support to meet user needs or missions based on this source
- Weather assimilated into NGATS "decision loops"
  - "Learning Automation" Accounts for Uncertainties in Weather and Managing Aircraft Trajectories
- Weather Data for Chemical/Biological/Nuclear (Radiation) Security Incidents

Example Implications (Concluded)

- Providing wake vortex impact information critical to greater throughput at airports ("super density operations")
- Observation / forecast for non-towered airports, and dissemination to pilots and other users

Integration Plans: Present to 2008

- Concept of Operations / Scenarios for NGATS Weather
  - Work with JPDO IPTs to develop NGATS concept to lower level of detail
  - Coordination with IPTs and external stakeholders
  - Define "NGATS-relevant information" to support decision making, and facilitate "weather-savvy" decision making and supporting automation
  - Consideration of non-ATM needs (e.g. homeland security)
  - Identify unique weather information needs related to new and evolving air vehicles, e.g. commercial space, UASs, very light jets
- Functional and operational weather system requirements development
- Transition plan to transform today's NAS into NGATS
  - Including emphasis on implementing near-term weather product improvements in ATM automation systems

Integration Plans: Present to 2008 (Concluded)

- **Research and analyses to further define priority NGATS weather capabilities**
  - **Alternative concept evaluation, e.g. integration of probabilistic weather information with ATM decision support tools**
  - **Determine metrics for measuring operational impact of weather information**
  - **Business Case analyses- where is the best bang for the buck**
- **Standards development for weather information access by all users**
- **Integration-related policy issue analysis, in concert with IPT's Policy Team, e.g.**
  - **Roles of government and private sector in access to and utilization of net-centric weather capability**

Integration Plans: 2008 to 2015

- Support initial implementation of net-centric weather capability
  - Enable access by current government systems (e.g. ERAM, TFM Modernization) to ensure utilization in a timely fashion
  - Companion integration into user systems (e.g., flight planning)
- Continue to ensure alignment of the weather concept of operations with evolving NGATS concept elements
- Execute, and adjust as necessary, the NGATS weather transformation strategy
  - As new/improved information is added, define and implement concepts/capabilities to utilize it
  - Emphasis on direct integration of probabilistic weather information with decision support algorithms
  - Emphasis on phasing out/modernizing legacy products, where appropriate (e.g. textual representations)
  - Data link of information to the cockpit will be a major priority, including low-cost display options (e.g., EFB)
- Evaluation/approval process streamlined to expedite new weather information into operational use

Integration Plans: 2015+

- **Complete the transition to the envisioned NGATS Weather Concept**
  - **Full implementation of transformational improvements based on overall NGATS roadmap and the availability of NGATS-relevant weather information availability**
  - **Highly "weather-capable" aircraft fleet in place to support:**
    - **Full utilization of airport resources**
    - **Near-VFR operations at all times**
  - **Weather information:**
    - **Fully integrated into government and user decision support capabilities and procedures, and**
    - **Roles/responsibilities refined to make optimal use possible**

Panel Discussion

- Comments?
- Issues?
- Recommendations?

Backup Charts

Agile Air Traffic System IPT Capability Roadmap - DRAFT 26-May-05

C2C Capabilities- Weather

- Enhanced weather observations and forecasts to meet user needs
- Dissemination of Common Weather Picture to All Users
- Integration/interoperability to Improve Transportation Decision Making Based on Utilization of Common Weather Picture