NGATS Weather Concept of Operations

JPDO Weather IPT

JPDO Recent Publications

- Concept of Operations for
  the Next Generation Air Transportation System
  - Draft Version 0.2; July 24, 2006

- Next Generation Air Transportation System
  Weather Concept of Operations
  - Version 1.0; May 13, 2006

  Both documents available for download and comment:
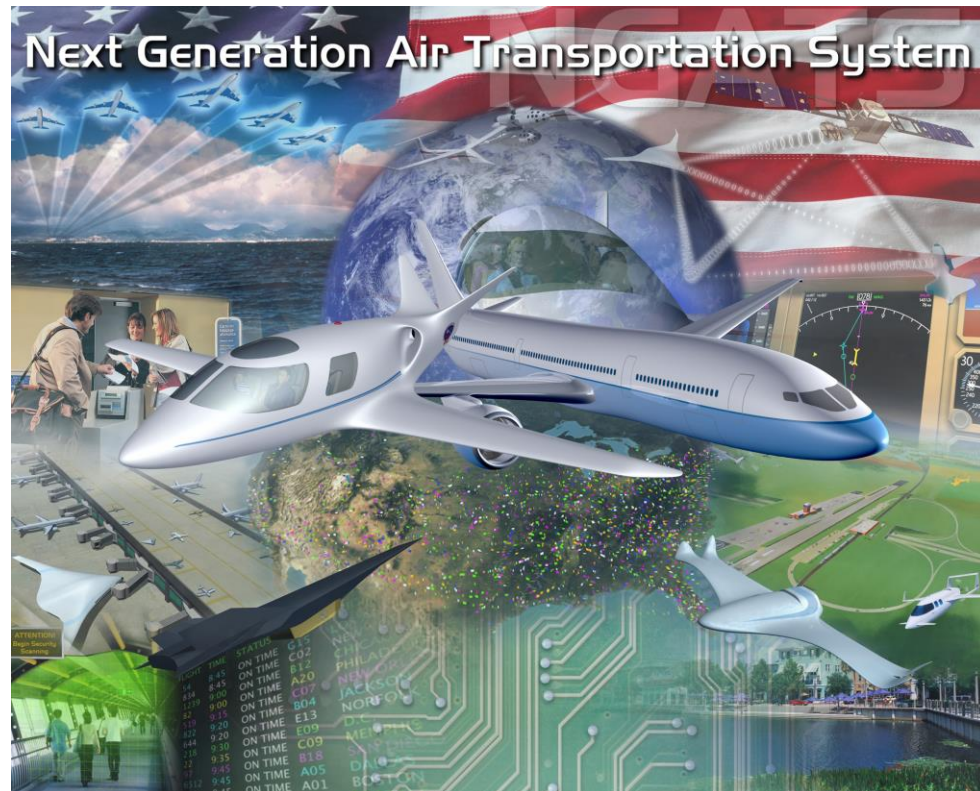 [http://techhangar.jpdo.aero/]

2025 NGATS Concept

Operating Principles

- "It's about the users…"
- System-wide transformation
- Prognostic approach to safety assessment
- Globally harmonized
- Environmentally compatible to enable continued growth

Key Capabilities

- Net-Enabled Information Access
- Performance-Based Ops & Services
- Weather-Assimilated Decision Making
- Layered, Adaptive Security
- Broad-Area Precision Navigation
- Trajectory-Based Aircraft Operations
- "Equivalent Visual" Operations
- "Super Density" Operations

Next Generation Air Transportation System

Weather Concept Philosophy

Our charge is NOT about the weather …

Rather, it is about the

Identification and effective use of weather information (and supporting capabilities) to mitigate weather impacts on NGATS operations

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Weather Concept Scope/Approach

- Scope
  - 2025 concepts for Weather Support (future vision)
    - Starting point for inter-IPT discussions
    - First step in NGATS weather functional analysis
- Approach
  - Analyzed NGATS 2025 Operating Principles and Key Capabilities
  - Identified Weather Implications/Impacts
  - Established resulting Operating Principles for NGATS Weather Support Concepts
  - Developed Weather Concept Details
- To Follow…
  - Transition "Road Map"
    - Transition plan for Weather Support - current NAS to 2025 Concept
  - Complementary products:
    - Weather System Requirements
    - Supporting R&D Requirements

Weather Implications/Impacts AMDAR Data Access

- Section 2.3 (Performance-Based Services)

  "… enables a definition of service tiers and allows the government to move from equipment-based regulations to performance-based regulations."

  – 2.3.1: Aircraft are capable of receiving and transmitting weather information

  – 2.3.2: Weather sensors included in Performance-Based Services

  "… At a minimum, in addition to accurately providing its 4-D geospatial position, aircraft provide in situ winds, temperature, relative humidity, turbulence and icing information. Aircraft may also measure non-weather phenomena (e.g., volcanic ash), utilize forward or down looking remote weather sensors, and carry dosimeters to measure the radiation environment which is affected by space weather activity."

Weather Concept Operating Principles AMDAR Data Access

- Operating principles
  - Derived from the analysis of the implications/impacts of weather from the NGATS 2025 Concept
  - Grouped into five (5) categories:

    1. Policy and Organization
    2. Data Collection and Access
    3. Products and Decision Oriented Tools
    4. Integration and Procedures
    5. Enhanced Aircraft Capabilities

Data Collection and Access
AMDAR Data Access

- Section 3.2.d: Aircraft "Performance-Based Service" includes data link capability for:

1) Accessing and processing in-flight updates to NGATS weather products

2) Transmitting and receiving aircraft weather data generated through on-board automation such as the Meteorological Data collection and Reporting System (MDCRS) or Tropospheric Airborne Meteorological Data Reporting (TAMDAR) type systems.

   Note: UAS platforms are used to gather such in-flight data.
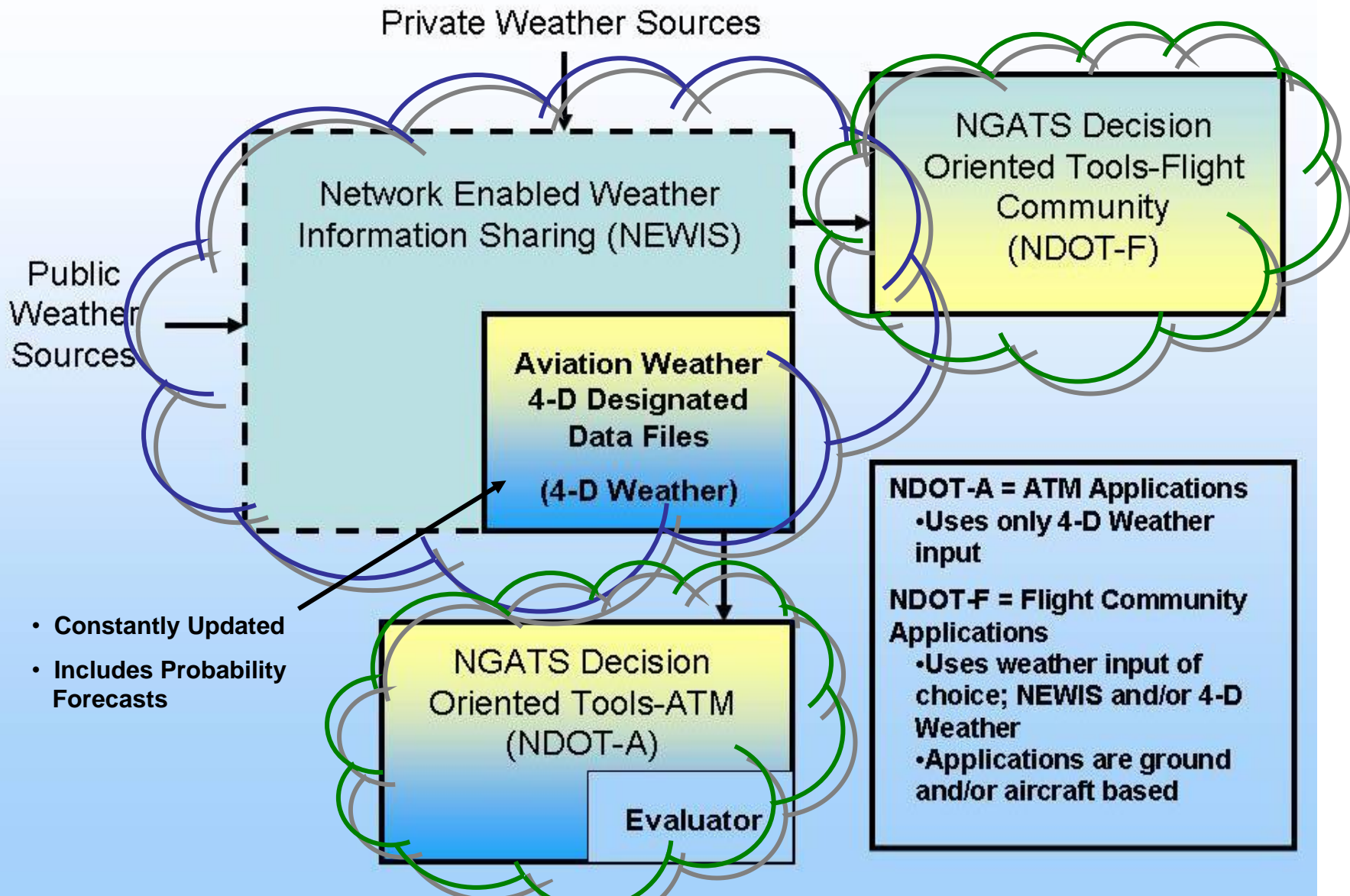
Summary

- ## Under NGATS (Section 2.3.2):

  > "Fully capable aircraft have a standardized set of weather sensors/algorithms to provide weather data to other users directly and via the [NGATS] 4-D Weather. Weather data from aircraft are valuable inputs to the [NGATS] 4-D Weather for providing advice and warning to nearby aircraft, and for providing input and verification for weather forecast products. …"

BACK-Up Slides

Weather CONOPS: Aviation Weather Information Access

Private Weather Sources

Network Enabled Weather Information Sharing (NEWIS)

Public Weather Sources

Aviation Weather 4-D Designated Data Files

(4-D Weather)

NGATS Decision Oriented Tools-Flight Community (NDOT-F)

NGATS Decision Oriented Tools-ATM (NDOT-A)

Evaluator

- **Constantly Updated**
- **Includes Probability Forecasts**

NDOT-A = ATM Applications
 •**Uses only 4-D Weather input**

NDOT-F = Flight Community Applications
 •**Uses weather input of choice; NEWIS and/or 4-D Weather**
 •**Applications are ground and/or aircraft based**

Weather CONOPS: Air Traffic Support