

## DEFINING THE INTERAGENCY OPERATIONAL GOVERNANCE STRUCTURE FOR THE NEXT GENERATION FOUR-DIMENSIONAL WEATHER DATA CUBE AND NEXT GENERATION NETWORK-ENABLED WEATHER

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### 1. INTRODUCTION

Today's aviation weather picture is a complex system that relies on point-to-point communication from a variety of data sources. This system can produce inconsistent delivery of aviation weather information to stakeholders throughout the National Airspace System (NAS). The Joint Planning and Development Office (JPDO), with industry participation through the NextGen Institute, provides a collaborative environment for the development of a solution to this problem.

The Next Generation Air Transportation System (NextGen) will represent a substantial and long-term change to the management and operation of the NAS. A new information management system will provide approved subscribers with weather information that enables the use of a common weather picture to meet Air Navigation Service Providers (ANSP) requirements, and help reduce NAS disruptions caused by weather.

Multiple parties at diverse physical locations will publish to this new information system, formed by a combination of the NextGen 4-D Weather Data Cube and NextGen Network-Enabled Weather (NNEW). Approved subscribers will be able to access end-use aviation weather information, including the Single Authoritative Source (SAS), from a virtual, secure source.

This multiagency-effort will require significant coordination and a governance structure that is both robust and flexible. The JPDO Weather Policy Team (Wx Policy Team) is nearing completion of formal governance documents, with full implementation expected in early 2013.

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### 2. BACKGROUND

In developing this governance structure, existing governance models are being leveraged, wherever possible. Many analogous processes exist within the partner Agencies and these functions will be incorporated in the final governance documents.

This governance structure is intended to adapt and evolve as NextGen weather requirements and capabilities mature.

### 3. COORDINATION

In April 2011, a conceptual governance structure was briefed to the NextGen Executive Weather Panel (NEWP) and the Wx Policy Team received approval to develop formal governance documents detailing a joint governance structure for the Cube and NNEW. These documents are expected to be available in 2012.

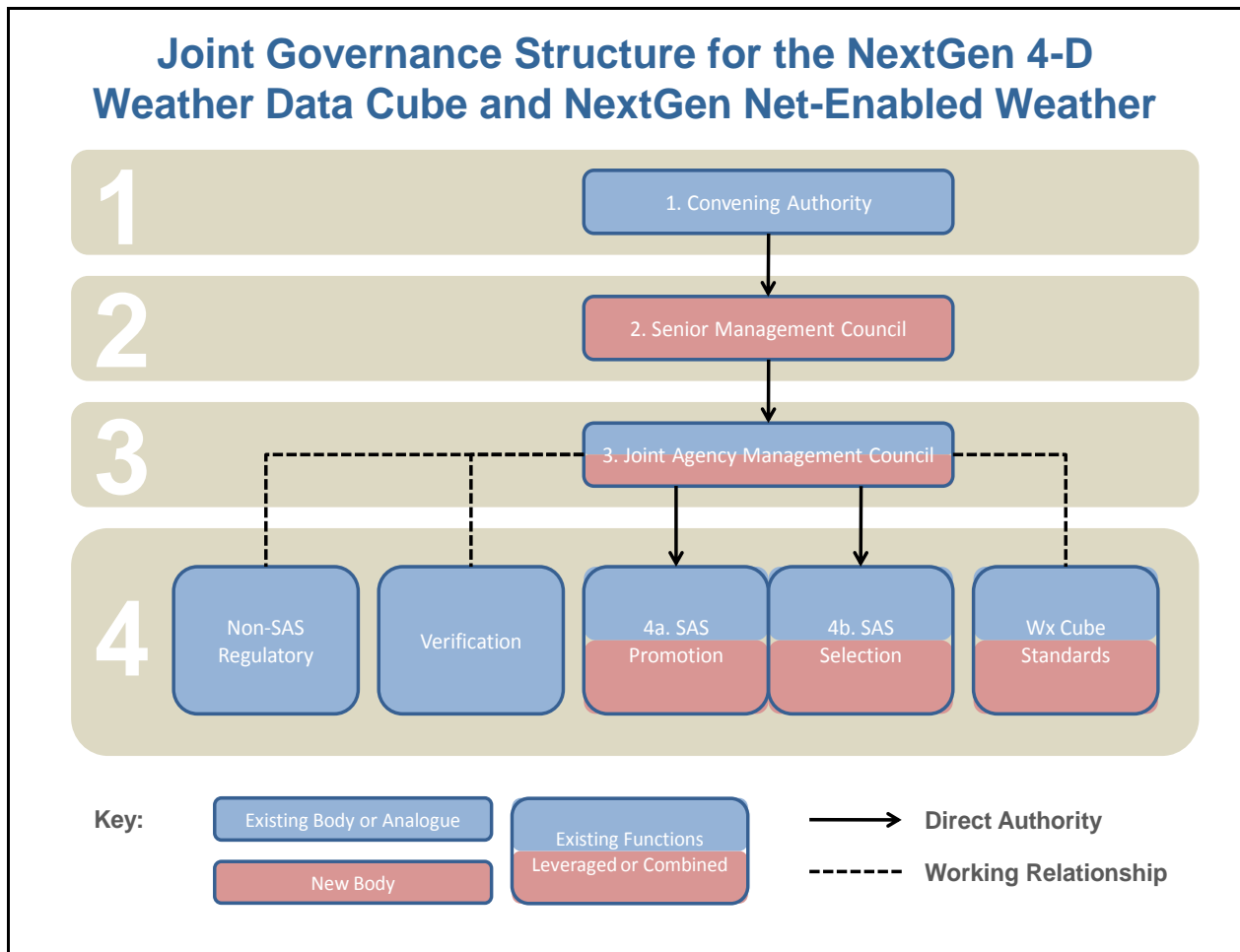
### 4. GOVERNANCE STRUCTURE

**Figure 1** illustrates the overall governance concept developed by the Wx Policy Team and shows a four-tiered authority structure. It indicates lines of direct authority (solid lines) as well as a number of working relationships\* (dashed lines).

Governance bodies shown in **BLUE** are existing governance mechanisms within the partner Agencies. The Agencies agree that these functions will continue to operate as they do today, with some modification in order to align their goals with the intent of the SAS, Cube and NNEW.

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\* A definition of this term is included in Section 5 of this paper, *Key Governance Terms*.



**Figure 1. Joint Governance Structure for the NextGen 4-D Wx Data Cube and NextGen Net-Enabled Weather.**

Governance bodies shown in **RED** are new governance mechanisms, while bodies indicated in both colors represent existing analogues—current functions that will be significantly modified and folded into the new governance structure.

### Convening Authority

The Convening Authority represents the ultimate decision-making body associated with the joint Cube and NNEW governance structure and is comprised of current NEWP members:

- Assistant Administrator for NextGen, **FAA**
- Assistant Administrator for Weather Services, **NOAA**
- Director of Weather, **U.S. Air Force**

- Director of Oceanography, Space and Maritime Domain Awareness, **U.S. Navy**
- Director of Airspace Systems Program Office, **NASA**
- Director of the **JPDO**

This body is responsible for approving the initial governance documents and for guiding the joint governance at the highest level. After appointing members to the Senior Management Council (SMC), the Convening Authority is expected to assemble only as-necessary in order to resolve any high-level, multi-agency issues.

### Senior Management Council

Members of the SMC are appointed by the Convening Authority at a level of authority similar

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to Directors and/or Deputy Directors and are drawn from:

- National Weather Service Offices (Climate, Water & Weather Services; Science & Technology; etc.)
- Federal Aviation Administration Service Units (Research & Technology; System Operations; Program Operations; etc.)
- U.S. Air Force (Deputy Director of Air Force Weather)
- Joint Planning and Development Office

The SMC conducts regular programmatic reviews and oversees any necessary realignment of governance roles and responsibilities across the partner Agencies. It represents the highest decision-making authority, short of recalling the Convening Authority.

SMC responsibilities include approving changes to the governance documents of subordinate bodies and, when necessary, overseeing any high-level dispute resolution among/between those bodies.

### Joint-Agency Management Council

Members of the JAMC are appointed by the SMC, with representatives drawn from FAA (division-level), NWS (branch-level) and the Air Force Weather Agency.

The JAMC is responsible for managing activities of the Working Groups, resolving disputes among/between them and advising the SMC in programmatic decisions. This includes oversight of the three working groups that maintain working relationships with auxiliary governance activities performed by one or more partner Agencies (Non-SAS Regulatory, Verification and Weather Cube Standards).

### Working Groups

The five Working Groups are subordinate governance bodies that perform the day-to-day tasks required to build, operate and maintain the Cube and NNEW.

Three of these groups (Non-SAS Regulatory, Verification and Weather Cube Standards) are governance mechanisms intended to interface—or maintain working relationships—with existing activities performed in one or more of the partner Agencies. These working relationships

are intended to ensure open communication and ease configuration control within the joint governance structure.

The other two groups will oversee SAS Promotion and SAS Selection—activities that will ultimately produce the common weather picture.

#### a. Non-SAS Regulatory

Functions overseen by the Non-SAS Regulatory Working Group are those performed today by the FAA's Aviation Safety Organization (AVS). AVS plays a vital role in the successful implementation of NextGen.

AVS establishes the standards and policies for NextGen operations, certifies compliance with those standards and ensures continued operational safety when adopting new aircraft technologies and change-procedures for flight crews and controllers. These AVS functions will be carried out much as they are today, but in close coordination with the new joint Cube and NNEW governance structure.

Specific functions delegated to this group include approving the use of weather information to meet regulatory requirements and exercising access control authority for Publishers and Subscribers to public domain regulatory Cube content. This access control authority relates specifically to data publishing and subscription access—and not the use of data associated with regulations within the FAA.

#### b. Verification

The Verification Working Group is intended to roll existing verification activities and agreements into the joint Cube and NNEW governance structure. Verification activities and responsibilities are clearly delineated in existing FAA-NWS agreements and are expected to remain in place with the implementation of the joint Cube and NNEW governance structure. *NOTE: The Department of Defense (DoD) has elected to retain control of DoD-specific verification activities.*

The primary responsibility of this working group is to continue developing and implementing a Quality Management System (QMS) for the content of the Cube. It is also responsible for recommending appropriate meta-data standards to identify data quality information.

### c. SAS Promotion

The NEWP approved a maturity model for categorizing weather information in the Cube, including the SAS. **Figure 2** is a simplified representation of this model. The joint governance structure establishes two working groups responsible for guiding weather products, models and datasets through this maturity model—SAS Promotion and SAS Selection. More information about the content of the 4-D Wx Data Cube can be found in the JPDO Policy Statement, *'Defining the Categorical Content of the Next Generation Four-Dimensional Weather Data Cube at Initial Operating Capability.'*



**Figure 2. Simplified Maturity Model.**

The SAS Promotion Working Group will be comprised of staff-level representatives from the FAA, National Weather Service (NWS) and Air Force. Advisory representatives of NAS Operators and non-government stakeholders are expected to participate in SAS Promotion in order to provide industry perspective, expertise and information. The specific roles of commercial aviation weather providers and airline operators as a source of industry perspective are yet to be determined.

This working group will formulate the thresholds necessary for products, models and datasets to gain entry to the Cube. Promotion in the Cube and SAS will be both performance- and utility-based. This body also approves Candidate and Alternative products, models and datasets.

### d. SAS Selection

The SAS Selection Working Group will perform functions akin to those of today's Collaborative Decision-Making (CDM) process. Products, models and datasets approved for use

as SAS Alternatives will be rotated in and out of the SAS, based on performance and utility and as prescribed by this group.

The group will be composed of representatives from FAA's Air Traffic Control System Command Center (ATCSCC), FAA Air Route Traffic Control Centers (ARTCCs), NWS Aviation Weather Center, NWS Center Weather Service Units (CWSUs), and DoD Operational/Forecast Units. As in SAS Promotion, the specific roles of commercial aviation weather providers and airline operators as a source of industry perspective are yet to be determined.

Responsibilities include selecting the SAS from a pool of SAS Alternatives, ensuring open-access to SAS Alternatives for all Cube Subscribers and defining access control for Publishers to the SAS.

### e. Wx Cube Standards

Weather Cube Standards is another working group intended to interface with the activities of an auxiliary governance mechanism—one that will span the partner Agencies and likely include industry participation. Those activities include establishing standards for weather-state data and metadata within the Cube, establishing standards for Publisher and Subscriber identities, and coordinating those standards.

This working group will be comprised of meteorological information subject matter experts (SMEs) and information technology SMEs from FAA, NWS, DOD and non-government stakeholders, including NAS Operators and commercial aviation weather providers.

## 5. KEY GOVERNANCE TERMS

**Next Generation Air Transportation System (NextGen):** A comprehensive transformation of the National Airspace System, upgrading existing ground-based technologies to satellite-based technologies and designed to make air travel more efficient, more dependable and safer.

**† NextGen 4-D Weather Data Cube:** The 4-D Wx Data Cube provides access to weather information and services. Weather information is comprised of aviation-relevant observations, analyses, forecasts (including probability), space weather information

<sup>†</sup> Definition currently under revision.

and climatology organized by three spatial dimensions (latitude, longitude, altitude) and time.

‡ **NextGen 4-D Weather Single Authoritative Source (SAS):** 1. An optimal representation of all Air Navigation Service Provider (ANSP) state-of-the-atmosphere weather information that is used directly or translated into operational impact by the ANSP, and is consistent in time, space, and among weather elements. The 4-D Wx SAS is specified by the ANSP and is accessible to all users of the NAS. The 4-D Wx SAS is the source of weather information for ANSP's Air Traffic Management (ATM) decisions and is supported by the same network services as the 4-D Wx Data Cube. 2. A product, model or dataset selected as the current SAS.

**NextGen Net-Enabled Weather (NNEW):** An IT infrastructure program that will facilitate integration of weather information into ATM decisions, using data from the National Weather Service's 4-Dimensional Weather Data Cube and internal FAA sources.

**weather state information:** Information that describes the state of the atmosphere at a given time and point location. This includes observed data (e.g., temperature, wind speed) and derived data (e.g., wind chill, EDR). This information does not include translated data (e.g., impact thresholds).

**Publisher:** One of four categories of entities identified in NextGen Governance that are authorized to publish data to the NextGen 4-D Wx Data Cube.

**Subscriber:** One of six categories of entities identified in NextGen Governance that are authorized to access data within the NextGen 4-D Wx Data Cube. Categorically, subscribers to the Cube/NNEW include all publishers to the Cube/NNEW as well as the operators of the NAS, including airlines, pilots, ANSPs, other government entities, and aviation weather service providers.

**Petitioner:** A product, model or dataset (sponsored by a valid potential publisher) that has not yet been granted entry to the 4-D Wx Data Cube.

**Candidate:** A product, model or dataset that has been granted entry to the 4-D Wx Data Cube for purely evaluative purposes and is not yet approved for selection as the SAS.

**Alternative:** A product, model or dataset that has been approved for use as the SAS but is not currently the selected SAS.

**verification system:** A program, software or entity that analyzes and validates weather data and products.

**commercial aviation weather provider:** A private weather information provider.

**Partner Agency:** One of six federal organizations comprising the joint Cube and NNEW governance structure, consisting of the Federal Aviation Administration (FAA), the National Oceanic and Atmospheric Administration (NOAA), the United States Air Force, the United States Navy, the National Aeronautics and Space Administration (NASA), and the Joint Planning and Development Office (JPDO).

**other government agency:** A government agency that does not control flight or weather operations but is an aviation weather data stakeholder including, but not limited to, NTSB, DHS, USDA, and USGS.

**NAS Operator:** A user within the National Airspace System, to include pilots, dispatchers, Airline Operations Centers (AOCs), and Flight Operation Centers (FOCs).

**working relationship:** A key touch-point between the newly-created joint Cube and NNEW governance structure, and an existing function within (or between) the Agencies—namely Non-SAS Regulatory, Verification, and Weather Cube Standards activities. Authorities within the governance structure will work in tandem with the organizations that perform these existing functions in order to better align their work with the overall goals of the NextGen Weather Enterprise.

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‡ JPDO Weather Policy Team Policy Statement, 12/29/09. Sometimes referred to as the, 'common weather picture.'