

THE 4-D WEATHER SINGLE AUTHORITATIVE SOURCE FOR AIR TRAFFIC MANAGEMENT

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1. INTRODUCTION

The key concept in the provision of weather information in the Next Generation Air Transportation System (NextGen) is the NextGen 4-Dimensional Weather Data Cube (4-D Wx Data Cube). On April 22, 2009, the NextGen Executive Weather Panel (NEWP) tasked the Joint Policy and Development Office Weather Policy Team (JPDO Wx Policy Team), under the JPDO Weather Working Group and Initial Operational Capability (IOC) Team, to define the 4-Dimensional Weather Single Authoritative Source (4-D Wx SAS), a subset of the 4-D Wx Data Cube.

2. BACKGROUND

The NextGen system will reduce weather impacts through a common weather picture available to all users, flexible and cost-efficient dissemination of this information, and direct integration into sophisticated decision support capabilities. As a common weather picture, the 4-D Wx SAS, will facilitate Shared Situational Awareness (SSA) and reduce the need for operational decisions regarding weather information sources.[†]

3. COORDINATION

The JPDO Wx Policy Team developed a 4-D Wx SAS definition that was reviewed and discussed by the JPDO Weather Working Group Executive Committee on May 26, 2009. On June 4, 2009 the definition was sent to the IOC Team

* NextGen ConOps, v2.0, Executive Summary, p. ES-3

† The following clarifying text has been proposed, The common weather picture means is the 4 dimensional state of the atmosphere.

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for concurrence. The NEWP gave provisional approval and requested several revisions to the 4-D Wx SAS definition on June 17, 2009. On October 30, 2009, final approval by the NEWP was completed.

4. DEFINITION

The 4-D Wx SAS is an optimal representation of all Air Navigation Service Provider (ANSP)-used weather information 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.[§] 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.

The ANSP will specify characteristics of the weather information needed to support its ATM decision-making and the corresponding decision support tools.^{**} As NextGen capabilities mature, the ANSP requirements will evolve. National

‡ The following clarifying text has been proposed, The 4-D Wx SAS is an optimal representation of all Air Navigation Service Provider (ANSP) state of the atmosphere weather information used directly or translated into operational impact by the ANSP and is consistent in time, space, and among weather elements.

§ The following clarifying text has been proposed, The 4-D Wx SAS is specified by the ANSP and is accessible to all users of the NAS.

** The following clarifying text has been proposed, The ANSP will specify characteristics of the state of the atmosphere weather information needed to support its ATM decision-making and the corresponding decision support tools.

Weather Service (NWS) will determine what information best meets the 4-D Wx SAS requirements specified by the ANSP; information from any source, including commercial sources, can be used to meet SAS requirements as long as it can be freely distributed to all.^{††}

With rare exceptions, the 4-D Wx SAS will be the only source of weather information for the ANSP's ATM decisions; however it will not necessarily be the only source for other decision makers, such as pilots and dispatchers. Making the 4-D Wx SAS both a support tool for the ANSP's ATM decisions and a NextGen resource provides both transparency and predictability in these decisions and SSA for all NextGen participants.

5. ELEVEN SAS MYTHS

- *Myth: The SAS is all aviation weather information*

Fact: SAS is a subset of all aviation weather information "contained" in the 4-D Wx Data Cube

- *Myth: The SAS is a single big server*

Fact: SAS is hosted on many servers around the US that is specified by metadata tag as SAS data

- *Myth: To the SAS user it is as if there is a single source*

Fact: Not a myth! The decision on the best source is left to the weather service provider consistent with the users requirements; the SAS user will automatically be directed to that single best source

- *Myth: The SAS is all the aviation weather information necessary to meet regulatory requirements*

^{††} The following clarifying text has been proposed, National Weather Service (NWS) will determine what state of the atmosphere information best meets the 4-D Wx SAS requirements specified by the ANSP; information from any source, including commercial sources, can be used to meet SAS requirements as long as it can be freely distributed to all.

Fact: Regulatory requirements are distinct from the SAS – some, but not all, SAS content may be regulatory and vice versa

- *Myth: The SAS will have the highest performance requirements for weather information*

Fact: Different data elements specified as SAS will have different performance requirements based on the criticality of the information for operational decisions. Some information may be accessed independent of the SAS due to stringent performance requirements (e.g., micro burst reports), and some high performance data may not be included in the SAS at IOC

- *Myth: FAA air traffic controllers and managers will use the SAS as their only weather information source to support decision making*

Fact: The FAA expects to use SAS, and all others must have access to SAS (consistent with contractual agreements). At IOC, there may be weather information needed for FAA's ATM decisions that is outside the SAS, but by FOC these exceptions will be rare. The SAS will be the weather basis upon which the ANSP-provided translation from weather to ATM impacts will rest

- *Myth: The FAA will require operators to use the SAS*

Fact: The civil ANSP will use the SAS for its weather information and translate it into operational decisions. Operators are free to use multiple sources of weather information, including the SAS, based on individual business models and as consistent with regulations

- *Myth: Commercial vendors are excluded from providing SAS content*

Fact: The SAS definition does not restrict sources, although it does require open distribution to all, consistent with contractual agreements.

- *Myth: Commercial vendors are excluded from using SAS content*

Fact: Commercial vendors can repackage SAS content as part of value-added end-to-end services

- *Myth: The SAS will signal the end of human-in-the-loop development of weather information.*

Fact: Methods used to create SAS content are independent of the SAS definition. Many expect continuation of human-in-the-loop approach (e.g., today's Collaborative Convective Forecast Product (CCFP)), but this is ultimately a science question

- *Myth: SAS is a static set of preferred sources*

Fact: SAS is a dynamic set of sources which are determined based on best judgment today with continuing research into how to determine the preferred source for the day. This is a "weather" question, not a translation question.