The primary goal of the Next Generation Air Transportation System (NextGen) is to address and meet the rapidly changing needs of the United States aviation industry, including the ever-increasing demand for air traffic services. Providing accurate, timely weather information at the temporal and spatial scales required by aviation decision makers is a fundamental component of NextGen, as this will increase airspace capacity, optimize efficiency, and improve safety. Weather has a considerable impact on aviation operations. The acquisition, management, dissemination, and utilization of weather-related information and data will play a vital role in the success of NextGen. Therefore, exploring, identifying, and employing methods and techniques that will help facilitate the flow of operation-specific weather-related data and information to end users is critical.

The concept of a 4-D Weather Data Cube is at the core of NextGen. It is envisioned that this virtual data cube will comprise weather data and information from disparate data contributors and locations. From this Cube, end users (e.g., air traffic managers, pilots, etc.) will be able to obtain a common weather picture of the National Airspace System (NAS).

The 4-D Weather Data Cube, a virtual repository of weather data and information from disparate data contributors and locations, will provide end users with a common weather picture.

The NextGen Network Enabled Weather (NNEW) project is dedicated to using and developing technologies and standards for NextGen that will support effective dissemination of weather data that originate from the 4-D Weather Data Cube. The National Center for Atmospheric Research/Research Applications Laboratory (NCAR), through support from the Federal Aviation Administration (FAA), and in cooperation with the National Oceanic and Atmospheric Administration/Global Systems Division (NOAA/GSD) and the Massachusetts Institute of Technology/Lincoln Laboratory (MIT/LL), is working to create a foundation for NextGen weather data distribution.

The following strategies are being adopted for developing this capability:

- Develop a comprehensive understanding of the needs and requirements of National Airspace System (NAS) decision makers, as they relate to weather data dissemination
- Utilize a Service Oriented Architecture (SOA) to generate a flexible, efficient approach for the delivery of weather-related data, products and services
- Explore and adopt open standards and specifications that meet NextGen weather data requirements
- Participate in national and international standards bodies (e.g., Open Geospatial Consortium)
- Develop a systematic, extensible implementation approach that will support additional capabilities, services, data, and products as they come online.

NNEW will be built upon a SOA to enable effective, efficient opportunities for data dissemination. SOA integrates services (applications) running on heterogeneous platforms using common standards (e.g., HTTP, SOAP, XML, etc.). In the case continued on reverse side
of NNEW, service-orientation focus is on service interfaces, with no requirement to use particular implementations of those interfaces. The SOA concept facilitates data exchange, as well as interactions in support of an outcome (e.g., product generation). Services are well-defined, self-contained, and do not necessarily depend on the state of other services. Standards and specifications developed and/or used by NNEW will be layered on top of ‘core’ services provided by the FAA System-Wide Information Management (SWIM) program. Both NNEW and SWIM will in turn be layered on top of the FAA Telecommunication Infrastructure (FTI), the basic network connectivity layer.

The primary objective of NNEW is to provide flexible, scalable open architecture and standards that will enable the seamless aggregation of data and services to support data discovery and acquisition by NAS decision makers.

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