FAA Aviation Weather Group

Status of RightSizing Project

Presented to: Joint Interagency Weather Research Meeting Review

By: Victor Passetti,

Operational Readiness and Impact Team

Date: July 19, 2010

Federal Aviation Administration

Agenda

- **Scope**
- **RightSizing NextGen Guidance**
- **FY09 Deliverables**
- **FY10 Activities and Status**

Scope

RWI Weather Observation Improvements - Addresses eliminating the gaps, inaccuracies, and inconsistencies in aviation weather observations.

Problem/Performance Gaps	Solution
➢ Non-optimized observational platforms Over/Under Sampling	➢ Optimize Obs. Sensor Network – correct sensor mix of ground-based, airborne, and other sources.
➢ Insufficient data resolution	➢ Improve spatial and temporal resolution network, tailored to domain
➢ Rigid, schedule driven data collection.	➢ Event driven, adaptive control of observational frequency

Support to Goals

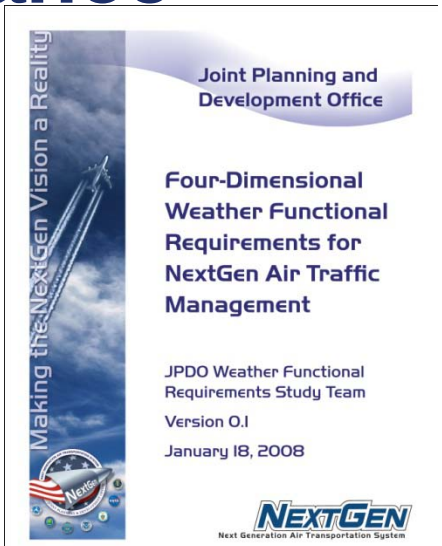
- ➢ FAA Strategic Goal – Greater Capacity
  - Increase reliability and on-time performance of scheduled carriers
  - Increase capacity to meet projected demand and reduce congestion

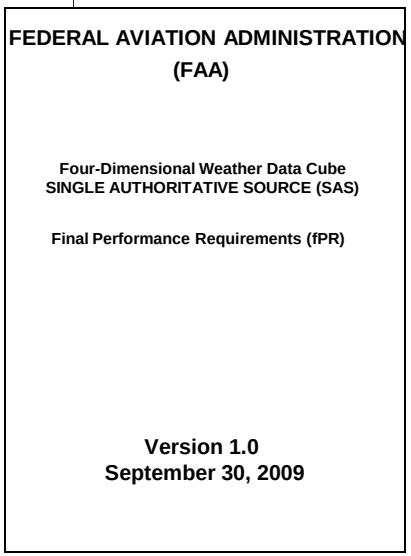
Interdependencies

- ➢ FAA sensor legacy programs
- ➢ NNEW (4-D Weather Data Cube)
- ➢ Aviation Weather Research Program
- ➢ RWI Weather Forecast Improvements
- ➢ Weather Technology in the Cockpit
- ➢ FAA NextGen Solution Set Requirements for weather information integration

RightSizing NextGen Guidance

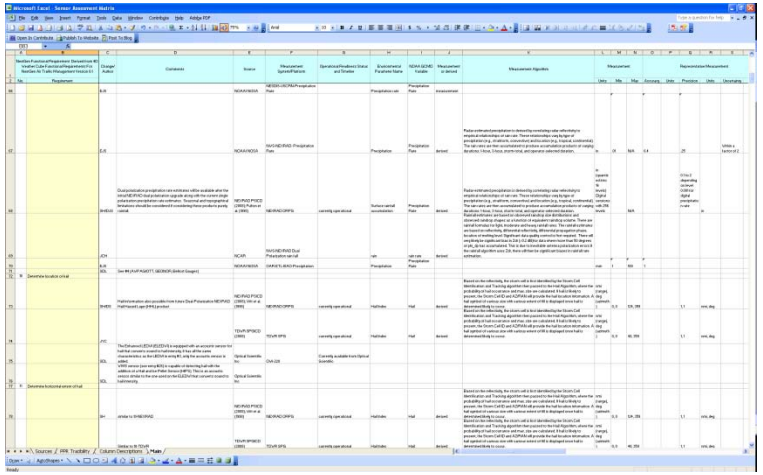
- **Began work in 2009 with functional requirements and preliminary portfolio performance requirements.**
- **For 2010 and beyond we are using the SAS performance requirements.**
  - Currently available only for SDO airspace and still undergoing review process.
  - All performance requirements are mapped to Functional Requirements Matrix.



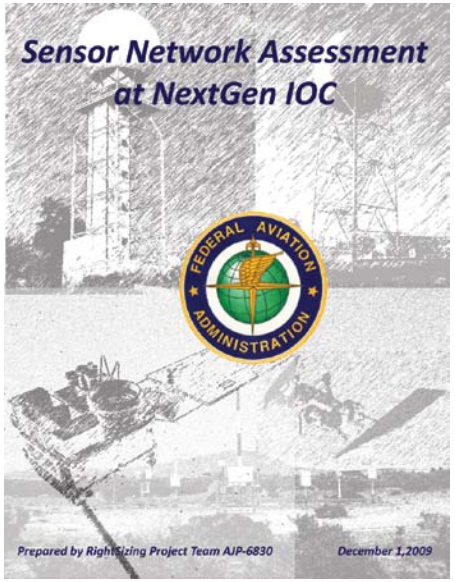


FY 09 Deliverables

- **RightSizing Sensor Assessment Database**
  - 308 functional requirements
  - 854 entries
  - 95 platforms surveyed



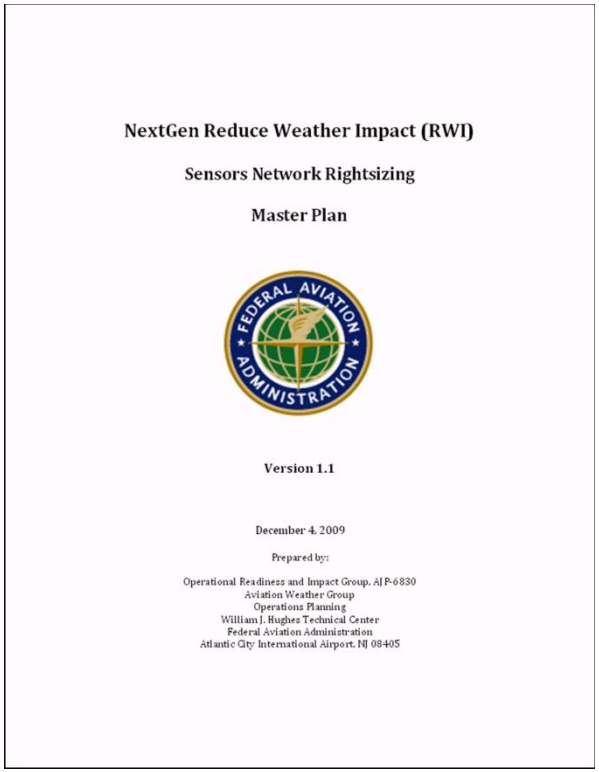
- **RightSizing Written Assessment Report completed in 2009**
  - Summary of assessment activities and initial findings
  - Identifies 45 initial gaps
  - Define categories of gaps



FY09 Deliverables

- **RightSizing Master Plan**
  - Documents the **RightSizing Process** to be followed throughout the project.

- Outlines planning, evaluations, demos, and implementation activities.
- Identifying activities associated with EA roadmap decision points, mitigating gaps, and exploring and demonstrating dynamic sensing and control in a SOA environment.
- A living document…


NextGen Reduce Weather Impact (RWI)

Sensors Network Rightsizing

Master Plan

Version 1.1

December 4, 2009

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FY10 Activities and Status

- **Gap Identification –** utilize latest performance requirements, sensor assessment database and additional research to produce a detailed report of ground and airborne SDO gaps.

- **Portfolio of reports:**

  - Radar – coverage, terminal winds, microburst detection
  - Ground sensors: ASOS and AWOS
  - Airborne

Project Report
ATC-369

OEP Terminal and CONUS Weather Radar Coverage Gap Identification Analysis for NextGen

J.Y.N. Cho

TBD May 2010

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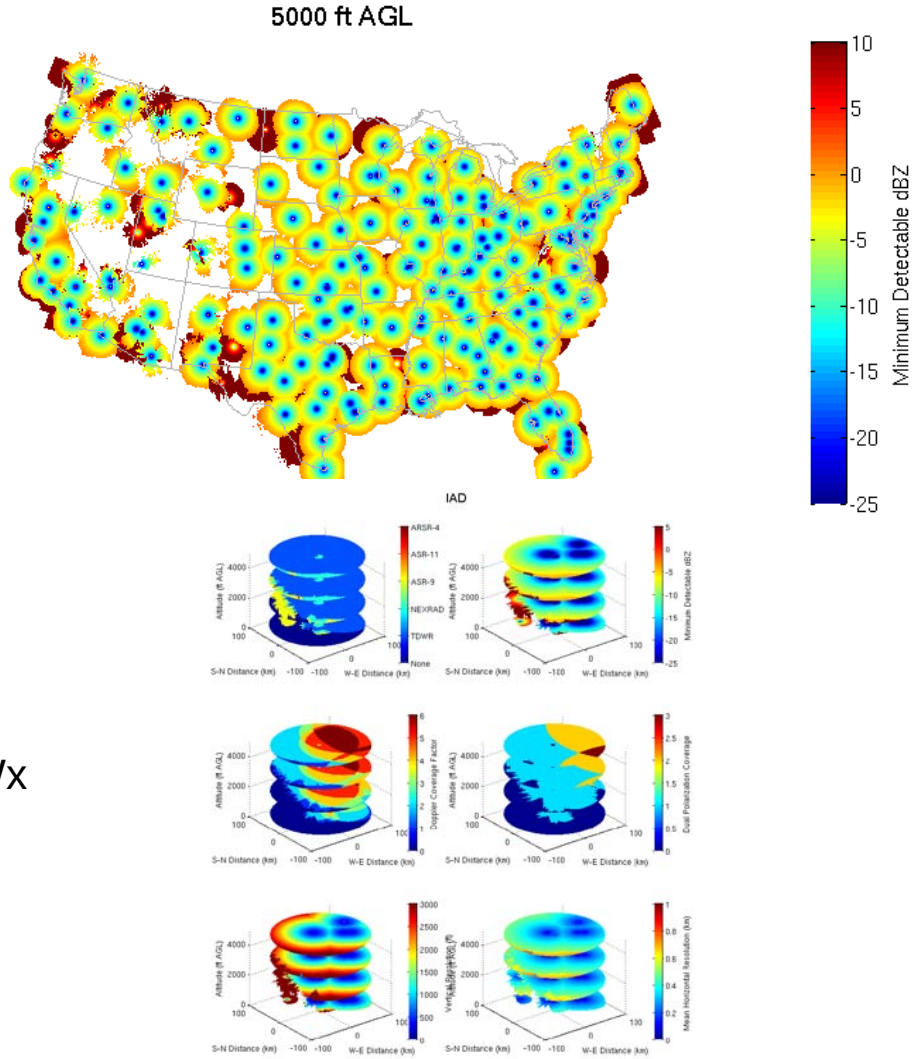
FY10 Activities and Status

- **OEP TERMINAL AND CONUS WEATHER RADAR COVERAGE ANALYSIS FOR NEXTGEN INITIAL OPERATIONAL CAPABILITY.**

  -The initial results of a weather radar coverage analysis.

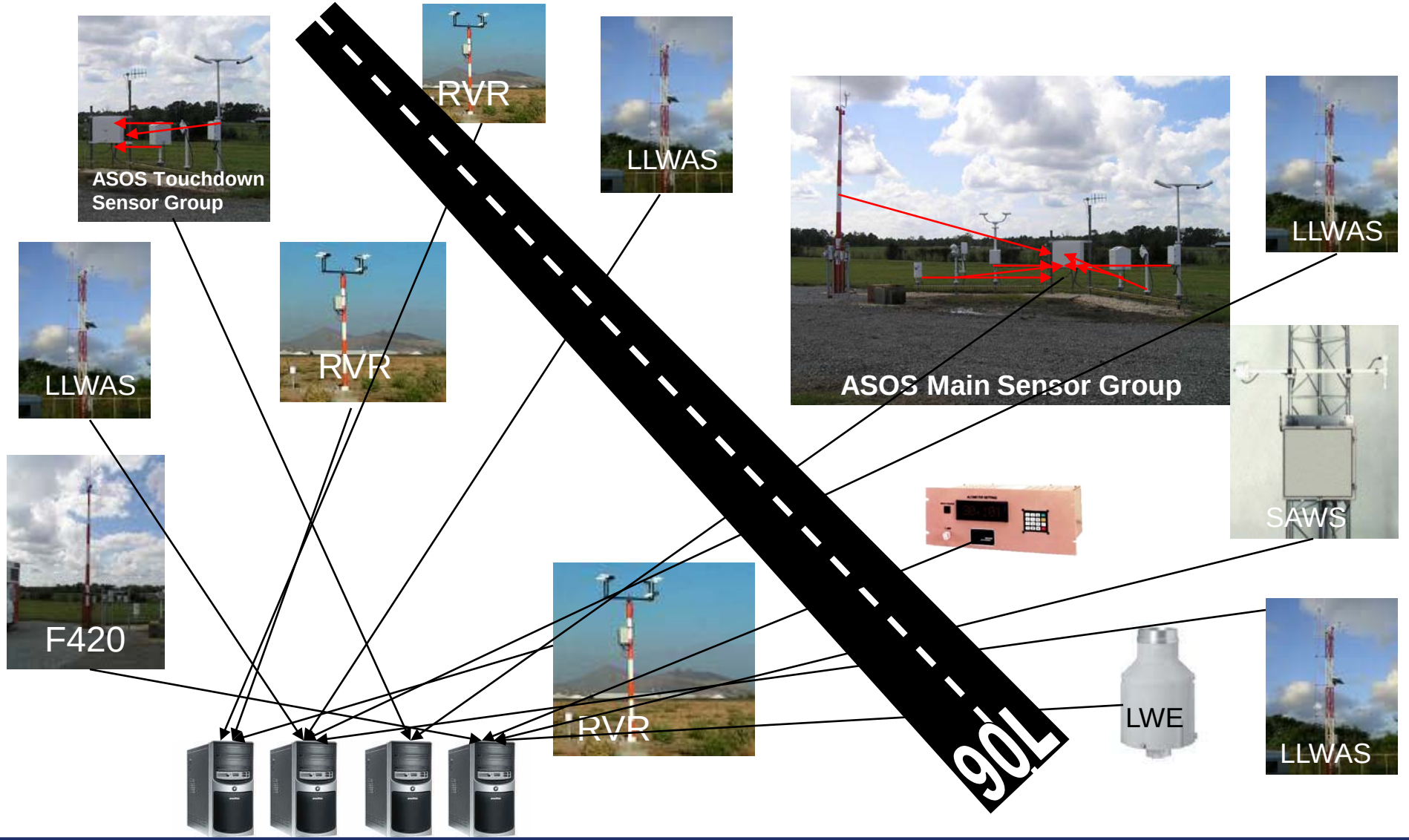
  -An initial step towards identifying and analyzing the sensor spatial coverage deficiencies relative to the NextGen 4D Wx SAS performance requirements.



FY10 Activities and Status

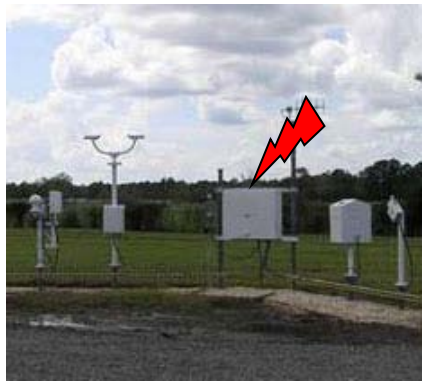
- **Adaptive Sensing Demonstration Plan**
  - Plan to demonstrate adaptable flexible sensor network applicable to SDO and other terminal airspaces.
  - Plan to demonstrate/simulate adaptive radar sensing capabilities using data assimilation techniques.

Current Terminal Sensor Configuration



NextGen Terminal Weather Sensors









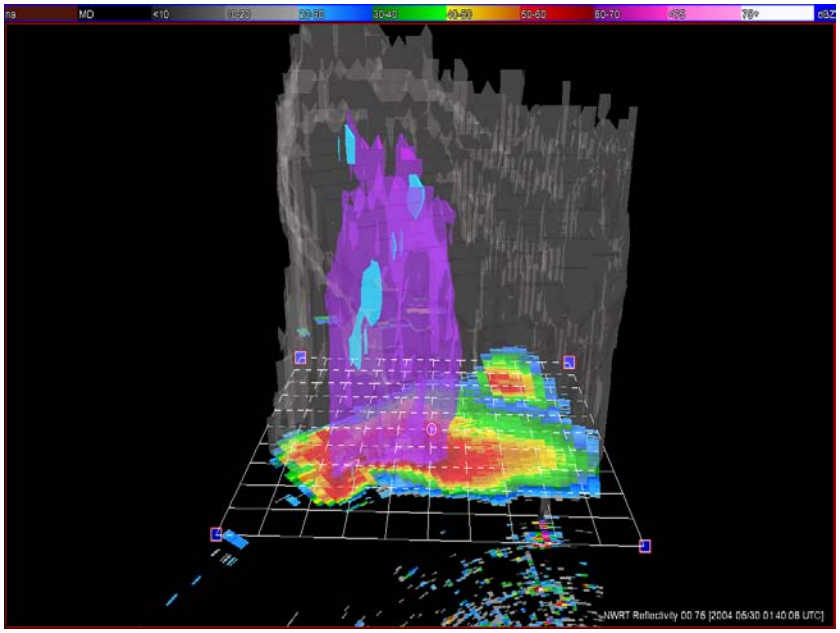


FY10 Activities and Status

- **Advanced Data Set Demonstration and Reports**
  - Transform and incorporate two advanced data sets.
    - MRMS – 3D radar mosaics into NetCDF CF and WCS RI
    - MADIS – Non-Federal sensor networks (clusters)
    - Support NNEW summer demo with data sets and display client.
  - Produce documented reports and process for adding future data sets.

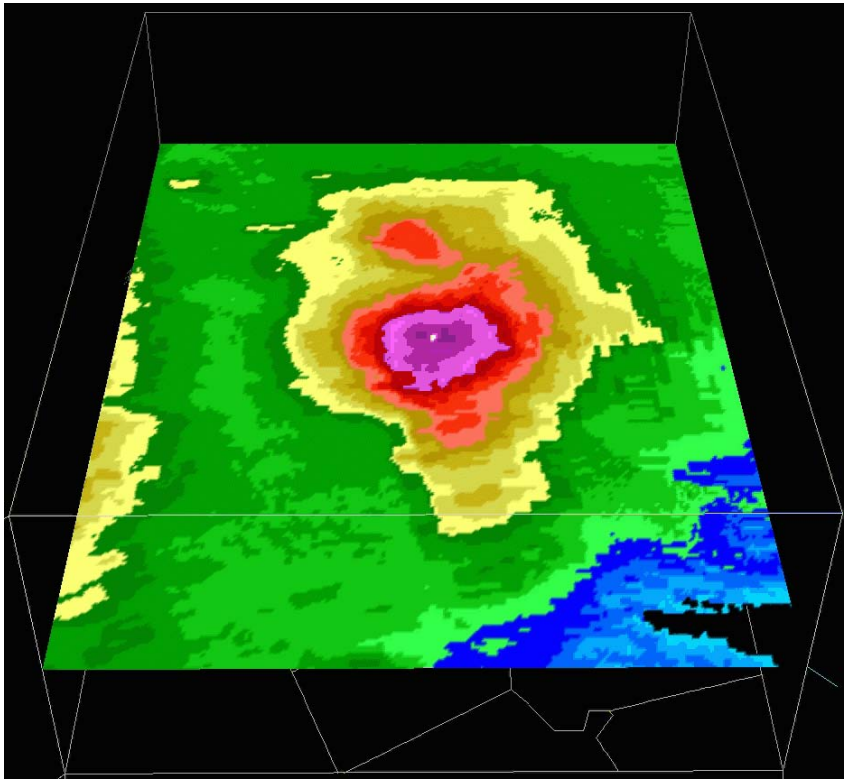
MRMS (Multi Radar Multi Sensor)

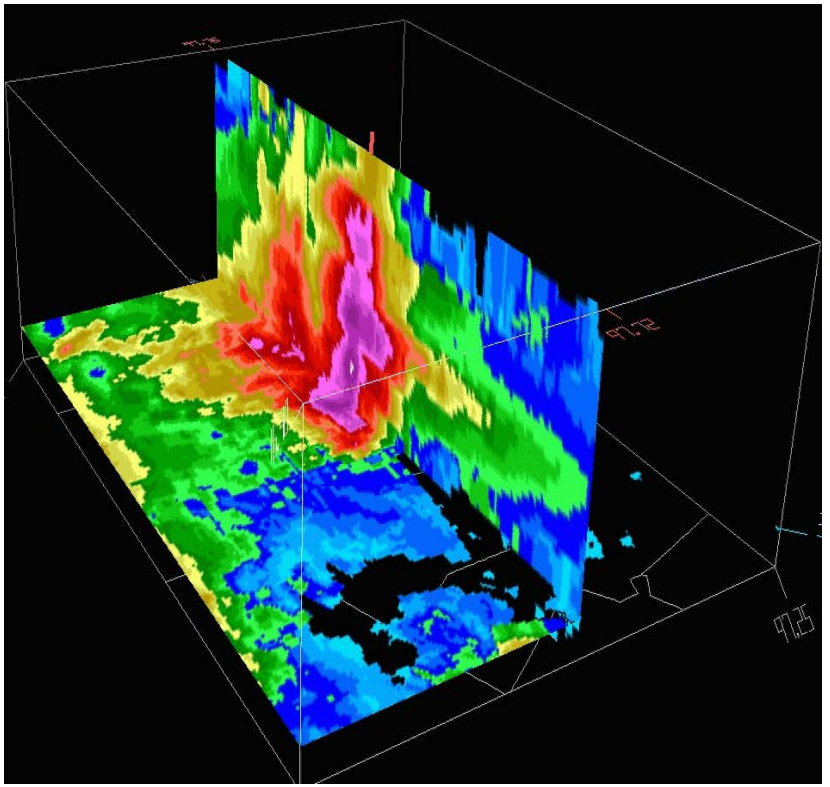
- 3D Radar Mosaic currently at 1km and 5 min updates.
- Output in NetCDF CF.
- MRMS CR, VIL, QA and other mosaics will be hosted on NNEW WCS RI.



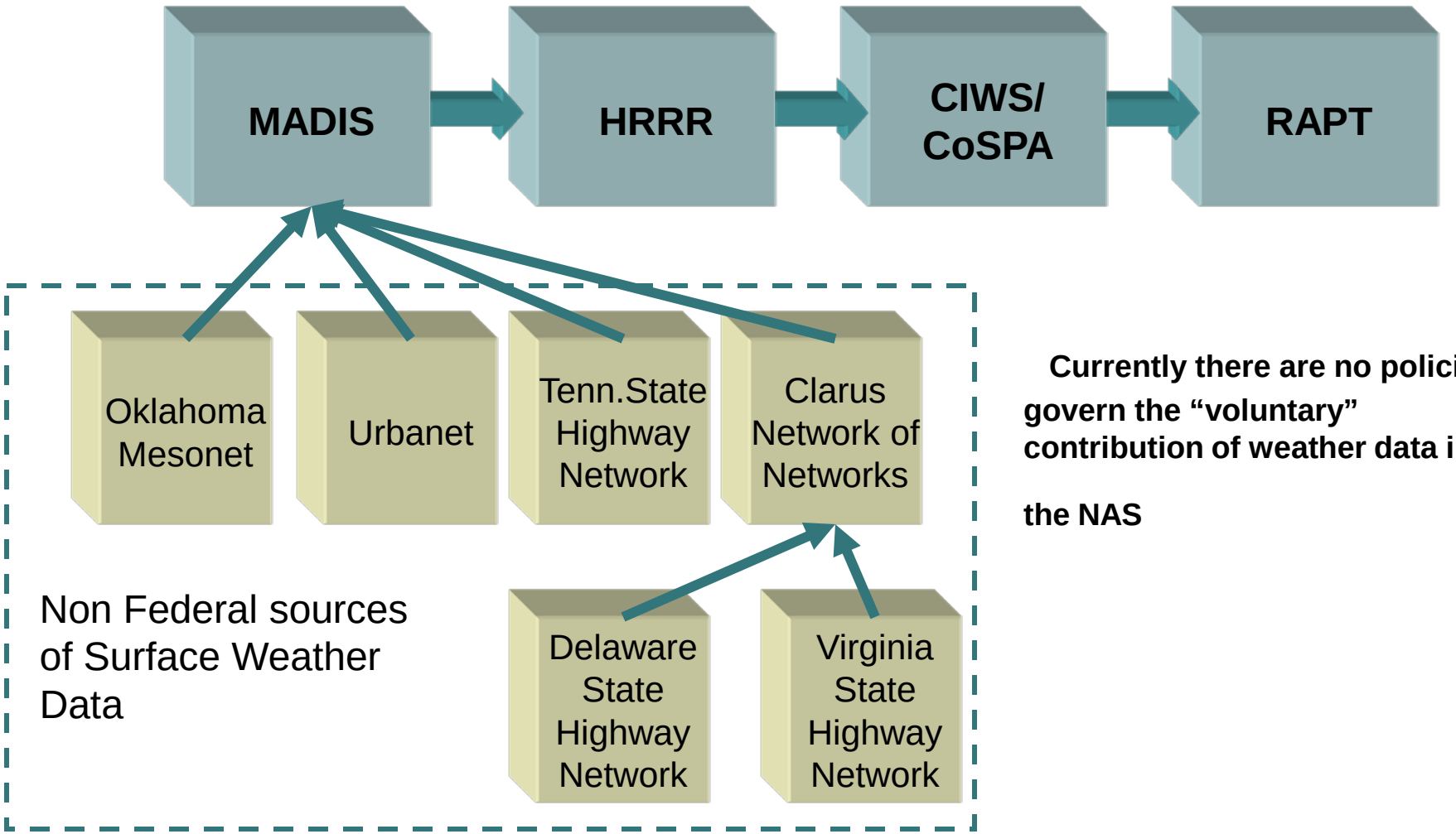
3 Dimensional representation of a severe storm cell

MRMS 3 Dimensional Radar Mosaic





ESRL - MADIS

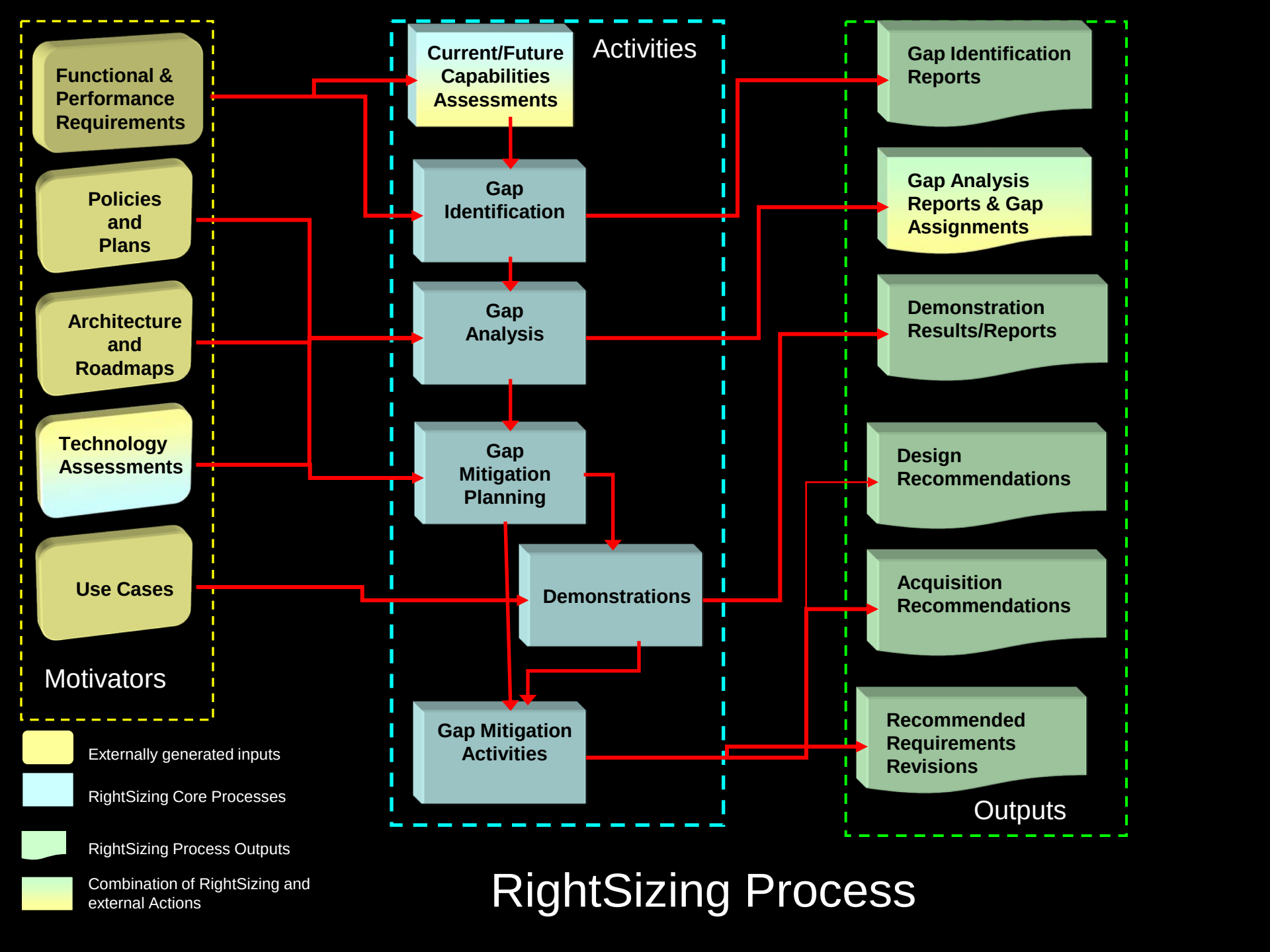


Currently there are no policies to govern the "voluntary" contribution of weather data into the NAS

Back up slides

Types of Gaps

• **Knowledge**	What techniques to apply?
• **Engineering**	Does technology exist?
• **Operational**	Transferring capability from R&D
• **Product**	Does an algorithm exist?
• **Spatial Coverage**	Is the domain covered?
• **Temporal Coverage**	24/7?
• **Performance**	All performance requirements satisfied?
• **Communications**	Data transfer structure adequate?
• **Metadata**	Sensor specifics properly characterized?
• **Dynamic**	Degraded operations mode?
• **Funding**	Can we afford it?


Functional & Performance Requirements
Policies and Plans
Architecture and Roadmaps
Technology Assessments
Use Cases
Motivators
Activities
Current/Future Capabilities Assessments
Gap Identification
Gap Analysis
Gap Mitigation Planning
Demonstrations
Gap Mitigation Activities
Gap Identification Reports
Gap Analysis Reports & Gap Assignments
Demonstration Results/Reports
Design Recommendations
Acquisition Recommendations
Recommended Requirements Revisions
Outputs
Externally generated inputs
RightSizing Core Processes
RightSizing Process Outputs
Combination of RightSizing and external Actions
RightSizing Process