



# IOC Status and R&D Challenges for NextGen Weather and the 4-D Cube

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# Outline

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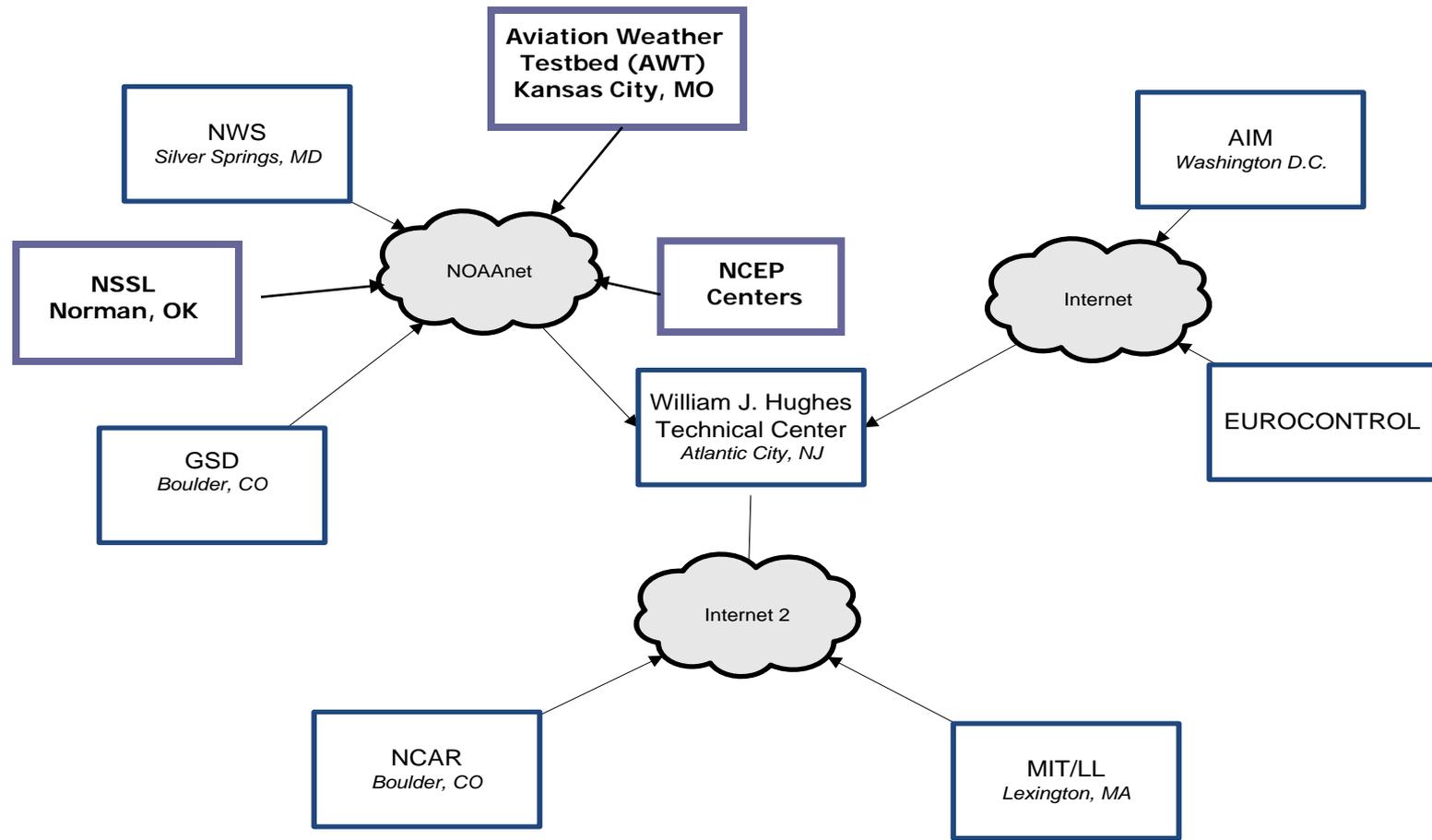
- Status of coordinated effort to meet the IOC 4-D Cube deliverable
- The new Research-to-Operations (RTO) Process
- The R&D Challenges ahead:
  - Integration of High Performance Computing Capabilities
  - Product Consistency
  - Uncertainty and Probabilistic Information
  - The role of the forecaster
  - ICAO and Global Harmonization

# FY10 Capability Evaluation

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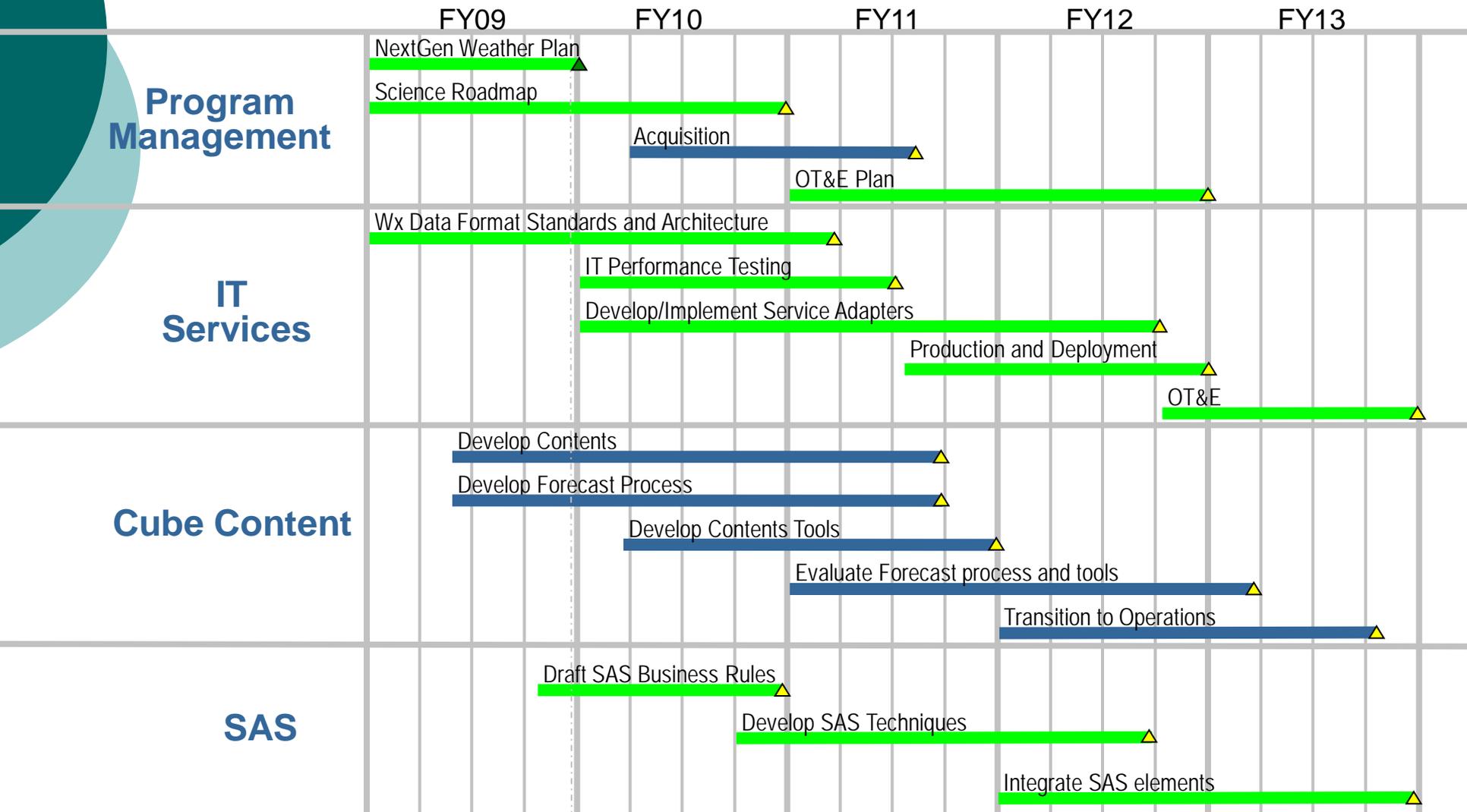
- **Primary Objective: To simulate operational Cube functionality as closely as possible to show how the Cube will operate at the Initial Operating Capability (IOC), including all applicable Cube standards and any available hardware and software infrastructure**
  - Providers will publish data, enabling it to be part of the Cube by utilizing a Provider Cube Service Adaptor (PCSA)
  - Consumers will consume data from the Cube utilizing a Consumer Cube Service Adaptor (CCSA)
  - 4-D Weather Data Cube Technical Architecture Framework of standards will be utilized
  - Dissemination of data via FTI and NOAAnet through boundary protection schemes to the maximum extent possible
  - Deployed Registry/Repository data will be federated across agency boundaries
  - Current requirements for WCS/WFS RI functionality are implemented
  - Include partner prototypes/capabilities

# DRAFT High-Level FY10 Capability Evaluation Architecture: NNEW



# Program Management

## Integrated Schedule



— NOAA Tasks

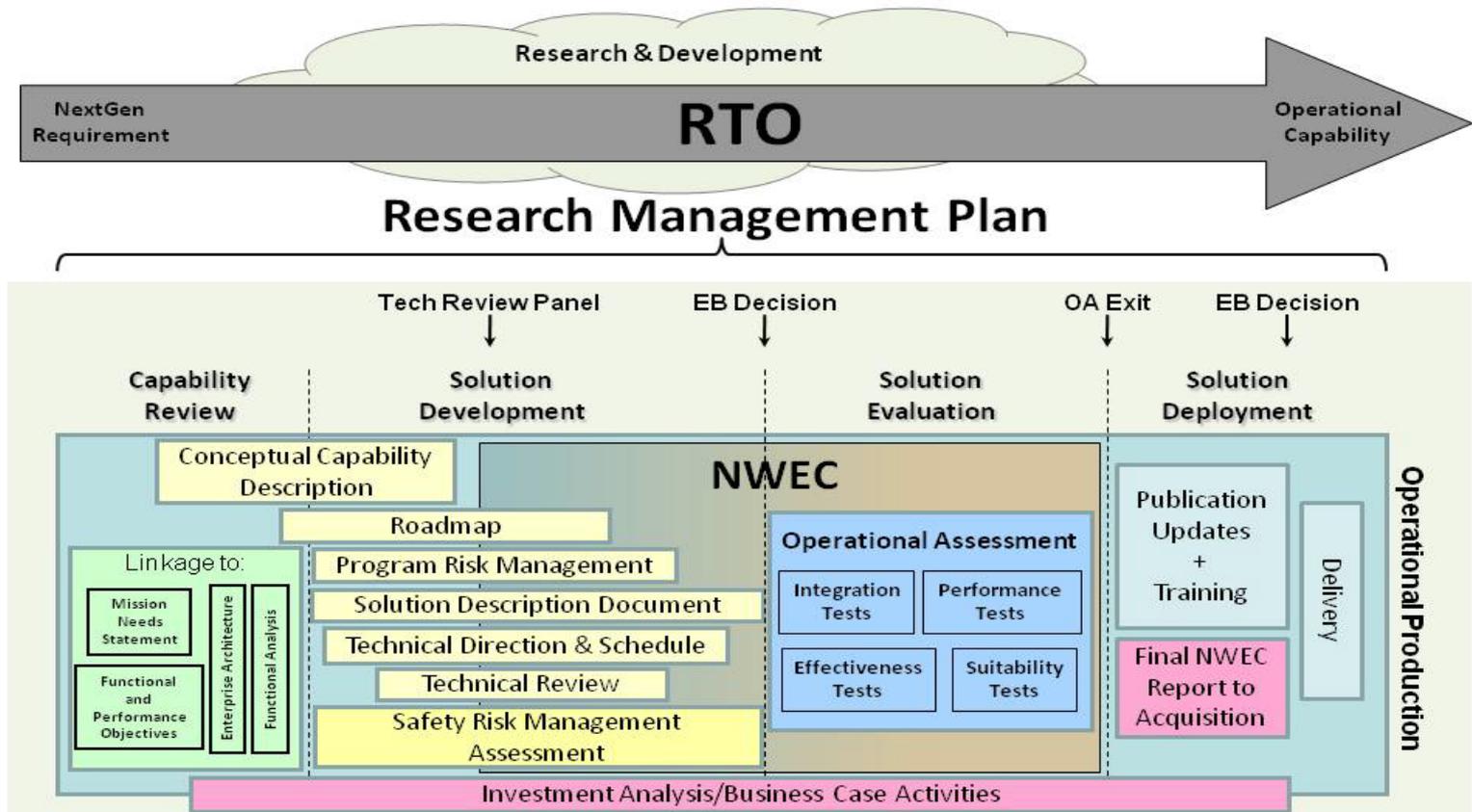
— Joint NOAA/FAA Tasks

# The new Research to Operations Process (RTO)

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- FAA, with dedicated NWS support, is leading transition to improved RTO process which moves mature research into **NAS operations**
- Replaces AWTT, but adds much more
- Focus on highly detailed Research Management Plans (RMP):
  - Where a proposed solution will run
  - Who will use it
  - Will it make another process obsolete
  - Much more...
- NextGen Weather Evaluation Capability (NWECC) will provide the formal operational assessment and the “ready for operations” rubber stamp

# The new Research to Operations Process (RTO)

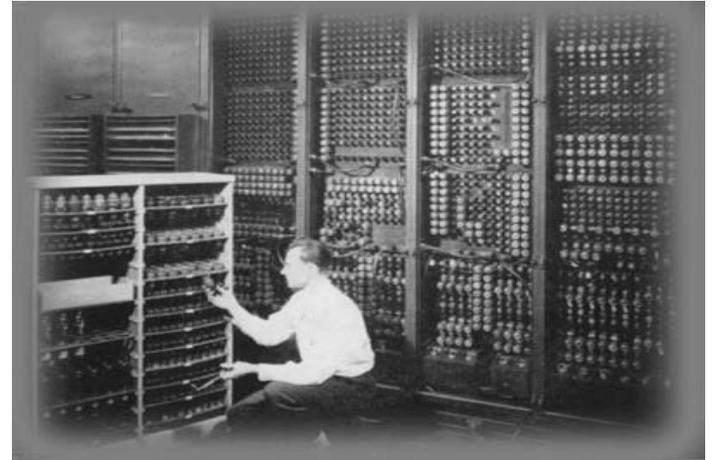


# R&D Challenges Ahead

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## ○ Transition of HPC to operations

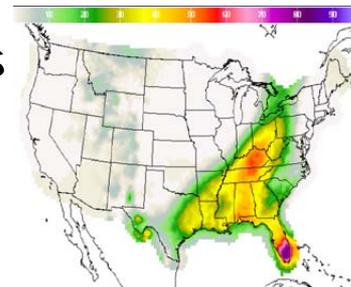
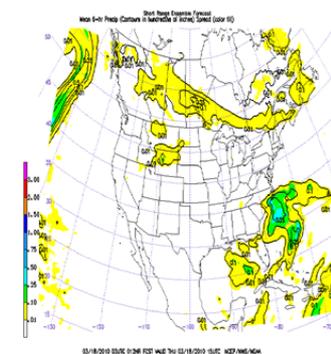
- Careful consideration when using “non-operational” models for operational solutions
- Consider the cost to make these models “operational”



# R&D Challenges Ahead

## ○ Product Consistency

- A huge challenge for NOAA/NWS as they serve many customer needs
- Also a weather consumer challenge as we are barraged by weather data
- The “SAS” definition specifies ATM decision-makers only



# R&D Challenges Ahead

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## ○ Probabilistic Information

"I believe..."

- From the JPDO Weather ConOps:  
"Uncertainty in meteorological phenomena that have significant impact on system capacity is managed through the use of probabilistic forecasts. These forecasts are in a quantitative format, covering location (three-dimensional space), timing, intensity, and **the probability of all possible outcomes...**"
- We must work toward common definitions of words that express uncertainty
- Aviation **decisions** are deterministic

30%

"likely"

"numerous"

"There is a high Probability..."

"This model Indicates..."

# R&D Challenges Ahead

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## ○ **The Forecast Process**

- As models improve, how do we maximize the value forecasters add?
- NWS strongly believes forecasters still add considerable value, but understand that roles could change (more “over the loop”?)
- It’s an NWS priority to enhance decision support services
- Decision support tools come in many shapes and sizes. Be sure you know your user:
  - For a forecaster?
  - For an ATM decision-maker?



# R&D Challenges Ahead

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- **ICAO Requirements and Global Harmonization**
  - Compatibility between international requirements and NextGen requirements is an issue
  - NWS working with international partners to urge harmonization of weather feeding the cube

# Summary

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- Good inter-agency coordination and progress to meet IOC in 2013
- Still many R&D challenges with common themes:
  - O to R
  - Social science concerns
- Be a believer!!!

