Federal Aviation Administration

FPAW Weather Integration Into NextGen

Date: October 12, 2011

Presented By: Shirley Burgess
Chief System Engineer
En Route and Oceanic Services

PMO Update

ATO Program Management Organization (PMO)

Congressional Approval

September 19, 2011

Congress of the United States
Washington, DC 20510

September 19, 2011

The Honorable Ray LaHood
Secretary
Department of Transportation
1200 New Jersey Avenue, S.W.
Washington, D.C. 20590

Dear Secretary LaHood:

We are in receipt of your letters dated June 30, 2011, and August 19, 2011, which included proposals for a reorganization of the Federal Aviation Administration's NextGen program, the creation of a Shared Services Organization and Assistant Administrator for Finance and Management, the creation of a Program Management Office within the Air Traffic Organization (ATO), and a $608 million reprogramming to match the new organizational structure. Your request of August 19, 2011, proposed moving three full time equivalent positions from the Office of Aviation Safety into the Finance Shared Services organization.

The Committees hereby approve the request to have the NextGen office report to the FAA's Deputy Administrator, creating an Assistant Administrator for NextGen, and moving the associated personnel and resources along with the office. However, the Committee denies the request relating to moving the Joint Planning and Development Office (JPDO) to the Deputy Administrator's office. While the Committees support the mission and goals of the JPDO, the Committees do not support the proposed approach and will address this office through the annual Appropriations process.

The Committees hereby approve the request to create a Program Management Program Office within the Air Traffic Organization as requested.

The Committees hereby approve the request to create an Assistant Administrator for Finance and Management, including creating a Shared Services Organization under this position that would combine Financial Services, Information Services, Acquisition and Business Services, and Regions and Center Operations. The Committees also concur with the request to move 3 full time equivalent positions from the Office of Aviation Safety into the new Shared Services Organization.

Sincerely,

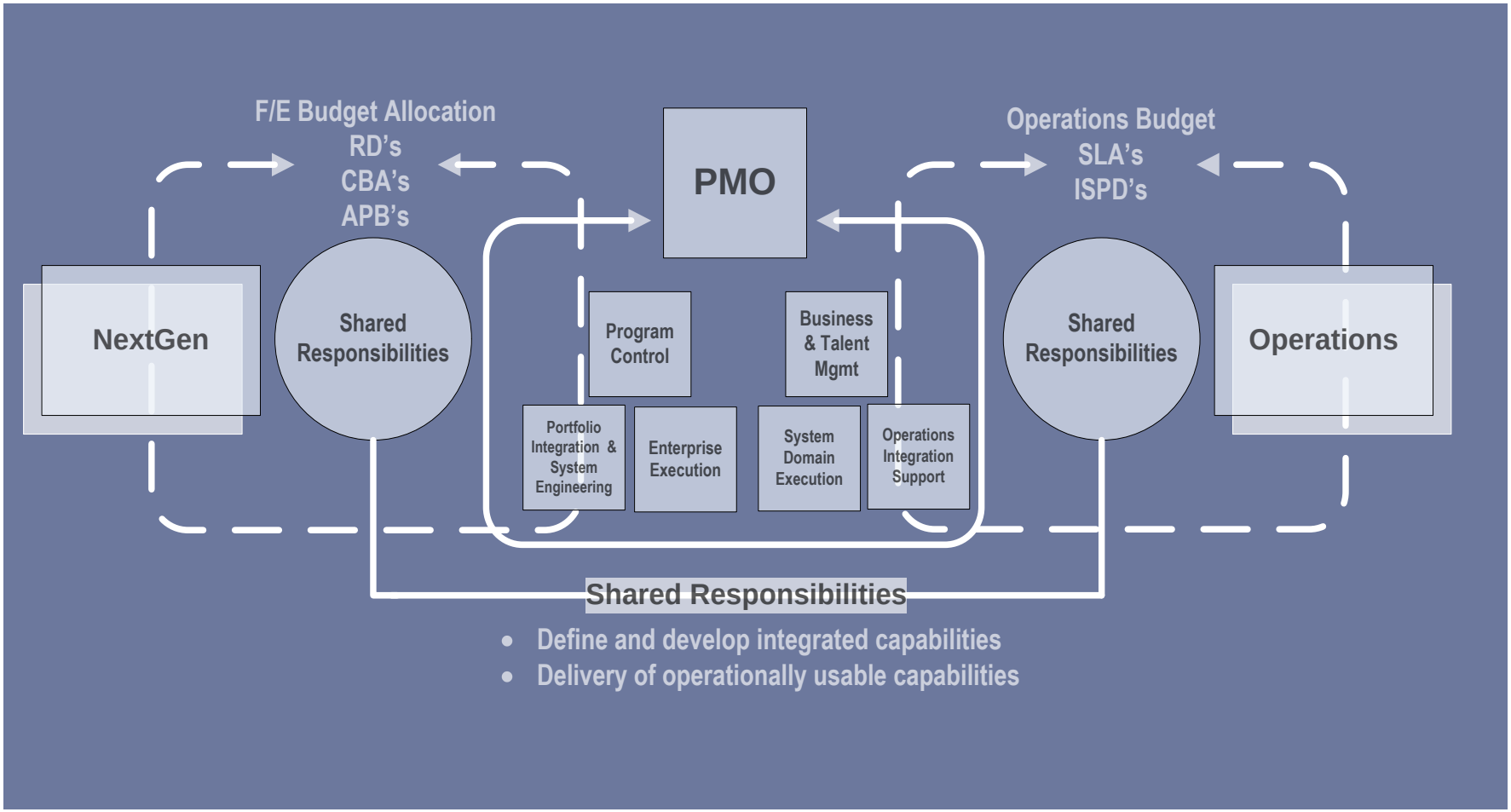
Patty Murray, Chairman
U.S. Senate
Committee on Appropriations
Subcommittee on Transportation, Housing and Urban Development, and Related Agencies

Thomas Latham, Chairman
U.S. House of Representatives
Committee on Appropriations
Subcommittee on Transportation, Housing and Urban Development, and Related Agencies

Susan Collins, Ranking Member
U.S. Senate
Committee on Appropriations
Subcommittee on Transportation,
Subcommittee on Transportation, Housing and Urban Development, and Related Agencies

John Olver, Ranking Member
U.S. House of Representatives
Committee on Appropriations
Subcommittee on Transportation,
Subcommittee on Transportation, Housing and Urban Development, and Related Agencies

The PMO: Shared Responsibilities



The Organization Design Concept

Program Management Organization (AJM)

- NextGen Liaison
- Systems Integration
- Systems Engineering
- Interface with Operations customers in articulating needs
- Ensures that delivered programs meet customer needs
- Second level engineering (automation, terminal, en route, sys ops)

- Establish peer reviews, best practices, scorecards
- Conducts QA, PIR, performance analysis, IV&V
- Standardize the program reporting mechanism both within PMO and to external orgs (e.g., NextGen)
- Develop *actionable* tracking metrics and goals for PMs

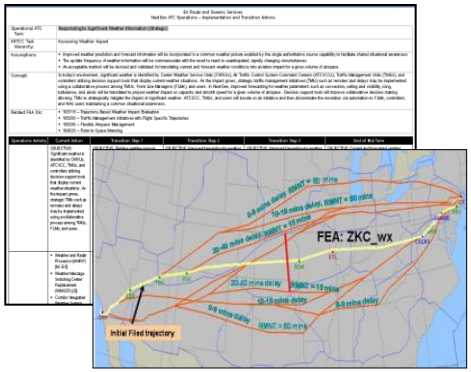
Supporting Better Program Execution and Integration of NextGen Capabilities

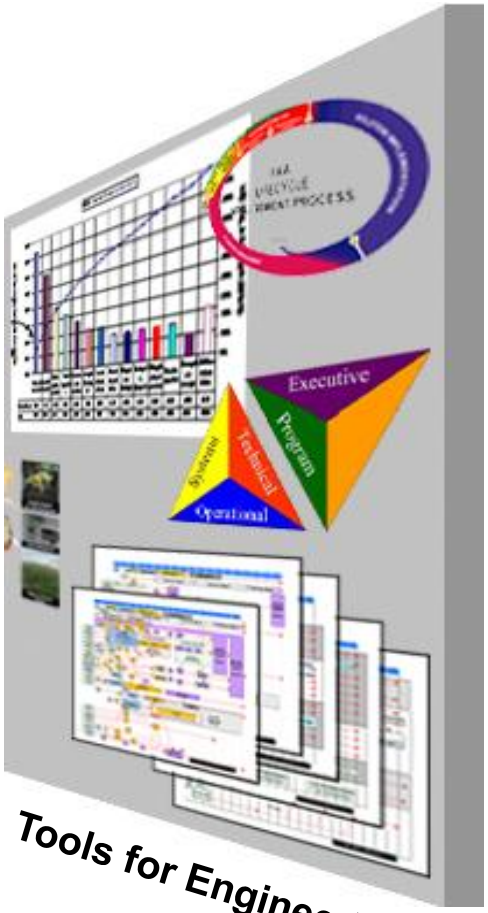
- **Automation**
  - **ERAM**
  - **TAMR**
- **Surveillance**
  - **ADS-B**
- **Weather**
  - **NNEW**
- **Navigation**
  - **RNAV/RNP**
- **Communications**
  - **DataComm**
  - **NVS**
  - **SWIM**

Weather Integration into Operations

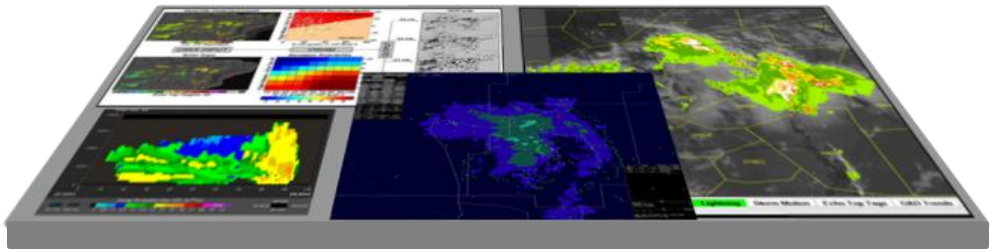
Future Operations

Tools for Operations





Tools for Engineering



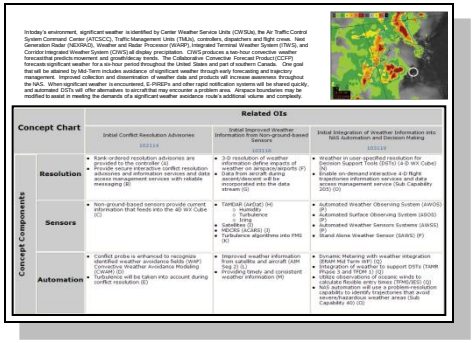
Tools for Weather

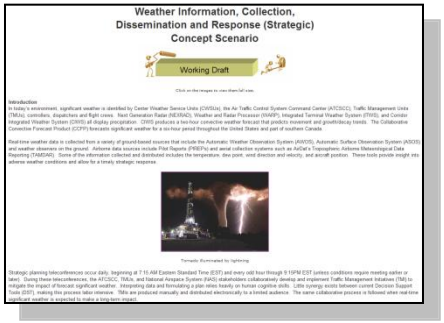
Federal Aviation Administration

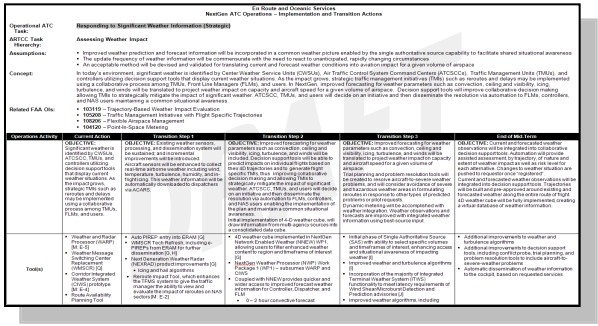
Collaborating on the Transition to NextGen

- ATC Operations
- Planners
- R&D/HSI
- Programs
- Engineers
- Aviation Weather Information Providers
- Users
- Stakeholders

https://ksn2.faa.gov/faa/eplans/NextGenWiki/Wiki%20Pages/Home.aspx







*A Wiki is a web site where content is developed and refined collaboratively by a community of users

Operational ATC Task: Responding to Significant Weather Information (Strategic)

ARTCC Task Hierarchy: Assessing Weather Impact

Assumptions:
- Improved weather prediction and forecast information will be incorporated in a common weather picture enabled by the single authoritativ
- The update frequency of weather information will be commensurate with the need to react to unanticipated, rapidly changing circumstanc
- An acceptable method will be devised and validated for translating current and forecast weather conditions into aviation impact for a give

Concept: In today's environment, significant weather is identified by Center Weather Service Units (CWSUs), Air Traffic Control System Command Ce controllers utilizing decision support tools that display current weather situations. As the impact grows, strategic traffic management initiatives using a collaborative process among TMUs, Front Line Managers (FLMs), and users. In NextGen, improved forecasting for weather parame turbulence, and winds will be translated to project weather impact on capacity and aircraft speed for a given volume of airspace. Decision s allowing TMIs to strategically mitigate the impact of significant weather. ATCSCC, TMUs, and users will decide on an initiative and then diss and NAS users maintaining a common situational awareness.

Related FAA OIs:
- **103119** – Trajectory-Based Weather Impact Evaluation
- **105208** – Traffic Management Initiatives with Flight Specific Trajectories
- **108206** – Flexible Airspace Management
- **104120** – Point-In-Space Metering

	Transition Step 1	Transition Step 2	Transition Step 3
	ATCSCC, TMUs, and controllers utilizing decision support tools that display current weather situations. As the impact grows, strategic TMIs such as reroutes and delays may be implemented using a collaborative process among TMUs, FLMs, and users.	**E:** Existing weather sensors, and dissemination system will ; and incremental improvements will be introduced. Aircraft sensors will be enhanced to collect real-time airborne weather including wind, temperature, turbulence, humidity, and in-flight icing. This weather information will be automatically downloaded to dispatchers via ACARS.	**OBJECTIVE:** Improved forecasting for weather parameters such as convection, ceiling and visibility, icing, turbulence, and winds will be included. Decision support tools will be able to predict impacts on individual flights based on their 4D trajectories and to generate flight specific TMIs, thus improving collaborative decision making and allowing TMIs to strategically mitigate the impact of significant weather. ATCSCC, TMUs, and users will decide on an initiative and then disseminate the resolution via automation to FLMs, controllers, and NAS users enabling the implementation of the plan and maintain a common situational awareness. Initial implementation of 4-D weather cube, will draw information from multi-agency sources into a consolidated data cube.	**OBJECTIVE:** Improved forecasting parameters such as convection, cei visibility, icing, turbulence, and winds translated to project weather impac and aircraft speed for a given volun airspace. Trial planning and problem resoluti be created to resolve aircraft-to-sev problems, and will consider avoida and hazardous weather areas in fo reroutes in response to other types problems or pilot requests. Dynamic metering will be accompli weather integration. Weather obser forecasts are improved with integra information using best-source input

Tools	▪ Weather and Radar Processor (WARP) [M: E-5]
	▪ Weather Message Switching Center (CWS) prototype [M: E-4]
	▪ Route Availability Planning Tool (RAPT) [M: E-3]
	▪ Severe Weather Avoidance Plan (SWAP) [Q]
	▪ Meter List (adjacent sector/facility) [Q]
	▪ URET: Trial Planning, Forecasted Winds [Q]
	▪ SIGMETS, CWA, MIS, PIREPS, and HIWAS [Q]
	▪ Perform metering through TMA to meter to TRACON/ARTCC boundary [Q]
	▪ Integrated Terminal Weather System (ITWS) [M: B-4]
		▪ Auto PIREP entry into ERAM [G]
		▪ WMSCR Tech Refresh, including e-PIREPs from ERAM for further dissemination [G, H]
		▪ Next Generation Weather Radar) product improvements [G] nd hail algorithms Impact Tool, which enhances the TFMS system to give the traffic manager the ability to view and evaluate the impact of reroutes on NAS sectors [M: E-2]
		▪ En Route Flow Planning Tool (EFPT) provides that once an area of weather is selected and timeframe to evaluate aircraft through the area can be selected and options for reroutes are given [M: E-1]
		▪ Most integration will remain in a manual mode but many weather displays will be improved to a "high glance value" mode [N: 2.0]
			▪ 4D weather cube implemented in NextGen Network Enabled Weather (NNEW) WP1, allowing users to filter enhanced weather content to region and timeframe of interest [G]
			▪ NextGen Weather Processor (NWP) Work Package 1 (WP1) – subsumes WARP and CIWS
			▪ Coupled with NNEW provides quicker and wider access to improved forecast weather information for Controller, Dispatcher, and FLM
			  • 0 – 2 hour convective forecast
			  • 2 – 6 hour convective forecast
			▪ Controller weather problem detection decision support to:
			  • Prevent directing aircraft into hazardous weather inadvertently when resolving aircraft-to-aircraft conflicts
			  • Evaluate a pilot requested maneuver around the weather to ensure it would not send the aircraft into another area of convection not yet visible on the aircraft's airborne radar [O: 5.5]
			▪ Controller weather problem resolution decision support to respond to pilot requests for assistance to:
			  • Route around significant areas of convective weather that are rapidly and unexpectedly worsening
			  • Return to aircraft's original flight plan when convective weather rapidly and unexpectedly improves [O: 5.5]
			▪ The Traffic Management Specialist (TMS) collaborating with TMCs, will be able to review available long-range forecast weather information in the context of flight intent information, historical traffic patterns, controller staffing resources, to select a baseline configuration [O: 8.7.1]
			▪ Planning Controller and TMC will have more timely, accurate weather information to be able to predict the timing of arrival/departure configuration changes [G: OI-104122, P: 2.3.2]
				▪ Initial phase of Single Authoritati (SAS) with ability to select specif and timeframes of interest, enha and situational awareness of impacting weather [I]
				▪ Improved weather and turbulenc [I]
				▪ Incorporation of the majority of In Terminal Weather System (ITWS) functionality to meet latency requ Wind Shear/Microburst Detectior Prediction advisories [J]
				▪ Improved weather algorithms, in convection [J]
				▪ Provide controller with prioritized routings (i.e., user preferences) f flight to address possible events such as the implementation of planned traffic management initiatives, the modification or cancellation of them (i.e., concept System Enhancements for Versatile Elec Negotiation (SEVEN) and user pr negotiation) [M: A-4.3.2]
				▪ Tools will assist the controller an management specialist to assess the risk management of the operational in weather on flights/trajectories an candidate actions that mitigate th on safety and traffic flow [N: 2.5]

Training	▪ Traffic Situational Display (TSD) [Q] ▪ Monitor Display Module (MDM) [Q] ▪ CIWS displays	▪ Flight Information Service Broadcast (FIS-B) on the Cockpit Display of Traffic Information (CDTI) in a Universal Access Transceiver (UAT) equipped aircraft [M: A-4.3.3]	▪ Future En Route Work Station (FEWS) [L: 4.1.7]

Operations Activity

- Tool(s)
- Display(s)
- Communications
- Interfaces
- Enablers
- Training
- Aircraft / Aircrew
- Dispatchers
- Human Systems Integration
- Facilities
- ATC Procedures
- Airspace Design
- Benefits
- Risks
- Policy/Rulemaking
- Certification Standards
- Requirements
- Safety
- R&D

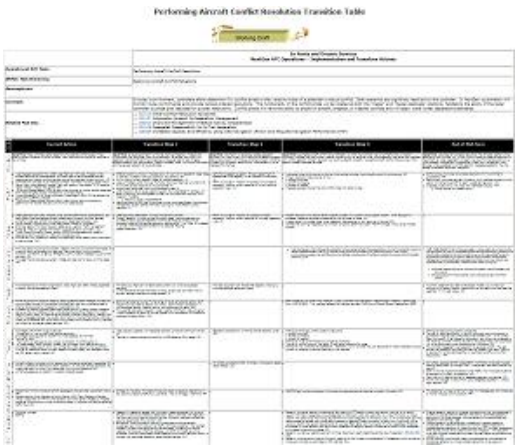
R&D in the Transition to NextGen

Current Operations

Plans and Investments

R&D (Planned, In Progress, and Completed)

Transition Tables

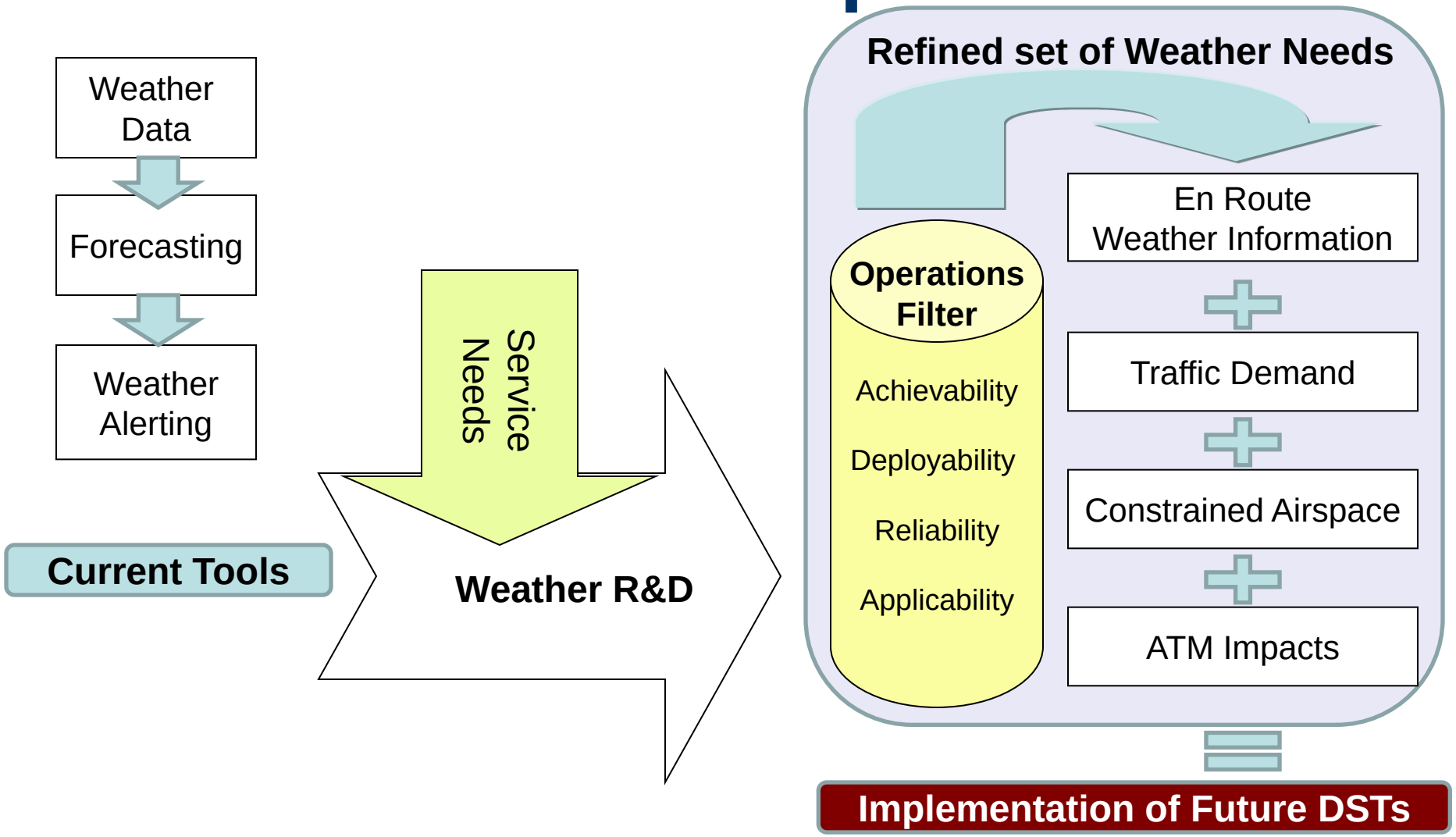


Know What to Expect

Identify Gaps

Align R&D with Service Needs

DST Development



Thank You!

Shirley Burgess
FAA, Chief System Engineer
EnRoute and Oceanic Services