
Federal Committee for Meteorological Services and Supporting Research (FCMSSR)

Dr. Kathryn Sullivan
FCMSSR Chair

October 20, 2016

Agenda

- 1:00 – Introduction (Dr. Sullivan)**
- 1:10 – Action Item Review
/ FCMSSR Charter Approval (Dr. Bill Schulz)**
- 1:20 – Federal Coordinator's Update (Dr. Bill Schulz)**
- 1:40 – National Earth System Prediction Capability (ESPC)
Executive Steering Group Update
{Dr. Dan Eleuterio (USN) & Dr. Jesse Carman (NOAA)}**
- 1:55 – Revised Process For the Federal Plan For Meteorological
Services And Supporting Research (OFCM)**
- 2:10 – Interagency Framework For Meteorological Observing (OFCM)**
- 2:25 – Spectrum Efficient National Surveillance Radar
(SENSR) Update. Mr. Paul Fontaine (FAA)**
- 2:40 – Open Discussion (All)**
- 2:50 – Wrap-Up (Dr. Sullivan)**

Meeting Roadmap

- **Introduction (Dr. Sullivan)**
- **Agenda Approval**
- **Action Item Review (OFCM)**
 - **Dr. William Schulz (Federal Coordinator for Meteorology) will review the status of Action Items recorded at previous FCMSSR meetings. This will include approval and signing of the updated FCMSSR charter provided to all members prior to the meeting.**

FCMSSR Action Items

AI #	Responsible Office	Text	Status	Due Date
2015-1.1	ICMSSR	ICMSSR will develop a concise framework to include a method for cost-benefit analytics which will help guide the acquisition of meteorological data and observing systems to include use of commercial and foreign sources.	Open	11/15/15
2015-1.2	ICMSSR	Evaluate the status of MPAR and prepare options for developing a whole of government radar capability to meet terminal and long-range weather and surveillance operational requirements and research needs.	Open	11/15/15
2016-1.1	OFCM	Work with Office of Management and Budget (OMB) and agency budget personnel to develop a proposal for adjusting the scope, contents, and process of the annual "Federal Plan for Meteorological Services and Supporting Research" to ensure that it becomes a functional product for interagency coordination and budget development.	Pending Closure	10/29/16

FCMSSR Charter

- **Charter was sent to the ICMSSR on Feb 26, 2016**
 - **All recommended changes were incorporated**
- **Charter was sent to DOC General Counsel and all FCMSSR members on April 1, 2016 for review**
 - **DOC-GC Clearance obtained Oct 12, 2016**
- **OFCM coordinated with OSTP to define FCMSSR relationship with NSTC**
- **OFCM coordinated with OMB to ensure the FCMSSR Charter compiled with their guidance under P.L. 87-843**
- **Final ICMSSR clearance obtained on Sep 29, 2016**
- **FCMSSR member concurrence collected and documented October 2016**

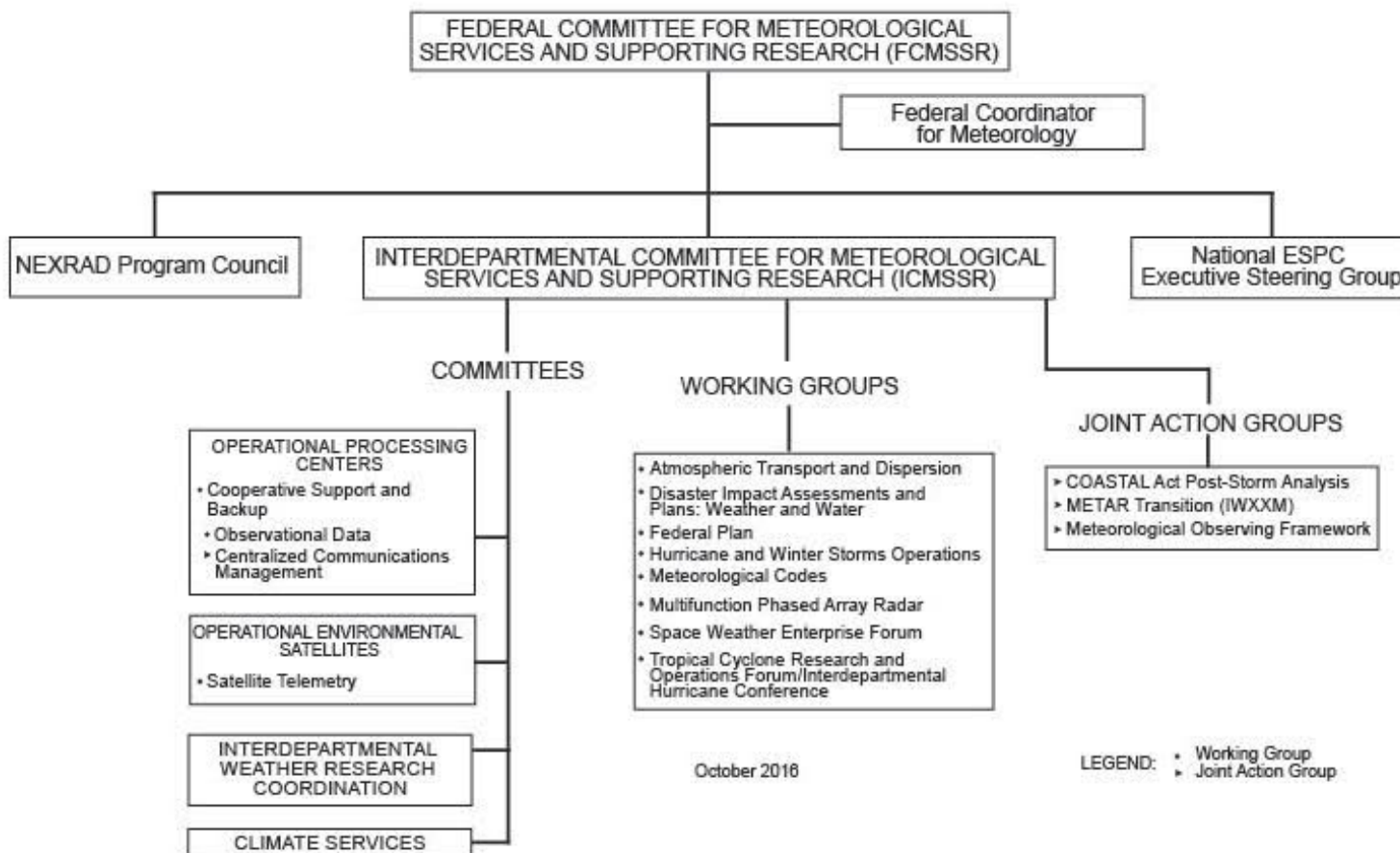
Meeting Roadmap (Continued)

- **Issues and Considerations of the Federal Stakeholders**
 - **Federal Coordinator's Update (Dr. Bill Schulz)**
 - **Earth System Prediction Capability (ESPC)
Executive Steering Group Update
{Dr. Dan Eleuterio (USN) & Dr. Jesse Carman (NOAA)}**
 - **Revised Process For the Federal Plan For Meteorological
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Meeting Roadmap (Continued)

➤ Federal Coordinator's Update

FEDERAL METEOROLOGICAL COORDINATING INFRASTRUCTURE



Federal Coordinator's Update

- **COES (Committee for Operational Environmental Satellites)**
 - Developing recommendations for improving interagency satellite coordination; expected for future FCMSSR/ICMSSR mtgs
 - Next meeting 2 Dec 16
- **COPC (Committee for Operational Production Centers)**
 - Alternate data path between operational production centers in place and op tested; working toward DoD mandated security testing
 - Next meeting 25-26 Oct 16
- **Interagency Weather Research Committee**
 - Formerly administered at National Science Foundation
 - NSF, DoD, NOAA, NASA; planned to extend invitations to DoE, FAA, USGS, DoI (BOEM)
 - Focus on facilitating shared use of national research infrastructure, assist in determining research priorities
 - **FIRST** meeting 28 Oct 16

Federal Coordinator's Update

- **Committee for Climate Services Coordination**
 - Recommendations to efficiently use resources to meet user requirements on climate services issues impacting multiple agencies
 - **FIRST** meeting 29 Nov 16
- **NEXRAD Program Council (DoD, NWS, FAA)**
 - Address disposition of DoD WSR-88D radars
 - Next meeting 8 Nov 16
- **ICMSSR**
 - Next meeting 12 Dec 16
- **FCMSSR**
 - Next meeting 25 Apr 17



OFCM's Updated Website

(goes live on 28 Oct 16)

Office of the Federal Coordinator for Meteorology

[Click here for the presentations from the Twentieth Annual George Mason University Conference on Atmospheric Transport and Dispersion Modeling](#)

[Click here for the 2016 National Hurricane Operations Plan](#)

[Click here for the Tropical Cyclone Operations and Research Forum/70th IHC](#)



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Personnel



Activities Report



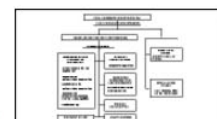
Special Projects

Office of the Federal Coordinator for Meteorology

Introduction: The Office of the Federal Coordinator for Meteorological Services and Supporting Research, more briefly known as the Office of the Federal Coordinator for Meteorology (OFCM), is an interdepartmental office established because Congress and the Executive Office of the President recognized the importance of full coordination of federal meteorological activities. The Department of Commerce formed the OFCM in 1964 in response to Public Law 87-843.

Mission: To ensure the effective use of Federal meteorological resources by encouraging and facilitating the systematic coordination of operational weather services and supporting research among the Federal agencies.

Activities: Fifteen Federal departments and agencies are currently engaged in meteorological activities and participate in the OFCM's coordination and cooperation



Coordinating Structure



Publications



Directions to OFCM

OFCM

Office of the Federal Coordinator for
Meteorological Services and Supporting Research

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OVER A HALF-CENTURY OF MULTI-AGENCY COLLABORATION

LATEST NEWS

OFCM COORDINATING INFRASTRUCTURE

JULY 26, 2016

OFCM has revamped its coordinating infrastructure. In the past year, we have streamlined our Committees, Working Groups, and Joint Action Groups in order to focus on the most active groups. Please click below for our Groups page, which contains a new infrastructure diagram and more information on existing groups.

NEW FEDERAL COORDINATOR FOR METEOROLOGY NAMED

DECEMBER 14, 2015

OFCM welcomes the new Federal Coordinator for Meteorology, Dr. William Schulz. Dr. Schulz comes to OFCM after a 30 year career in the U.S. Navy. His last assignment was at the United States Naval Academy, where he was the chair of the Oceanography Department.

UPDATED FMH11 PART A PUBLISHED

JANUARY 31, 2016

The Office of the Federal Coordinator for Meteorological Services and Supporting Research (OFCM) has posted a new version of Federal Meteorological Handbook No. 11 - Doppler Radar Meteorological Observations (WSR-88D), Part A - System Concepts, Responsibilities, and Procedures. Click "Read More" below to access the Handbook.

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FEDERAL METEOROLOGICAL COORDINATING GROUPS

COORDINATING STRUCTURE

OFCM operates with policy guidance from the [Federal Committee for Meteorological Services and Supporting Research \(FCMSSR\)](#). The Chairperson of FCMSSR is the Under Secretary of Commerce for Oceans and Atmosphere, and Administrator of NOAA. The members of the FCMSSR are senior policy executives from the federal agencies with meteorological programs. In addition to reviewing OFCM activities and providing policy guidance, FCMSSR is the final forum to resolve agency differences.

The [Interdepartmental Committee for Meteorological Services and Supporting Research \(ICMSSR\)](#), with a rotating chair assisted by the Federal Coordinator, is the primary program management body of the Federal coordinating structure. ICMSSR provides advice to OFCM, implements FCMSSR policies, and oversees the committees and working groups that address observing systems, weather operations and services, operational processing centers, and automated weather information systems.

The Committees and their Working and Joint Action Groups provide at the program and working level (1) a forum for each agency to report activities, difficulties, and achievements; (2) a mechanism for coordinated change and problem solving; (3) a medium for collection, documentation and consolidation of agency requirements and inventories; (4) oversight for coordinated system development; (5) a vehicle for coordinating with other groups; and (6) a mechanism for the preparation of studies, agreements, standards, protocols, reports, and national plans.

ORGANIZATIONAL CHART

[Organizational Chart in PDF](#)

GROUP WEBPAGES

OFCM group webpages, where available, are below.

Committees

- [FCMSSR - Federal Committee for Meteorological Services and Supporting Research](#)
- [ICMSSR - Interdepartmental Committee for Meteorological Services and Supporting Research](#)
- [COPC - Committee for Operational Processing Centers](#)
- [COES - Committee for Operational Environmental Satellites](#)
- [CRC - Committee for Research Coordination](#)

Other Groups

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COMMITTEE FOR OPERATIONAL PROCESSING CENTERS

PURPOSE

The Committee for Operational Processing Centers (COPC) shall be the principal agent of the Interdepartmental Committee for Meteorological Services and Supporting Research (ICMSSR) for coordinating data assimilation, analysis, and prediction efforts for services and products provided by the Department of Commerce (DOC), through the National Oceanic and Atmospheric Administration (NOAA), and the Department of Defense (DOD) meteorology, oceanography, and satellite operational processing centers. The objectives of the COPC are to:

- Promote free and open exchange of information concerning numerical weather and ocean prediction modeling efforts, data resources or problems, and atmospheric, oceanographic, and satellite products.
- Develop cooperative agreements for technical support and interface requirements, where appropriate.
- Identify areas where expanded coordination efforts are needed and recommend plans of actions.

Terms of Reference for COPC

MEMBER AGENCIES

COPC members include representatives from the following agencies:

- NOAA
 - NWS
 - NESDIS
- DoD
 - Navy
 - USAF

MEETINGS

COPC meets twice a year to discuss important issues. Details of the most recent meetings are linked below.

[COPC Meetings](#)

PUBLICATION

The COPC is responsible for the Federal Plan for Cooperative Support and Backup Among Operational Processing Centers. Please contact OFCM at ofcm.mail@noaa.gov if you need a copy.

ASSOCIATED GROUPS

The COPC has three subgroups:

- [Working Group for Cooperative Support and Backup](#)
- [Working Group for Observational Data \(WG/OD\)](#)
- [Joint Action Group for Centralized Communications Management \(JAG/CCM\)](#)

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GROUPS

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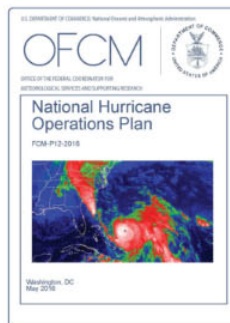
MEETINGS

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OFCM PUBLICATIONS

OFCM Publications can be divided into three main categories: [Handbooks](#), [Plans](#), and [Reports](#).

MOST REQUESTED PUBLICATIONS



OFCM

Office of the Federal Coordinator for Meteorology

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HANDBOOKS FOR METEOROLOGICAL OBSERVATIONS AND CODING

DATA ACQUISITION STANDARDS TO BENEFIT ALL AGENCIES

Since 1987, OFCM has been the custodian of the Federal Meteorological Handbooks. The Handbooks define data acquisition standards across all Federal agencies, ensuring all data collected is in the same format and in the same way. This standardized data acquisition benefits all partners in the Federal Meteorological Enterprise, leading to reduced costs.

All Federal Meteorological Handbooks, including changes, are linked on this page.

[FCM-H1-2005, Federal Meteorological Handbook No. 1 - Surface Weather Observations and Reports, September 2005](#)

[FCM-H2-1988, Federal Meteorological Handbook No. 2 - Surface Synoptic Codes, Last Change - March 2005](#)

- [Changes 1 and 2 memo \(Change No. 1 - November 1989 and Change No. 2 - December 1989\)](#)
- [Change 3 memo \(November 1991\)](#)
- [Change 4 memo \(March 2005\)](#)

[FCM-H3-1997, Federal Meteorological Handbook No. 3 - Rawinsonde and Pibal Observations](#)

- [Change No. 1 memo and pages \(August 2006\)](#)

Federal Meteorological Handbook No. 11 - Doppler Radar Meteorological Observations (WSR-88D)

- [Part A - System Concepts, Responsibilities, and Procedures, January 2016](#)
- [Part B - Doppler Radar Theory and Meteorology, December 2005](#)
- [Part C - WSR-88D Products and Algorithms, April 2006](#)
- [Part D - WSR-88D Unit Description and Operational Applications, February 2006](#)

[Federal Meteorological Handbook No. 12 - United States Meteorological Codes and Coding Practices, with all changes incorporated. \(Last change - January 2013\)](#)



OFCM Meetings

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Other bookmarks

OFCM

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OFCM MEETINGS CALENDAR

OFCM MEETINGS CALENDAR

Meetings are the lifeblood of OFCM's Coordinating Infrastructure. They bring the Federal meteorological community together to discuss important issues affecting the Nation as a whole. Below is a listing of meetings - some sponsored by OFCM, some in which OFCM staff participate (indicated by an asterisk).

2016	Meeting	Location
January 10-14	*American Meteorological Society Annual Meeting	New Orleans, LA
February 25	Interdepartmental Committee for Meteorological Services and Supporting Research	Silver Spring, MD
March 8-9	*Nationwide Network of Networks Meeting	Washington, DC
March 14-17	Tropical Cyclone Operations and Research Forum/70th Interdepartmental Hurricane Conference	Miami, FL
March 22-23	*MPAR ATD CDR	Atlantic City, NJ
April 5	Joint Action Group for Central Communications Management	Silver Spring, MD
April 6-7	Working Group for Cooperative Support and Backup	Silver Spring, MD
April 23-30	*Space Weather Workshop	Boulder, CO
May 4-5	Committee for Operational Processing Centers	Monterey, CA
May 20	Climate Services Meeting	Silver Spring, MD
June 1	Interdepartmental Committee for Meteorological Services and Supporting Research	Silver Spring, MD
June 14	Special Session: George Mason University Conference on Atmospheric Transport and Dispersion Modeling	Fairfax, VA
June 14-15	*NASA Flood Response Workshop	Greenbelt, MD
June 15-16	*Wind Turbine Radar Interference Mitigation	Crystal City, VA
June 21-22	*MPAR R&D Meeting	Norman, OK
June 29	Committee for Operational Environmental Satellites	Silver Spring, MD
July 1	Committee for Cooperative Research	Silver Spring, MD
July 5	NEXRAD Program Council Meeting	Silver Spring, MD
July 28	*Subcommittee on Hydrology	Greenbelt, MD
August 2-3	*Friends and Partners in Aviation Weather	Washington, DC
August 9	MPAR ATD Meeting	Silver Spring, MD
August 10	Joint Action Group for Meteorological Observing Framework	Silver Spring, MD
August 16	Joint Action Group for Central Communications Management	Silver Spring, MD
August 18	Working Group for Cooperative Support and Backup	Silver Spring, MD
August 22-24	*Extreme Space Weather Workshop	College Park, MD
August 25	Joint Action Group for Federal Plan Revision	Silver Spring, MD
September 7	Committee for Operational Environmental Satellites	Silver Spring, MD

ABOUT OFCM

OFCM'S PURPOSE

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OFCM is a **service organization**. OFCM is the Federal Weather Enterprise's (FWE) resource for the following:

- Coordinating the exchange of information, plans, and concerns among the FWE agencies, to help the Nation get the most effective use from the \$5.3 billion collectively spent annually by the partner agencies.
- Providing a strategic view of interagency Federal weather efforts, to support related decisions at executive leadership levels of partner agencies.
- As seen on the [Publications](#) page, we produce and maintain a variety of foundational meteorological documents including Federal Meteorological Handbooks, the Federal Plan for Meteorological Services and Supporting Research, among others.

OFCM STAFF

- [Dr. William Schulz](#), Federal Coordinator for Meteorology
- Lt Col Darren Sokol, Assistant Federal Coordinator for Air Force and Army Affairs
- CDR Christopher Gabriel, Assistant Federal Coordinator for Navy and Marine Corps Affairs
- LCDR Jason Mansour, NOAA/NOAA Corps
- Mr. Michael Bonadonna, Senior Staff Meteorologist
- Mr. Judson Stailey, Lead Meteorologist
- Mr. Donell Woods, Senior Staff Physical Scientist
- Mr. Kenneth H. Barnett, Information Technology Specialist
- Ms. Christina M. Bork, Management Analyst
- Ms. Erin E. McNamara, Program Specialist
- Ms. Ivett Shields, Program Specialist
- Mr. Anthony R. Ramirez, Staff Support Meteorologist / Project Manager (Science and Technology Corporation)

OFCM DIRECTIONS

Coming to OFCM for a meeting? Click [here](#) for directions.

Meeting Roadmap (Continued)

- **Issues and Considerations of the Federal Stakeholders**
 - **Earth System Prediction Capability (ESPC)
Executive Steering Group Update**

Drs. Eleuterio and Carman will provide an update on the activities of the ESPC program. Per FCMSSR direction at the April 2016 meeting, the ESPC ESG now reports to the FCMSSR with support through the OFCM.



National Earth System Prediction Capability (National ESPC)

Scott Livezey – Steering Group Chair

Jessie Carman – NOAA/OAR, Fred Toepfer – NOAA/NWS,
Dan Eleuterio - Navy/ONR, Dave McCarren – Navy/OPNAV



What Is the National ESPC?

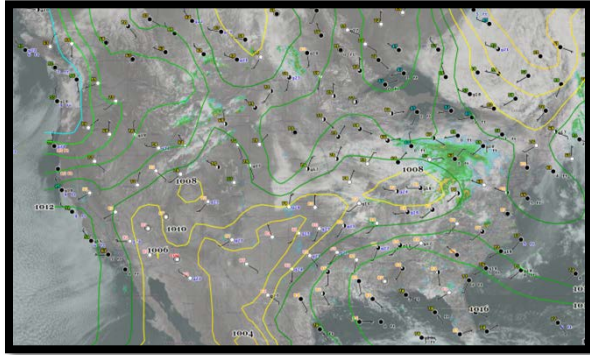
- An integrated National Capability meeting the U.S. Federal need for Earth System Prediction for the provision of operational products and services for
 - Protection of life and property in the US
 - Economic development, aviation, maritime, shipping, agriculture of the US
 - National defense and homeland security (World Wide)
 - Strategic decision making
- Includes:
 - Near term, medium range and extended range weather (< 90 days)
 - Seasonal and inter-annual climate (90 Days+)
 - Sub-decadal to decadal
- Leverages existing and planned Agency operational capabilities, and research and development programs and projects
- Strong need identified for Inter-Agency Coordination

Efforts are broadly consistent with WMO Plans for Seasonal-to-Subseasonal Prediction and High-Impact Weather (HiW).



Weather and Climate Modeling

Need for Improved Skill

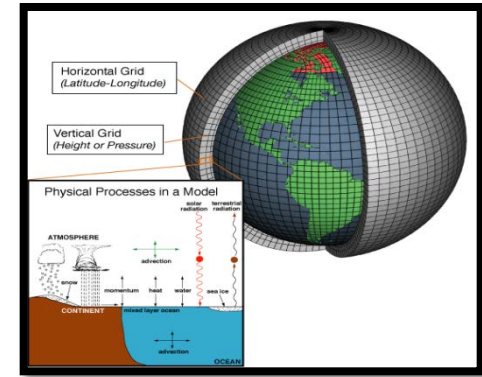


Weather Modeling
Hours to 1-2 weeks

Highly sensitive to
initial conditions

SKILL
GAP

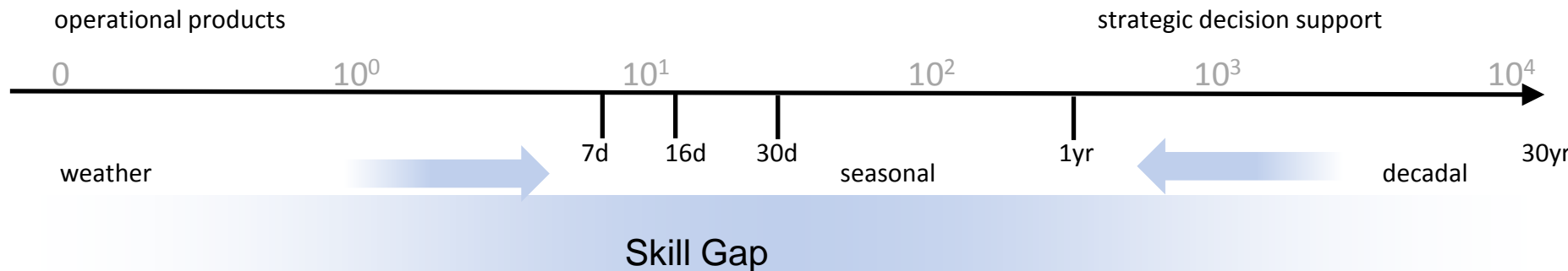
Needs
both



Climate Modeling
Seasonal to Decadal

Sensitive to boundary
conditions related to
coupling of ocean, land,
ice, and atmosphere.

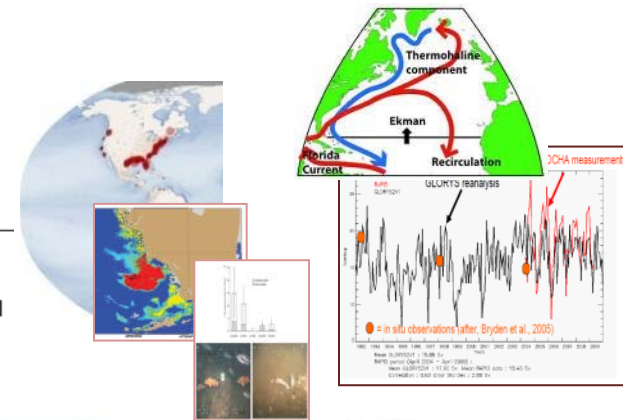
Bridging the Gap



- To extend weather skill past traditional weather scales:
 - Fully coupled air-ocean-land-ice modeling systems needed
 - Multi-model ensembles
 - Improved data assimilation techniques, particularly for ocean-land-ice
 - To improve climate model skill at subseasonal scales:
 - Data assimilation, reanalysis/reforecast
 - Process representation
- Needed across time scale:
- Improved HPC utilization, incl. advanced architectures
 - Common model architectures
 - Multi-model ensemble management
 - Uncertainty depiction; metrics suited for longer time scales
 - Product creation
- Research agencies: work within mission expertise to improve skill
 - Operational agencies: exploit the research for skill improvements
 - *Need strategic-level coordination of issues*

Exploit Sources of Extended Range Predictability

Global Coupled Modeling



National **ESPC**
Earth System Prediction Capability



Building a National ESPC

- Develop and implement a common or coordinated prediction technology through
 - An affiliation of existing Programs, Projects, Laboratories, Centers
- Cooperative effort of the participating federal environmental research and environmental operational guidance agencies
 - Multiple offices and laboratories within each agency
 - Application of significant internal & external research and development funding
- Focus on meeting needs of user community through existing and planned agency operational numerical prediction capabilities through coordinated R&D and Operations

Coordination of Existing and Planned Agency Capabilities



Where we are

- Operational Global Weather Ensemble

- 63 member, multi-model, > 80 variables, out to 16 days, with skill at 11+ days, at 1 degree resolution - going to ½ degree, adding variables, will do extended runs to 32 days

- Operational Multi-model Ensemble for Sub-seasonal and Seasonal Prediction

- Earth System Modeling Framework - Common Model Architecture

- In-place Coordinating Structure – Project Office

- Executive Steering Group

- Multiple committees - agencies regularly interacting to solve problems in a common way.

- BAMS article: THE NATIONAL EARTH SYSTEM PREDICTION CAPABILITY:
Coordinating the Giant <http://journals.ametsoc.org/doi/abs/10.1175/BAMS-D-16-0002.1>

NRC Study “Developing a U.S. Research Agenda to Advance Subseasonal to Seasonal Forecasting”

- **Key Recommendations***

- Engage users** – Need to engage users right from the very start (bringing users aboard rapidly) to become involved in the product development so that they understand what is possible and we create products that provide value.
- Increase S2S Forecast Skill**— Need improvements in observations, coupled data assimilation, models, and calibration, combination, optimization, and verification of models and multi-model ensembles
- Improve prediction of high-impact events**—Develop an ability to forecast disruptive and extreme events, as well as consequences of unanticipated forcing events such as volcanic events or oil spills.
- Include more Earth system components in S2S models**—Include and enhance sophistication of ocean, atmosphere, land, and ice components, as well as waves, aerosols, hydrology, and vegetation. Including more output variables, e.g. sea-ice characteristics or seasonal vegetation states, can help make forecasts more useful.

*<http://www.nap.edu/catalog/21873/next-generation-earth-system-prediction-strategies-for-subseasonal-to-seasonal>

Issues and Challenges

Unmet Needs

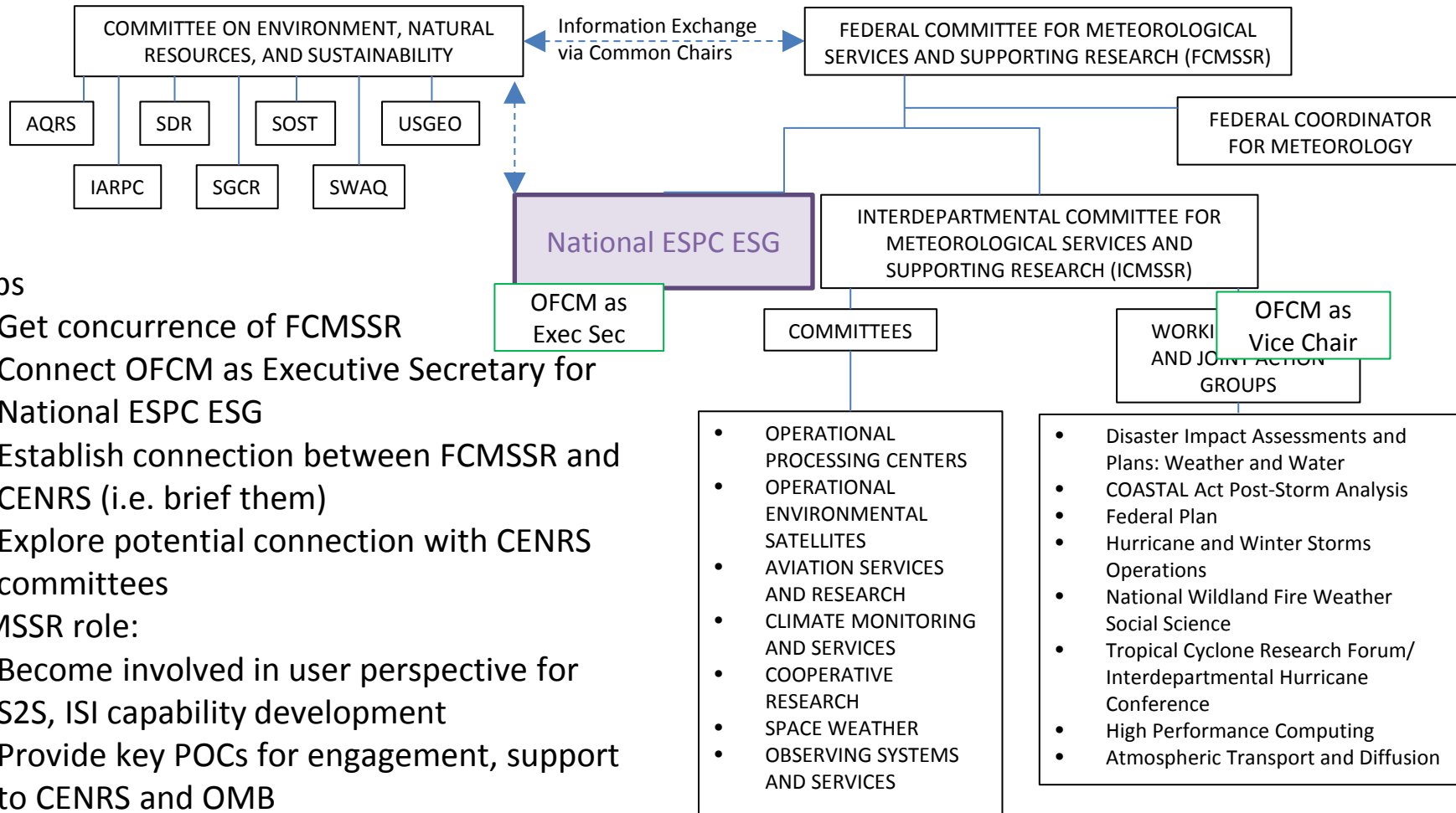
- Comprehensive Identification of User Need
- Improved Operational Prediction Skill at longer time scales
 - Identifying sources of predictability
 - Predictability beyond 2 weeks
- Inter-Agency Coordination: Imprimatur
 - Complementary Missions and Mission Capabilities
 - Technological Capability Integrations
 - Connectivity to Interagency Coordination Committees

Recommendations

for phased implementation

1. Implement ESG as committee of FCMSSR for operational coordination
 - Identical tier as ICMSSR
 - Build ESPC awareness among CENRS subcommittees
2. National ESPC office continues to report to ESG.
 - ESG report to FCMSSR for operational guidance
 - Leverage OFCM as Executive Secretary for ESG: continuity
 - Leverage OSTP membership on FCMSSR for awareness of policy issues
3. Formalize policy/EOP advocacy linkages. Options:
 - a. Classify ESG as a CENRS Subcommittee
 - b. OSTP join ESG as an advisor

Phased Implementation



Steps

- Get concurrence of FCMSSR
- Connect OFCM as Executive Secretary for National ESPC ESG
- Establish connection between FCMSSR and CENRS (i.e. brief them)
- Explore potential connection with CENRS committees

FCMSSR role:

- Become involved in user perspective for S2S, ISI capability development
- Provide key POCs for engagement, support to CENRS and OMB

Discussion/Questions



Meeting Roadmap (Continued)

- **Issues and Considerations of the Federal Stakeholders**
 - **Revised Process For the Federal Plan For Meteorological Services And Supporting Research**

Per FCMSSR AI 2016-1.1 and ICMSSR 2016-2.1 OFCM has worked with the EOP and other Agencies of the FWE to develop a new approach to meeting legislative requirements for an annual horizontal view of Federal investments in Meteorological Services and Supporting Research. Dr. Schulz will provide a progress update including a proposal for the framework of the new Federal Plan.

FEDERAL PLAN PROCESS REVISION

CURRENT

FEDERAL PLAN (annually, ~ October)

A. AGENCY BUDGET SUMMARIES

1. Costs by Agency
2. Cost by Budget Category (Ops/Sys)
3. Supporting Research by Category
4. Operational Cost by Service Category (8)
5. Personnel totals
6. Interagency Funds transfers
7. Observing Facilities/Systems Locations

B. AGENCY PROGRAMS

1. Coordination (OFCM Structure)
2. Basic Services
 - a. Agricultural Services
 - b. 8 other categories

PROPOSED

STRATEGIC DOCUMENT (every 4 years)

- A. Vision
- B. Mission
- C. Goals (5-7)
- D. Objectives (5-7 each, associated with goals)
- E. Appendices

ANNUAL DOCUMENT (early March)

- A. Organizational Structure (OFCM Diagram)
- B. Agency involvement/interest matrix
- C. Budget Tables
 1. Current PBR*/enacted/previous
 2. Simplified categories
- D. Past and planned efforts per goals
- E. Calendar in review
- F. Individual agency reports (optional)

*President's Budget Request

FEDERAL PLAN MISSION AND VISION

“in the strategic document”

Federal Weather Enterprise Coordination Vision

Well-coordinated weather services and supporting research across the Federal Weather Enterprise that meet the evolving needs of the Nation.

OFCM Mission

Foster the effective use of Federal meteorological resources by encouraging and facilitating the systematic coordination of weather services and supporting research across the Federal Weather Enterprise.

FEDERAL PLAN GOALS AND OBJECTIVES

“in the strategic document”

- ***The following are examples to show the format under consideration.***
- ***Anticipate 5-7 Goals, with a few objectives under each.***
- ***Request ICMSSR ideas/direction on goals; JAG will flesh them out.***

Goals:

1. Improve observing systems and processes to better support forecasting, decision making, and discovering more about our environment.

Objectives:

1.1 Develop an interagency approach toward planning the integration of commercial observations into the FWE.

1.2 Maximize the value of our high resolution upper air soundings by conforming to WMO standards.

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***President's Budget Request**

Agency Involvement/Interest Matrix

“in the annual document”

FOCUS AREAS	DOC/NOAA	DOD	DOT/FAA	USDA	DOE	DOI	STATE	NASA	FEMA	EPA	NSF	NRC	NTSB	OMB
Natural Hazards (Volcanos, Tornadoes, Flash Floods, etc)	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Space Weather	●	●	●		●	●	●	●			●			●
Transportation	●	●	●	●	●							●	●	●
Aviation	●	●	●	●		●		●					●	●
Urban Meteorology/Air Quality	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Water Resources Management	●	●		●		●		●	●					●
Agriculture	●			●			●							●
Fire	●	●		●		●			●	●				●
Marine/Ocean	●	●	●			●		●			●			●
Climate	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Hydrology	●	●		●		●		●	●		●	●		●
Man-Made Hazards	●	●	●	●	●	●	●	●	●	●	●	●	●	●

● **Services**

● **Supporting Research**

● **Both**

FEDERAL PLAN PROCESS REVISION

Roadmap (for FCMSSR concurrence):

- Brief FCMSSR on structure (October 20)
- Bring FCMSSR feedback to JAG (November)
- JAG builds goals and objectives, works toward a process description
- JAG Drafts the FWE Strategic Goals(November-December 2016)
- Update ICMSSR at their December meeting
- JAG Drafts the FY18 FWE Strategic Plan for ICMSSR Approval (January- March 2017)
- Approval of FY18 Fed Strategic Plan at April 2017 FCMSSR meeting
- Annual FY19 Fed Plan will be new version

Meeting Roadmap (Continued)

- **Issues and Considerations of the Federal Stakeholders**
 - **Interagency Framework For Meteorological Observing (OFCM)**

Per ICMSSR AI 20161.1, OFCM has taken action to establish a Joint Action Group to answer FCMSSR AI 2015-1.1 to draft a "Framework to guide acquisition of observing capabilities." OFCM will provide and update on the status of the JAG and preview the proposed framework.

METEOROLOGICAL OBSERVING SYSTEMS INTERAGENCY FRAMEWORK

- OFCM has established the Joint Action Group for Meteorological Framework (JAG/MOF) with representatives from key agencies of Federal Weather Enterprise responsible for acquiring, deploying, and operating both ground-based and space-based observing systems used to support operational meteorological services and support supporting research.
- JAG/MOF has met twice to review current practices employed by the agencies to gather and document requirements, plan and program for acquisition of new observing capabilities.
- Information gathered during these and subsequent meetings will be used to draft a concise “Observing Framework” as directed by the FCMSSR.
- The status on the development of the framework will be presented to the ICMSSR on September 29, 2016 and the subsequently to the FCMSSR on October 20, 2016.

FCMSSR / ICMSSR Taskers

- [FCMSSR Action Item 2015-1.1.](#)
 - ICMSSR will develop a concise framework to include a method for cost-benefit analytics which will help guide the acquisition of meteorological data and observing systems to include use of commercial and foreign sources.
- [ICMSSR Action Item 2015-1.1.](#)
 - Request OSTP USGEO program “develop a concise framework to include a method for cost-benefit analytics which will help guide the acquisition of meteorological data and observing systems to include use of commercial and foreign sources.” and provide a status update at the next FCMSSR meeting scheduled in Nov/Dec 2015.
- [ICMSSR Action Item 2016-1.1.](#)
 - Establish a Joint Action Group (JAG) to answer FCMSSR AI 2015-1.1 to draft a "Framework to guide acquisition of observing capabilities"

Proposed Meteorological Observing Framework

- What's a Framework?

- Description of structure, organization, and process
- Flexible in nature
- Non-directive

- Proposal:

- The Framework will describe the current methods used by the agencies to implement the “Planning Cycle”.
- It will highlight the key differences and commonalities between the agencies, and identify potential synergies
- It will provide recommendations to improve effectiveness in the execution of the planning cycle across the agencies.
- Agencies will employ their internal methods, procedures, and organizations to accomplish each of the process activities in the planning cycle.
- Existing methods, procedures, and organizations could be modified to facilitate interagency cooperation.

Findings

- GAO Report 15-96 recommended NOAA develop a plan to guide the integration of its observing systems, analyze whether unnecessary duplication exists in its observing portfolio and develop a standardized methodology for the routine preparation and reporting of observing systems costs.
- NOAA Administrative Order 212-16 established policy on NOAA observing systems portfolio management.
- NOAA Observing Systems Program Council (NOSC) is chartered to conduct NOAA observing systems portfolio management and has been working with other agencies (USGS) and USGEO.
- USGEO conducts a triennial Earth Observing Assessment (EOA) which includes input from most Federal Weather Enterprise agencies
- NOAA TPIO supports both NOSC and USGEO with database development and analytical assessments forming the backbone of the EOA and the NOAA Observing System Integrated Analysis
 - TPIO uses the US government owned PALMA as the software tool to conduct this work.

Proposed Meteorological Observing Framework

Roadmaps & Strategic Planning	Mission, Science Needs	Capability Gap Analysis	Observing Requirement Collection & Validation	Observing System Portfolio Planning	Program Development & Acquisition	Budget Planning & Funding Support	Observing Portfolio Operations & Management	Mission Effectiveness Analysis
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- Architecture
 - US Govmnt.
 - Commercial
 - International
- Cost / benefit
 - System level
 - Portfolio level

Observing System Portfolio Planning		
Cost (Requires acquisition professionals to consider purchase, maintenance, life cycle, data processing and distribution costs)	Benefits	Analysis/Action
Single Agency	Done with Interagency Coordination	
Single Agency Purchase	Multiple agency <ul style="list-style-type: none"> • Number/type of priority mission requirements met or partially met • Number/type of priority mission requirements met where this observation is sole source • Societal benefits • Contribution to mission effectiveness, Number of lives saved, cost avoidance from weather impacts 	<ul style="list-style-type: none"> • Judgment to determine if it is a reasonable cost • Satisfied due diligence requirements • Create agreements for resource sharing to enact the acquisition sharing
Commercial Buy		
International agreement/Payment in Kind		
	Combined partnership	

Recommendations

- As the NOSC administers a framework that is becoming capable of performing cost-benefit analyses of observing systems, do not attempt to create a new parallel structure.
- Build on the interagency contacts already inherent in the NOSC (e.g. USGS, USGEO connections, use of DoD software tools):
 - When ready, NOSC can reach out to other agency partners
 - Assign OFCM as an observing member of the NOSC via ToR change, standing by to facilitate interagency connections as needed
- Close FCMSSR AI 2015-1.1

Meeting Roadmap (Continued)

- **Issues and Considerations of the Federal Stakeholders**
 - **Spectrum Efficient National Surveillance Radar (SENSR) Update.**

Mr. Fontaine will provide an update on Spectrum Efficient National Surveillance Radar (SENSR). This initiative may have direct impact on future national meteorological and air surveillance radar capabilities and the Multifunction Phased Array Radar technological solution.

Spectrum Efficient National Surveillance Radar (SENSR)

Background Brief



Presented by: Paul Fontaine

**Director, Portfolio Management and
Technology Development (ANG-C)**

Federal Aviation Administration

Spectrum Capitalization Background

- **Presidential mandate to free 500 Mhz Gov't spectrum**
- **Bi-Partisan budget control act to free 30 Mhz below 3.0Ghz for auction by 2022, & auction by 2024**
- **Significant private sector demand for spectrum not anticipated to abate**
- **Recent auction of paired 25 Mhz L-Band grossed \$42.4B**
- **Commensurate valuations expected for Long Range Radar L-band allocation**
- **Private sector capital may be leveraged for infrastructure investments**

OMB Guidance, Constraints

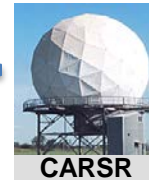
- OMB authorized to disburse up to \$500M
- Agencies must submit a Spectrum Pipeline Plan
 - ✦ Pre-implementation activities for systems that accommodate spectrum sharing or consolidate spectrum
- Reviewed by a technical panel, then Congress
- Signed by Secretary level official(s)
- Scored in part by likelihood of spectrum auction 8 years after funding received
- Activities Supported
 - ✦ Research & Development - Planning Activities
 - ✦ Economic Analysis - System Activities
 - ✦ Engineering Studies
 - Requirements Analysis - Performance Trades
 - Polarmetric Performance - Command & Control / Mission Assurance Analysis
- Auction proceeds to cover 110% of relocation or spectrum sharing costs
- Limited increases in solution functionality allowable
- 'Reasonable' increases in recurring costs also covered

ATC / Weather Radar Footprint

Long Range

(1.215-1.390 GHz)

- CARSR
- ARSR4



Terminal

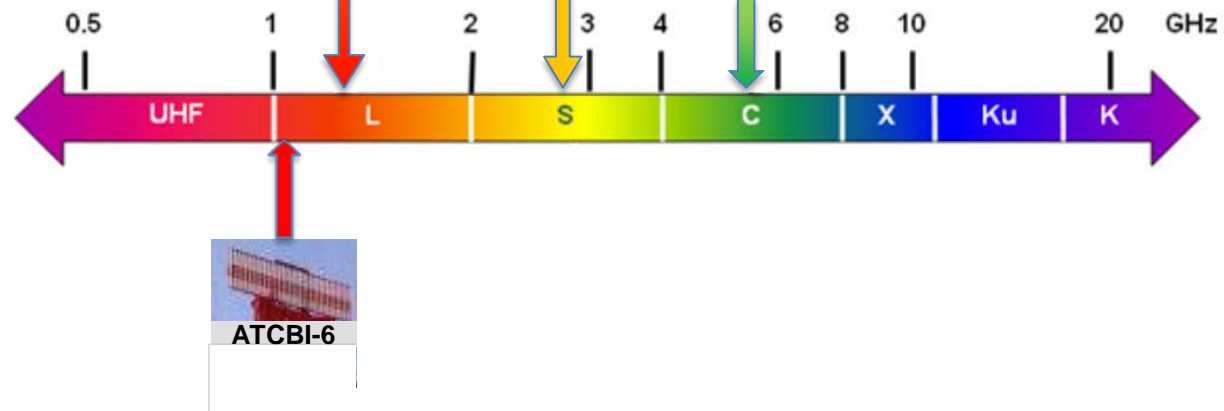
(2.7-2.9 GHz)

- ASR-8 / GPN-20
- ASR-9 / GPN-27
- ASR-11 / GPN-30



Weather

- TDWR (5.5-5.65 GHz)
- NEXRAD (2.7-3.0 GHz)



Memorandum of Understanding

- Develop multiagency spectrum pipeline plan
- Define spectrum opportunities
 - ✦ Validate spectrum valuations
 - ✦ Potential reallocation of S-band
- Identify impacted systems
- Develop and validate a Concept of Operations
- Define and validate cross-agency system performance
- Offer recommendations for ways forward

MEMORANDUM OF UNDERSTANDING
BETWEEN
DEPARTMENT OF TRANSPORTATION / FEDERAL AVIATION ADMINISTRATION
DEPARTMENT OF COMMERCE / NATIONAL OCEANIC AND ATMOSPHERIC
ADMINISTRATION
DEPARTMENT OF DEFENSE
DEPARTMENT OF HOMELAND SECURITY
FOR
RELOCATION of NATIONAL SURVEILLANCE RADAR CAPABILITIES
FEASIBILITY ASSESSMENT

ARTICLE 1. Parties

The parties to this Memorandum of Understanding (MOU) are the Department of Transportation, Federal Aviation Administration (FAA); the Department of Commerce, National Oceanic and Atmospheric Administration; Department of Defense (DOD); and the Department of Homeland Security (DHS).

ARTICLE 2. Background

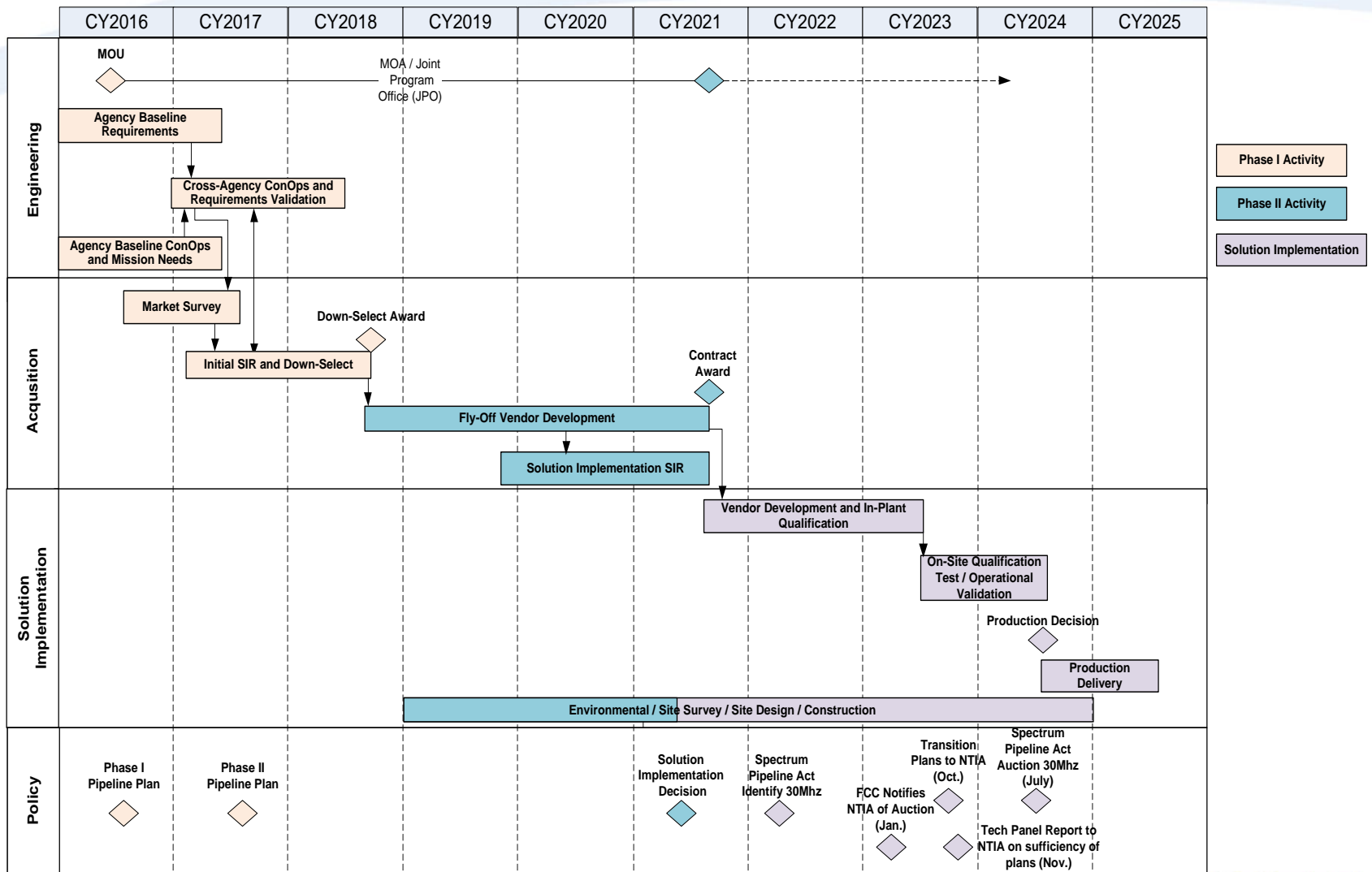
The 2010 Presidential Memorandum, *Unleashing the Wireless Broadband Revolution*, encourages identification of 500 Megahertz (MHz) of Federal and non-federal Radio Frequency (RF) spectrum for repurposing to wireless broadband use by 2020. Additionally, Title X of the Bipartisan Budget Act of 2015 - Spectrum Pipeline, stipulates that 30 MHz of Federal spectrum below 3 gigahertz be identified for non-Federal use. Given the potential of evolving radar system technology, capabilities may be realized that could subsume the functions of current air-traffic control, weather, and homeland defense/security surveillance systems that operate across multiple frequency bands. These capabilities may enable reallocation of particular bands of Federal spectrum, allocated for weather and aircraft surveillance infrastructure, to satisfy federal mandates while simultaneously providing for the evolution and sustainment of those mission-critical capabilities.

A multi-phased process is to be pursued that will enable the Parties to determine the feasibility of relocating surveillance radar capabilities in such a way that certain spectrum can be identified as having the potential to be repurposed to enable non-Federal access. Successive phases will be informed by and build upon previous phases, the specific details of which may be influenced by entities that are not a Party to this agreement such as the Office of Management and Budget (OMB) and the National Telecommunications and Information Administration (NTIA). If relocation of surveillance radar capabilities is determined to be feasible, follow-on initiatives will be required to determine a range of solution implementation alternatives, to demonstrate and evaluate technologies and capabilities, and to provide final surveillance spectrum relocation proposals.

REV 15



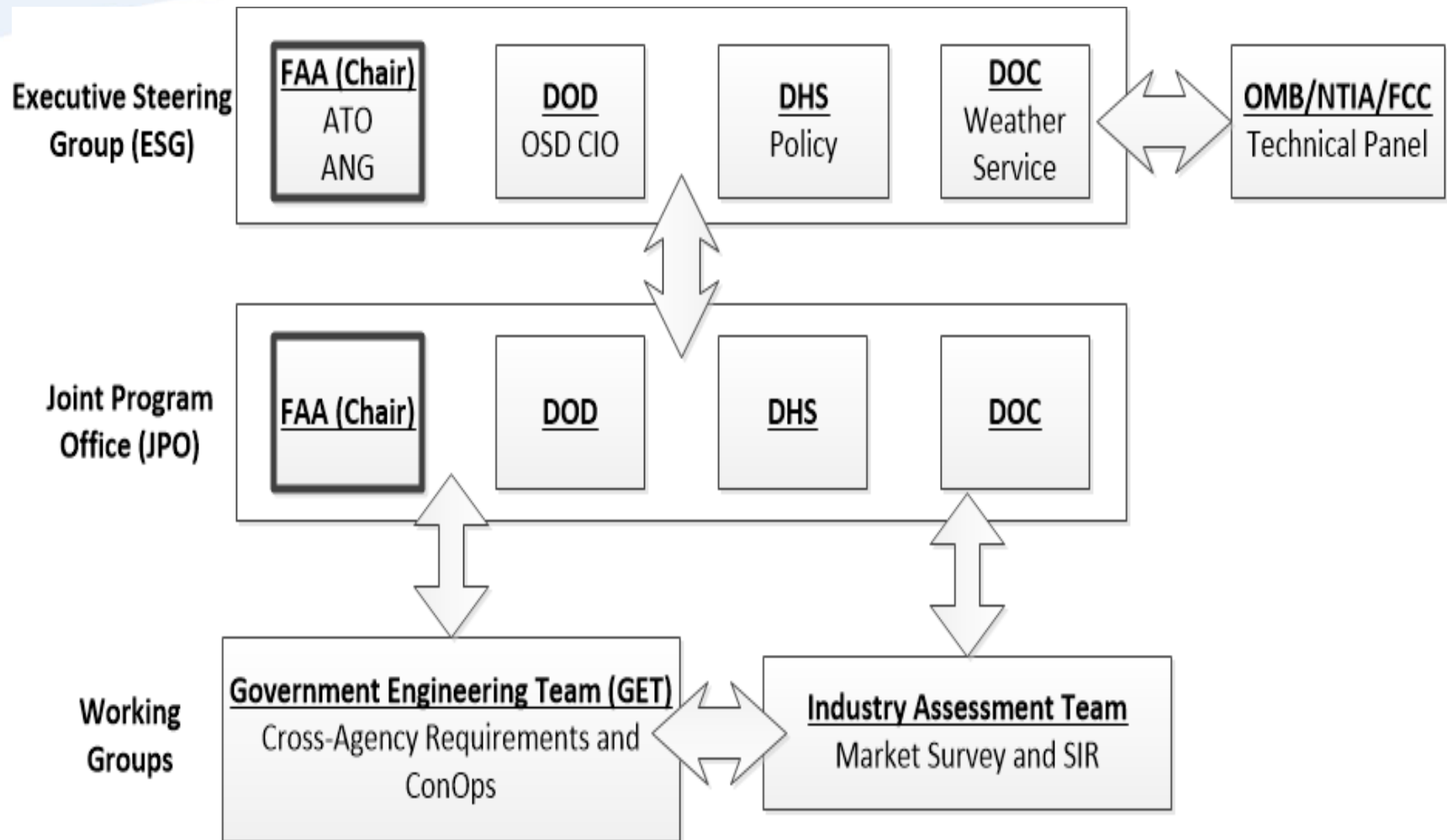
Status and Timelines



FAA

NextGEN

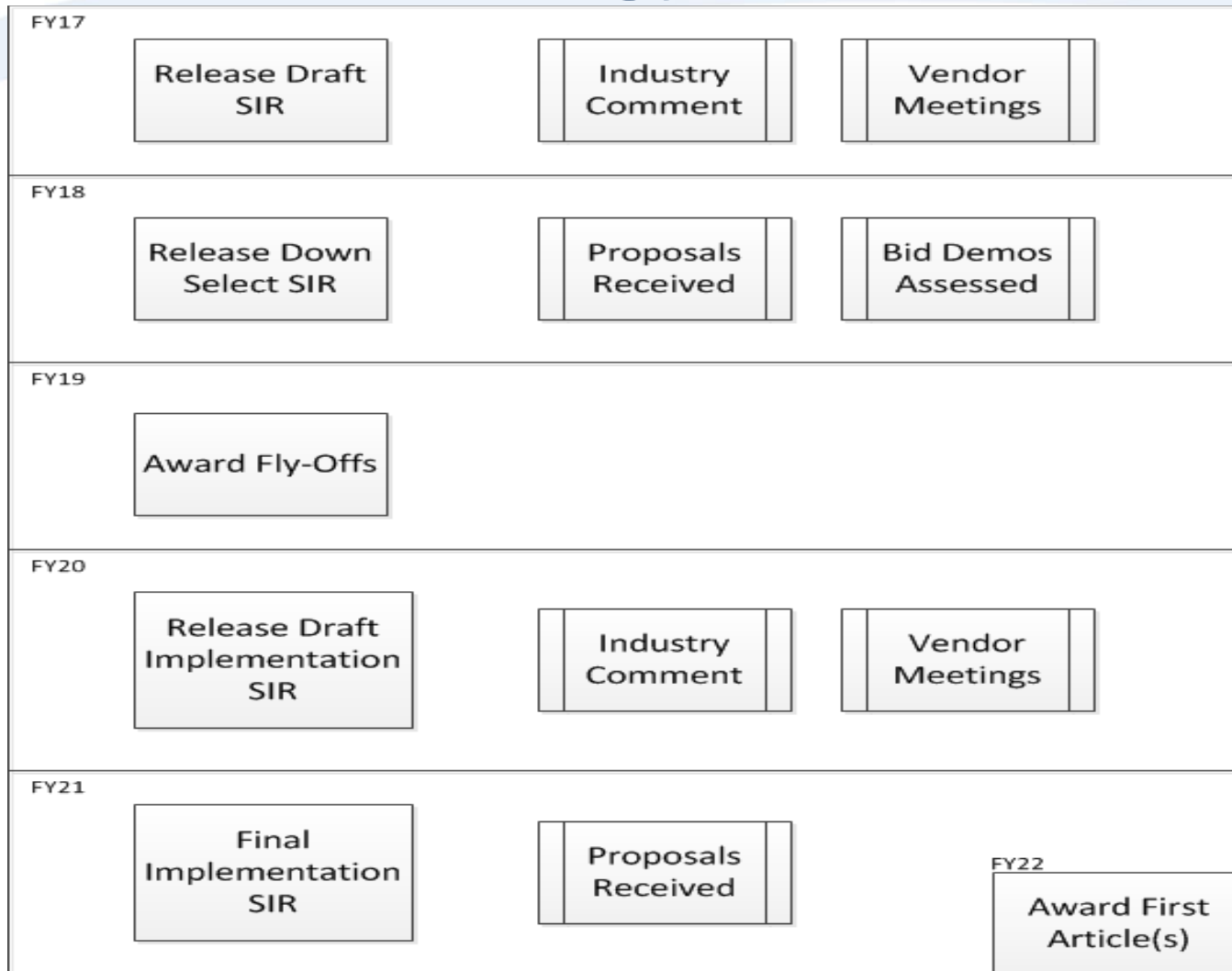
JPO Establishment



FAA

Next**GEN**

Acquisition Strategy



FAA

NextGEN

Weather Requirements

- Supports Multiple Agency missions

NOAA	FAA	DOD
Forecasts & Warnings	Windshear	Intercept Forecasts
Environment Prediction	ATC Wx	Weather Intelligence
Flooding (precipitation estimation)		
Aviation Wx		

- Largely based on Beyond NEXRAD RFR
- Defines performance for Spectral Moments and Polarimetric Variables
- Specifies scanning adaptability and faster volume updates (relative to WSR-88D)

NextGEN



FAA

Meeting Roadmap (Continued)

- Open Discussion (All)
- Wrap-Up (Dr. Sullivan)

Open Discussion

FCMSSR Action Items

AI #	Responsible Office	Text	Status	Due Date
2015-1.1	ICMSSR	ICMSSR will develop a concise framework to include a method for cost-benefit analytics which will help guide the acquisition of meteorological data and observing systems to include use of commercial and foreign sources.	Pending Closure	11/15/15
2015-1.2	ICMSSR	Evaluate the status of MPAR SENSOR and prepare options for developing a whole of government radar capability to meet terminal and long-range weather and surveillance operational requirements and research needs.	Ongoing	11/15/15
2016-1.1	OFCM	Work with Office of Management and Budget (OMB) and agency budget personnel to develop a proposal for adjusting the scope, contents, and process of the annual "Federal Plan for Meteorological Services and Supporting Research" to ensure that it becomes a functional product for interagency coordination and budget development.	Pending Closure	10/29/16

Wrap-Up

- OFCM will document any new Action Items and provide the meeting Record of Action within two weeks.
- Next FCMSSR meeting will be April 25, 2017
- **Wrap-Up (Dr. Sullivan)**