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# ***Interdepartmental Committee for Meteorological Services and Supporting Research (ICMSSR)***

*Meeting 2016-3*

September 29, 2016

# Administrative Info

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- **Meeting will be recorded**
- **Facilities**
- **Telecon / GoToMeeting**
  - Dial-in 1-888-680-9581, passcode 535430#
- **GoToMeeting:** <https://global.gotomeeting.com/join/293418653>
- **Slides posted at:** <http://www.ofcm.gov/icmssr/meetings.htm>
  - Please advise us of any sensitivities

# Opening Remarks

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## *Interdepartmental Committee for Meteorological Services and Supporting Research (ICMSSR)*

*Mr. Scott Livezey (USN)  
Chair, ICMSSR*

- **Welcome**
- **Introduction and Background**
- **Roll Call**

# Today's Agenda

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- **OPENING REMARKS** Mr. Scott Livezey (USN)
- **FEDERAL COORDINATOR'S UPDATE** Dr. William Schulz (OFCM)
- **RADIO SPECTRUM ENCROACHMENT ON GOES-R FREQUENCIES** Mr. Al Wissman (NOAA)
- **FEDERAL PLAN PROCESS REVISION** Dr. William Schulz (OFCM)
- **INTERAGENCY COORDINATION ON ENVIRONMENTAL SATELLITE ISSUES** Mr. Joe Pica (NOAA)
- **METEOROLOGICAL OBSERVING SYSTEMS INTERAGENCY FRAMEWORK** Mr. Michael Bonadonna (OFCM)
- **FCMSSR MEETING PREP** Dr. William Schulz (OFCM)
- **OPEN DISCUSSION**
- **ACTION ITEM REVIEW** Mr. Michael Bonadonna (OFCM)
- **CLOSING COMMENTS / ADJOURN**

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# **FEDERAL COORDINATOR'S UPDATE**

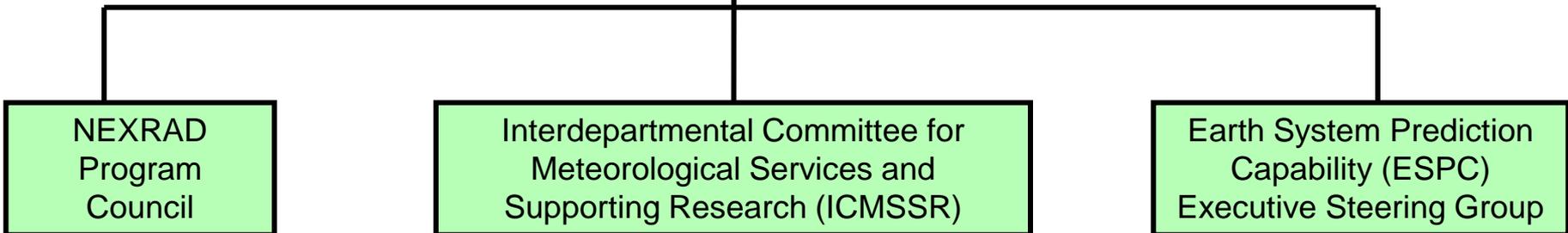
*Bill Schulz*  
*Federal Coordinator*

# Federal Weather Enterprise Infrastructure

	Current	Active
FCMSSR		
ICSSR	2	2
Councils	2	2
Committees	4	2
WGs	13	11
JAGs	6	3
TOTAL	27	22

Federal Committee for Meteorological Services and Supporting Research (FCMSSR)

Federal Coordinator for Meteorology



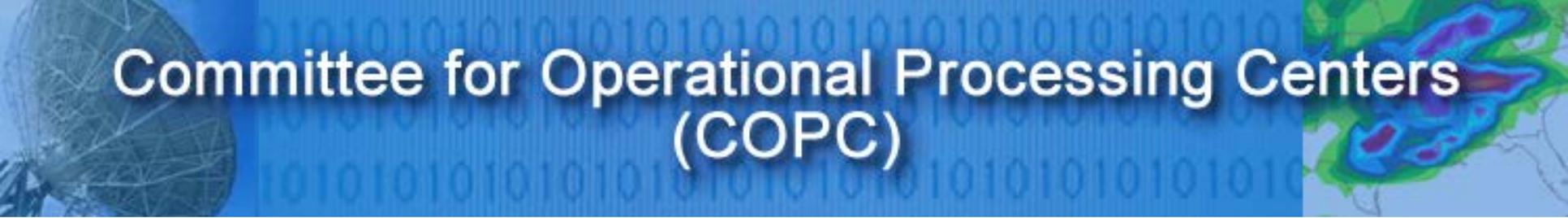
Working Groups (enduring)

Joint Action Groups (short-term)

# Federal Coordinator's Update

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- **Committee for Climate Services**
  - Requested Action: Authorize Establishment
- **Interdepartmental Weather Research Committee**
  - Requested Action: Authorize Establishment
- **NEXRAD Program Council**
  - Informational: Activities and Update
- **Committee for Operational Processing Centers**
  - Informational: Activities and Update
- **New OFCM Web Page**
  - Demonstration
  - Requested Action: Approval to post activity records



# Committee for Operational Processing Centers (COPC)

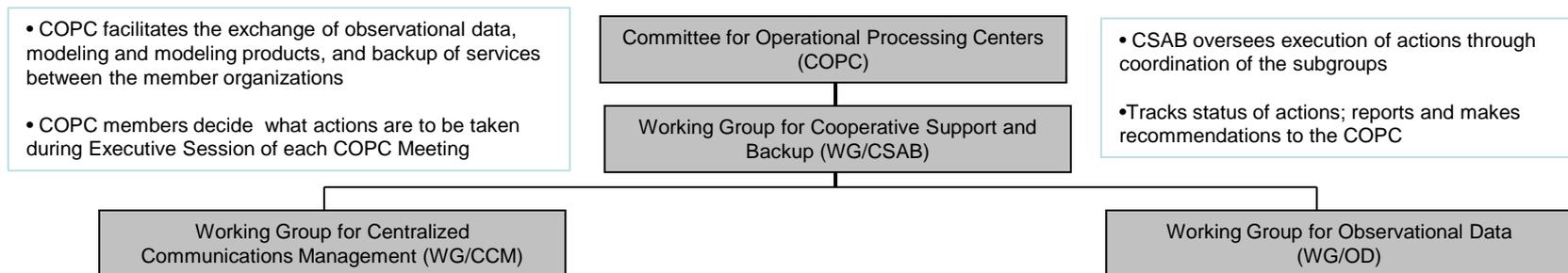
## **The Federal Coordinator's COPC Update to ICMSSR**

**(OFCM, Silver Spring, Maryland)  
September 29, 2016**

# Committee for Operational Processing Centers

COPC shall be the principal agent of the ICMSSR for coordinating the cooperative support related to data collection and processing, and the development and dissemination of meteorological, oceanographic, and satellite products within the operational processing centers (OPC) of the DOC and DOD.

- NOAA/National Weather Service's National Centers for Environmental Prediction (NCEP) headquartered at College Park, Maryland.
- NOAA/National Environmental Satellite, Data, and Information Service Office of Satellite and Product Operations (NESDIS/OSPO) at Suitland, Maryland.
- DOD/Air Force 557 Weather Wing at Offutt AFB, Nebraska.
- DOD/Navy Fleet Numerical Meteorology and Oceanography Center (FNMOC) at Monterey, California.
- DOD/Navy Naval Oceanographic Office (NAVOCEANO) at Stennis Space Center, Mississippi.



# Current topics

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- [Cooperative Support] - OPC outage mitigation strategies for critical data sources and products.
  - To increase the understanding of mission essential data exchange, single data sources, and data agency interdependencies, with the overall goal to mitigate the impacts on the OPCs when significant data outages occur.
- [Communications] - Developed and implemented an alternate NOAA/DOD OPC data exchange network path. (Used multiple times now since Apr to mitigate network outages.)
  - Finalizing a CONOPS for implementing planned and unplanned failovers.
  - Planning the use of the alternate path to meet DOD mandated security testing.
- [Observational Data (Conventional)] – Developing an interagency process to implement WMO mandated data management standards and procedures.
  - WIGOS (WMO Integrated Global Observing Systems) and OSCAR Surface (The Observing System Capability Analysis and Review)
- [Observational Data (Satellite)] – Coordinating the satellite data exchange for the OPCs.
  - Himawari 8, Jason 3, GOES-R, PDA, Meteosat 8, JPSS-1, JSH, and legacy satellite data exchange.

# MPAR/SENSR

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- Spectrum Efficient National Surveillance Radar (SENSR) is a multiagency (NOAA, FAA, DoD, DHS) program loosely following the MPAR model
- Predicated on funding radar replacement from the sale of L-band spectrum
- Opportunity to leverage Spectrum Pipeline Act (2015) which set aside Spectrum Relocation Fund money for feasibility studies prior to commitment to spectrum sale
- Status:
  - Spectrum Pipeline Plan (the ask for funds for a feasibility study) is in final drafting and coordination; to be submitted to Technical Panel in October.
    - Requests roughly \$60M for Phase 1 of feasibility study
    - Should be approved by the end of CY16
  - Preliminary requirements nearly complete; various mission CONOPS are under development
  - Draft RFI is to be released to industry in early October
  - Formal RFI will be released after Technical Panel approves the Plan
- Targeting Congressional mandate for L-band spectrum sale in 2024



Click here for the announcements from the 2016th Annual George Mason University Conference on  
Atmospheric, Terrestrial and Oceanic Modeling

Click here for the 2016 National Hurricane Operations Plan

Click here for the Tropical Cyclone Operations and Research Report (TCOR)



# OFCM's Updated Website



## Office of the Federal Coordinator for Meteorology

**Mission:** The Office of the Federal Coordinator for Meteorology Services and Supporting Research, now fully known as the Office of the Federal Coordinator for Meteorology (FCM), is an interagency office established under the auspices of the Executive Office of the President, designed to coordinate all activities of the Federal Government in the area of meteorological services. The Department of Commerce serves the Office in this a Memorandum of Understanding.

**Focus:** To ensure the effective use of Federal meteorological services in emergency and weather-related operations, coordination of weather, water, and related services among the Federal agencies.

**Activities:** These Federal departments and agencies are closely engaged in meteorological activities and activities in the services, operations, and coordination.



ICMSSR Presentation  
9/29/2016

# 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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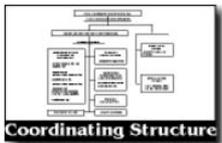


## Office of the Federal Coordinator for Meteorology

**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



# OFCM

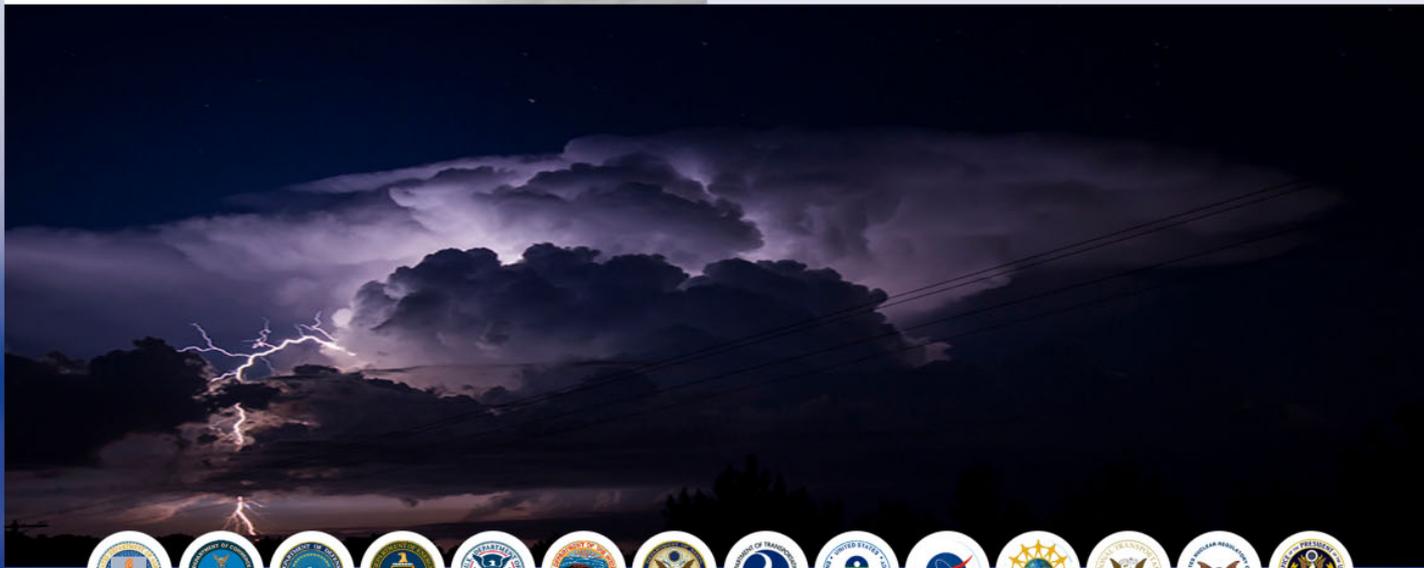
Office of the Federal Coordinator for  
Meteorological Services and Supporting Research

GROUPS

PUBLICATIONS

MEETINGS

ABOUT



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.

# 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

## 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:

- a. 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.
- b. Develop cooperative agreements for technical support and interface requirements, where appropriate.
- c. 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](mailto: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 \(JAG/CCM\)](#)

# OFCM

Office of the Federal Coordinator for Meteorology

GROUPS

PUBLICATIONS

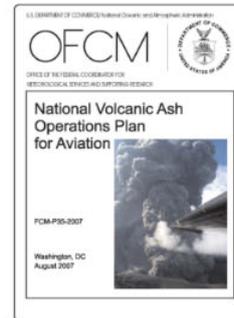
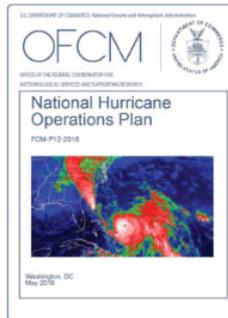
MEETINGS

ABOUT

## OFCM PUBLICATIONS

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

### MOST REQUESTED PUBLICATIONS



# 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 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	* <a href="#">American Meteorological Society Annual Meeting</a>	New Orleans, LA
February 25	<a href="#">Interdepartmental Committee for Meteorological Services and Supporting Research</a>	Silver Spring, MD
March 8-9	*Nationwide Network of Networks Meeting	Washington, DC
March 14-17	<a href="#">Tropical Cyclone Operations and Research Forum/70th Interdepartmental Hurricane Conference</a>	Miami, FL
March 22-23	*MPAR ATD CDR	Atlantic City, NJ
April 5	<a href="#">Joint Action Group for Central Communications Management</a>	Silver Spring, MD
April 6-7	<a href="#">Working Group for Cooperative Support and Backup</a>	Silver Spring, MD
April 23-30	* <a href="#">Space Weather Workshop</a>	Boulder, CO
May 4-5	<a href="#">Committee for Operational Processing Centers</a>	Monterey, CA
May 20	Climate Services Meeting	Silver Spring, MD
June 1	<a href="#">Interdepartmental Committee for Meteorological Services and Supporting Research</a>	Silver Spring, MD
June 14	<a href="#">Special Session: George Mason University Conference on Atmospheric Transport and Dispersion Modeling</a>	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	<a href="#">Committee for Operational Environmental Satellites</a>	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	* <a href="#">Friends and Partners in Aviation Weather</a>	Washington, DC
August 9	MPAR ATD Meeting	Silver Spring, MD
August 10	Joint Action Group for Meteorological Observing Framework	Silver Spring, MD
August 16	<a href="#">Joint Action Group for Central Communications Management</a>	Silver Spring, MD
August 18	<a href="#">Working Group for Cooperative Support and Backup</a>	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	<a href="#">Committee for Operational Environmental Satellites</a>	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

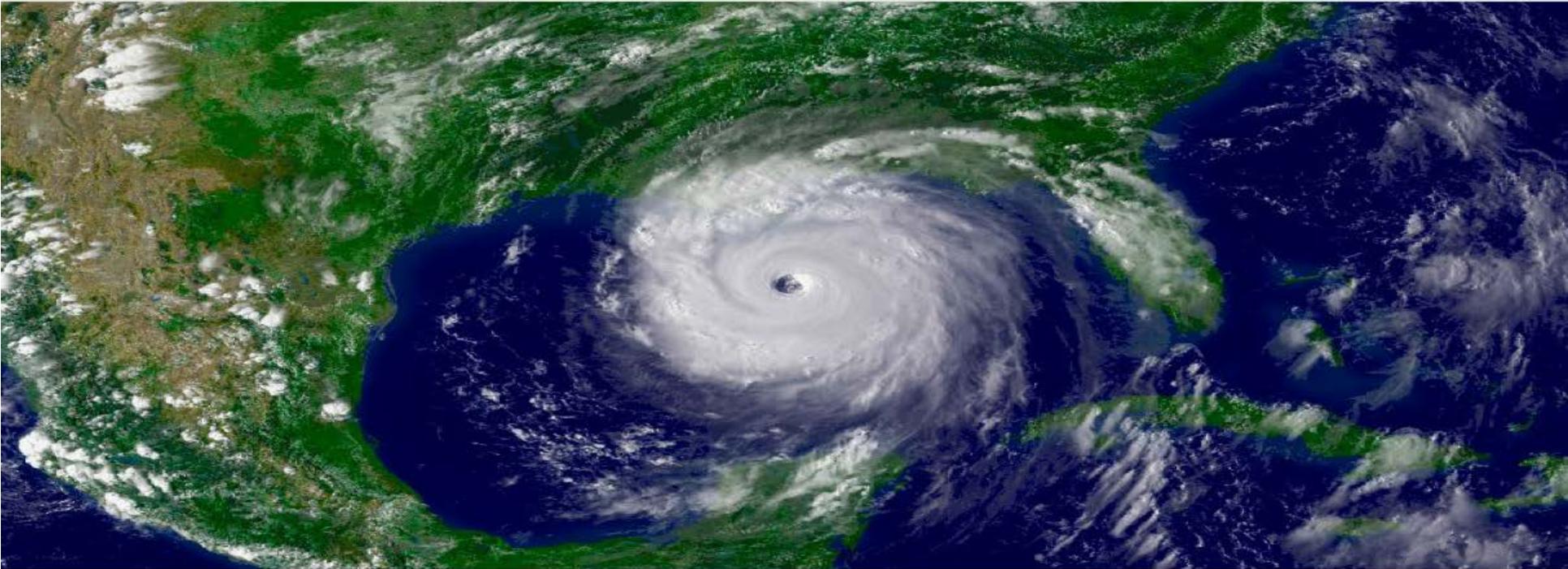
Coming to OFCM for a meeting? Click [here](#) for directions.

# Today's Agenda

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- **RADIO SPECTRUM ENCROACHMENT ON GOES-R FREQUENCIES** Mr. Al Wissman (NOAA)
- COPC UPDATE: Mr. Lamar Russel (USN)
- FEDERAL PLAN PROCESS REVISION Dr. William Schulz (OFCM)
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- OPEN DISCUSSION:
- ACTION ITEM REVIEW: Mr. Michael Bonadonna (OFCM)
- CLOSING COMMENTS / ADJOURN

# Spectrum and the U.S. Weather Enterprise



**Al Wissman**

**Spectrum Management :**

**National Oceanic and Atmospheric Administration**

September 29th, 2016

# Increase in Extreme Events

“Average” Year and Trends in the U.S.



650 Deaths  
\$15B in Losses



26,000 Severe  
Thunderstorms



6 Atlantic Basin  
Hurricanes



1,300  
Tornadoes



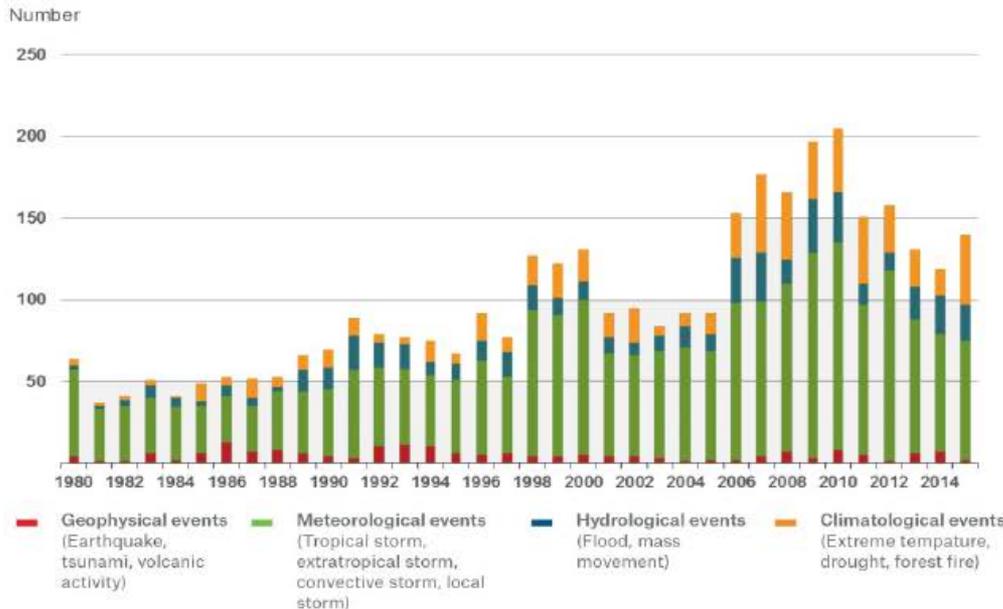
5,000 Floods

Munich Re NatCatSERVICE

## Loss events in the U.S. 1980 - 2015

Number of events\* \*Excludes last week of December 2015

Munich RE 



© 2016 Münchener Rückversicherungs-Gesellschaft, Geo Riska Research – As at January 2016

## Increasing Vulnerability

- Increasing population
  - More infrastructure at risk
  - Signs of sea level rise
- Improve forecasts of extreme events 4-8 days in advance
- Connecting forecasts to decision-makers is basis for building a Weather-Ready Nation

# Data from Satellites are Essential to *All Forecasts and Warnings*

## Hurricanes



## Flooding



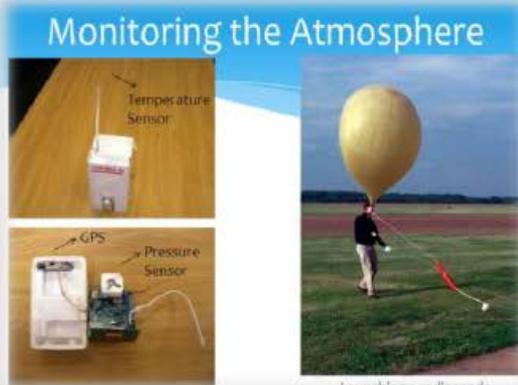
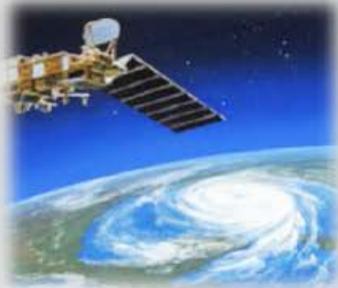
## Tornados



# Access to Spectrum is Critical to NOAA Missions



Command and Control of NOAA satellites



Launching a radiosonde



**NOAA Aircraft**

## **Radiosondes**

Data critical from remote locations for input into weather forecasts, warnings and numerical weather prediction models

## **Stream Gage**



## **Radar**



**Seismic stations**



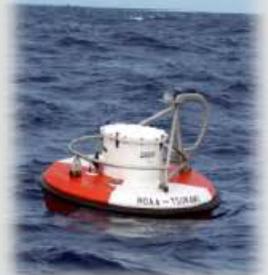
**Tracking endangered wildlife**



**EMWIN**



**Ships**



**Tsunami Buoy**



# GOES-R

## Huge Strides in Capabilities

**3X MORE CHANNELS**



Improves every product from current GOES Imager and will offer new products for severe weather forecasting, fire and smoke monitoring, volcanic ash advisories, and more.

**4X BETTER RESOLUTION**



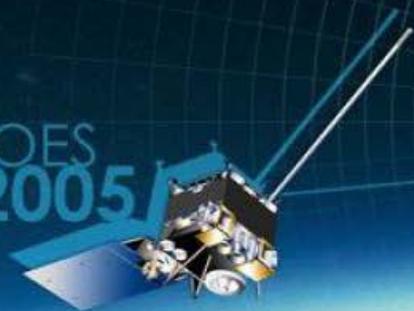
The GOES-R series of satellites will offer images with greater clarity and 4x better resolution than earlier GOES satellites.

**5X FASTER SCANS**



Faster scans every 30 seconds of severe weather events and can scan the entire full disk of the Earth 5x faster than before.

GOES  
2005



HURRICANE KATRINA | 10 YEARS LATER



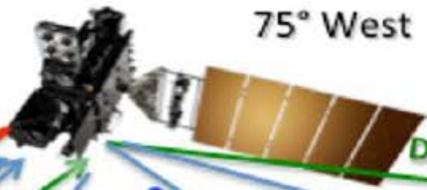
GOES-R  
2016



# GOES-R Architecture

GOES-West  
137° West

GOES-East  
75° West



Raw Instrument Data

Command & Control, Mission Data, GRB

DCPR

GRB

GRB



State, Federal & Local



HRT/EMWIN

## GRB/GVAR Direct Broadcast Users

NWS Federal      Non-Federal      Other Federal

- NOAA/NESDIS:**
- NSOF Suitland
  - Greenbelt MD

- NWS Centers:**
- Aviation Weather Kansas City MO
  - Nat'l Hurricane Miami FL
  - Space Weather Boulder CO
  - Storm Prediction Norman OK
  - Alaska Region Anchorage
  - Pacific Region Honolulu
  - Ocean Prediction College Park MD
  - Weather Prediction Puerto Rico (future)

- Airlines
- Bus. Aviation
- Marine Transport
- Railroads & Trucking
- Energy Exploration
- Power Generation
- Sat. Communication
- Media -TV Radio Internet
- Fishing
- Sports (Pro Outdoor)
- Recreational Boating
- Manufacturing
- Retail
- Public Sector
- Commercial Weather Enterprise

- DoD
- NASA
- FAA
- DOI
- USFS
- USCG
- TVA
- & many others

10,000 State, Local & Federal users

DCPR



Wallops Command & Data Acquisition Station



Fairmont Command & Data Acquisition Station



NOAA Satellite Ops Fac. Suitland

2700 Products For NWS, Private & Public Sectors



More Than 27,000 Terrestrial Sensors Hydrology, Seismic & Env. Use



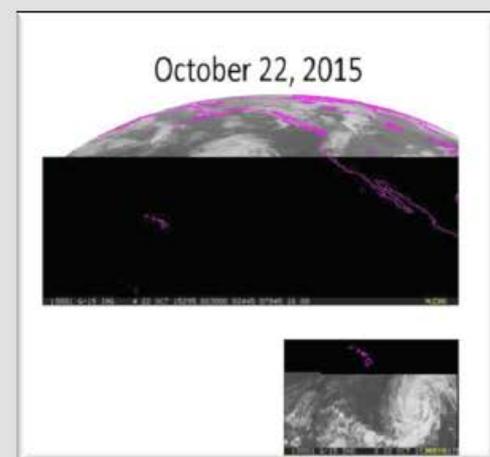
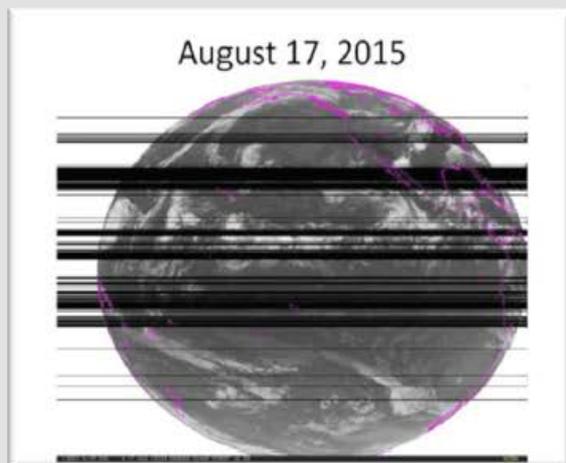
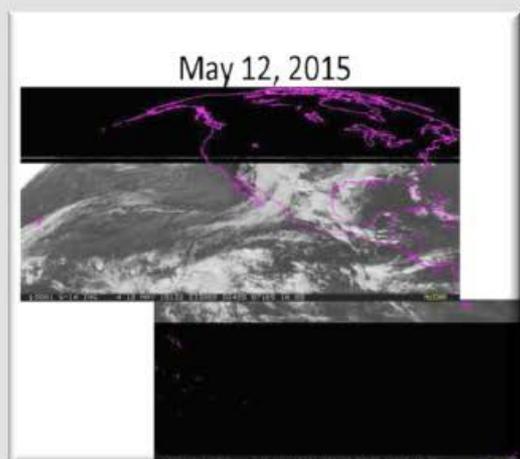
# Potential Impacts of 1675-1680 MHz Sharing

- GOES-NOP satellites deliver critical Sensor Data:
  - Sensor Data downlink contains the raw imagers and sounder data that are transmitted to NOAA data acquisition stations in the 1675-1680 MHz band
  - These data are the basis for many of the satellite products that NOAA provides to public and the weather enterprise
  - Loss of these data will result in the loss of images required to track hurricanes and monitor the rapid development of severe storms that may develop into destructive tornados
- Federal and non-federal users of Data Collection Platform rebroadcast (DCPR) outside protection zones will be subject to interference
  - Reception of hydrological data from sensors deployed nationwide required for flood prediction and warnings
  - Reception of sensor data required for wildfire management

# Current RF Interference Challenges

## GOES Satellite

### Recent Examples of Satellite Data Loss Due to Interference



Loss of any one of these images will impact the entire suite of products and users

Potential operational impacts include:

- Weather forecasting nation-wide
- Tornado warnings – flash flood warnings
- Shipping industry
- Airlines, including domestic and international routes
- Satellite dropout affects US & foreign weather and aviation services
- Tropical cyclone forecasting in the Atlantic and Pacific oceans



# Summary

- NOAA's National Weather Service relies on accurate, timely and reliable satellite observations to provide better information to save lives and property -- as it builds a Weather-Ready Nation
- NOAA satellite operations have experienced interference in the 1670-1675 MHz for the past several years
- Federal and non-federal users of Data Collection Platform outside protection zones cannot be protected and will be subject to interference
  - Potential impacts to emergency management, weather warnings, aviation, and wildfire management capability
- These data are the basis for satellite products provided by NOAA to the public and other government agencies, and further used by the weather enterprise
- Additional studies required prior to any auction of NOAA frequencies

# Today's Agenda

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- OPENING REMARKS: Mr. Scott Livezey (USN)
- FEDERAL COORDINATOR'S UPDATE Dr. William Schulz (OFCM)
- RADIO SPECTRUM ENCROACHMENT ON GOES-R FREQUENCIES : Mr. Al Wissman (NOAA)
- **FEDERAL PLAN PROCESS REVISION** Dr. William Schulz (OFCM)
- INTERAGENCY COORDINATION ON ENVIRONMENTAL SATELLITE ISSUES: Mr. Joe Pica (NOAA)
- METEOROLOGICAL OBSERVING SYSTEMS INTERAGENCY FRAMEWORK: Mr. Michael Bonadonna (OFCM)
- FCMSSR MEETING PREP Dr. William Schulz (OFCM)
- OPEN DISCUSSION:
- ACTION ITEM REVIEW: Mr. Michael Bonadonna (OFCM)
- CLOSING COMMENTS / ADJOURN

# 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 3-5 years)

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

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### 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

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*“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

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*“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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# 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

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Roadmap (for ICMSSR concurrence):

- Bring ICMSSR feedback to JAG (early October)
- *FY17 Fed Plan released as normal in October 2016*
- Brief FCMSSR on structure (October 20)
- Bring FCMSSR feedback to JAG (November)
- JAG builds goals and objectives, works toward a process description
- Update ICMSSR at December and March meetings
- Approval of plan/process at April '17 FCMSSR
- FY18 Fed Plan will be abbreviated version of current format (transition)
- FY19 Fed Plan will be new version

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# Interagency Coordination of Environmental Satellite Issues

*Interdepartmental Committee for Meteorological Services  
and Support Research (ICMSSR)*

*Meeting 2016-3*

September 29, 2016

# Interagency Coordination of Environmental Satellite Issues

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## ICMSSR Action Item 2016-2.3.

Revise the briefing on “Interagency Coordination of Environmental Satellite Issues” to address the key challenges of data coverage gaps, data dissemination, data exploitation, and coordination of independent requirements and acquisition processes. Present the revised briefing at the next ICMSSR meeting (Sep 29<sup>th</sup>) and be prepared to give the presentation at the October FCMSSR meeting (Oct 13<sup>th</sup>).

## Agenda:

- Background: Federal Agencies, EOP, and International Coordination
- Successes: Examples of major accomplishments
- Challenges: Interagency Challenges and recommended solutions
- Conclusion

# Background: Coordination among the Federal Agencies

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- **Federal Weather Enterprise Coordinating Infrastructure**
  - Spans from strategic planning and guidance to operational issues:
    - Federal Committee for Meteorological Services and Supporting Research (FCMSSR)
    - Interdepartmental Committee for Meteorological Services and Supporting Research (ICMSSR)
    - Committee for Operational Environmental Satellites (COES)
    - Committee for Operational Processing Centers (COPC)
- **Federal Plan for Meteo. Services and Supporting Research**
  - Provides an annual synoptic view of FWE plans and investment
- **Bilateral, Multilateral**
  - Numerous partnerships and cooperative relations
  - Often documented in MOAs, MOUs, and IAAs, etc.
- **Operations and mission execution**
  - NOAA, USAF, USN, NASA, USGS operate environmental satellite missions, data centers, and service providers

# Background: Coordination among the Federal Agencies – Agency Roles

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- Requirements and Acquisition
  - DoD conducts requirements assessment and analysis of alternatives
  - Under JROCM 092-14, DoD will rely on “civil and international” partners for space-based environmental data
  - NOAA has operational responsibility for the nation’s civil weather and space weather satellites
  - USGS has operational responsibility for the nation’s land imaging program.
  - NASA provides for instrument and spacecraft satellite procurement, launch, and data acquisition and conducts independent science-driven research.
  - For all other civilian agencies, NASA is responsible for considering the satisfaction of agency’s Earth observing needs using satellite assets
  - Each agency is responsible for gathering, documenting, and managing individual processes for requirements collection and validation

# Background: Coordination with the EOP (OMB, OSTP)

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- **OSTP US Group on Earth Observations (USGEO)**
  - Coordinates, plans, and assesses Federal Earth observation activities in cooperation with domestic stakeholders
  - Fosters improved Earth system data management and interoperability throughout the Federal Government
  - Engages international stakeholders by formulating the U.S. position for, and coordinating U.S. participation in, the intergovernmental GEO.
- **OSTP USGEO Satellite Needs Working Group (SNWG)**
  - The USGEO has established the SNWG to collect the domestic needs of the federal agencies for new environmental satellite observing capabilities and to present these needs to potential provider agencies (NASA, NOAA, USGS, DoD) for consideration and inclusion in their new programs.
- **Communication with OMB**
  - Accomplished through agency annual budget process
  - Single and multi-agency dialog and consultation
  - Supported by the annual Federal Plan for Meteorological Services and Supporting Research

# Background: Coordination with International Partners and Groups

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- **International Partnerships**
  - NOAA, NASA, and DOD all have important partnerships with foreign environmental satellite agencies and services.
- **Coordination Group for Meteorological Satellites (CGMS)**
  - US participants: (NOAA, NASA) should represent USG needs
  - Established in 1972 and is comprised of 16 foreign and international agencies
  - Most relevant coordination group for ICMSSR
- **Committee on Earth Observing Satellites (CEOS)**
  - US participants: (NOAA, NASA, USGS) should represent USG needs
  - Established in 1984 under the G7 Economic Summit of Industrial Nations.
- **Group on Earth Observations (GEO)**
  - Established in 2005, GEO is a voluntary partnership of 102 nations and 95 participating organizations
  - Covers all Earth observing capabilities
- **World Meteorological Organization (WMO) Space Programme**
  - Organized under the United Nations and promotes availability and utilization of satellite data and products for weather, climate, water and related applications to WMO Members.

# Successes: Space Weather

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- Interagency coordination led to broad Federal support for the DSCOVR mission
  - OSTP requested the National Space Weather Program (NSWP) Council determine impacts and provide recommendations for replacement of ACE for solar wind monitoring.
  - The interagency-approved report provided the foundation for the DSCOVR program – the first new operational orbit for NOAA since geosynchronous coverage started in the 1970s.
  - The NSWP report also provided recommendation for commercial space weather data sources and the DSCOVR follow-on program.
- The unified, coordinated approach helped inform the President's Budget requests and support the individual agency budgets for this programs

# Successes: GPS-RO

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- Strong US interagency and international cooperation led to the development and deployment of the Constellation Observing System for Meteorology, Ionosphere, and Climate (COSMIC) program.
  - Designed to provide advances in meteorology, ionospheric research, climatology, and space weather by using GPS satellites in conjunction with low Earth orbiting (LEO) satellites.
  - COSMIC is a joint U.S.-Taiwanese project with major participants including the UCAR, NSF, NRL, AFRL on the U.S. side and the National Space Organization (NSPO) on the Taiwanese side.
  - The total cost of the project is US\$100 million, 80% of which is being provided by NSPO, and the remainder by various U.S. agencies.
  - COSMIC was launched in 2006.
- The National Space Weather Program Council provided OSTP recommendations which strongly endorsed the COSMIC program and gave interagency support for the development of COSMIC-2 to meet both terrestrial and space weather observing needs.

# Successes: International Cooperation

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- Long standing cooperation between NOAA and EUMETSAT established and has maintained the Initial Joint Polar System (IJPS) and Joint Polar System (JPS)
  - Provides instruments, data exchange, and coordinated operations of Low Earth Orbit
- International cooperative agreements now include JAXA GCOM missions.
- Cooperation through the WMO Space Programme has yielded global geosynchronous environmental satellite coverage.

# Successes: Global Precipitation Mission

GPM uses inputs from an international constellation of satellites to provide improved space and time coverage of precipitation.

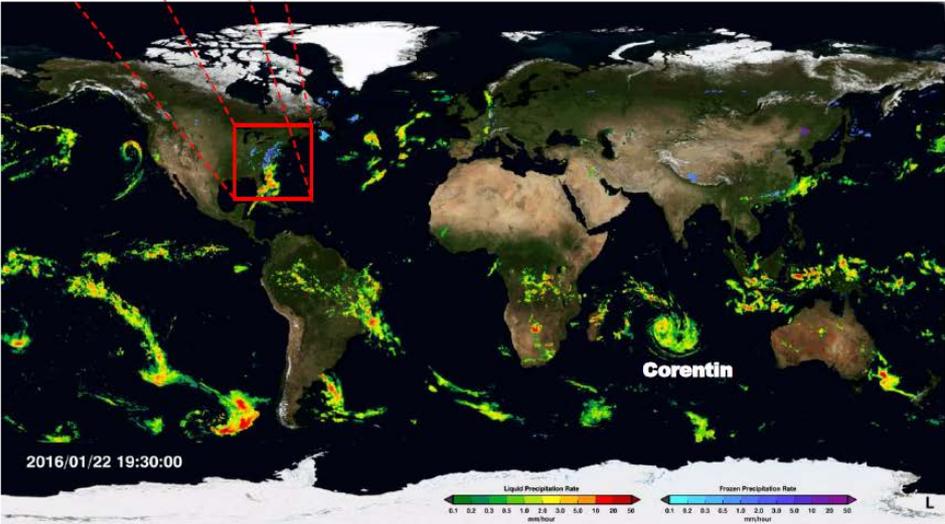
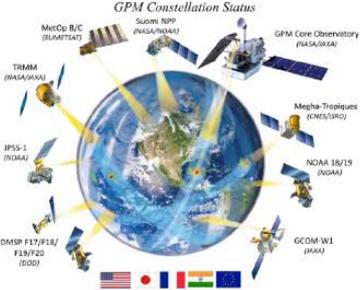
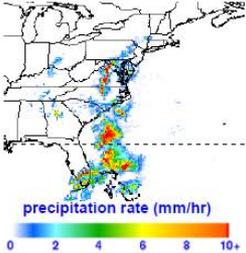


## GPM Multi-Satellite Precipitation



Integrated Multi-satellite Retrievals for GPM (IMERG)

- calibrate all satellites by Core Observatory
- merge all estimates on a  $0.1^\circ \times 0.1^\circ$  grid
- “morph” data to get half-hourly maps
- estimate precipitation phase (rain/snow)
- first estimates are posted in 5 hours, then at 15 hours and 2.5 months (research grade)
- the same map shows the Snowzilla storm and Tropical Storm Corentin



see <http://svs.gsfc.nasa.gov/cgi-bin/details.cgi?aid=4285>

# Challenges

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- What and where are the observation gaps?
  - Observing Capabilities
  - Geographic coverage
  - Orbital coverage
- How are data moved between the providers and users?
  - Satellite Data Communication and Dissemination
  - Information Assurance Security
- How are the data exploited by the users
  - Data assimilation for models
  - Science exploration and research

# Challenges: Observing Gaps

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- Joint Requirements Oversight Council Memo 092-14
  - Prioritized gaps for DoD:
    - Ocean Surface Vector Winds
    - Tropical Cyclone Intensity
    - Low Earth Orbit Energetic Charged Particle
  - Numerous other DoD requirements to be provided from “Civil and International Partners.”
- Recommendations:
  - Consult with other agencies thru COES prior to major acquisition milestones for satellite observing systems to identify possible civil and international observational solutions for DoD needs.
  - Determine whether data gaps could be met by unconventional satellite or non-space-based sources
  - Improve data assimilation and model performance to enable use of satellite data from non-optimized orbits.
  - Determine whether other agencies require data from the 0530 orbit currently provided by DMSP

# Challenges: Observing Gaps

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- **Indian Ocean Data Coverage**

- Interagency dialog necessary to prepare NOAA to represent US national needs for continued geosynchronous environmental satellite coverage of the Indian Ocean and surrounding land masses to support DoD mission and modeling needs
- Information gathered from CGMS and CEOS will help all US federal agencies prepare for future agency mission specific operational capabilities and/or shortfalls
- Near-Term solution: continue to be utilize EUMETSAT data (Metop, Meteosat 7, and 8)

- **Recommendations**

- FWE agencies should consult with each other prior to negotiating with foreign environmental satellite data providers
- Use of INSAT 3D-R if practical
- Leverage DoD-unique assets to meet IO data requirements if possible

# Challenges: Observing Gaps

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- Commercial Data Providers

- Commercial are offering services to provide Earth observing data of various types, quality, and coverage
  - Can commercial provided data supplement or replace traditional government observing systems?
  - Can Government-wide cost effective solutions be found that still provide incentive for commercial providers?
- Recommendation: Use an interagency cooperative approach to assess commercial solutions for environmental satellite data needs of all federal agencies
  - Request policy guidance and/or development regarding use of commercial data sources to meet core FWE data requirements
  - Determine which data elements must remain inherent USG capabilities.
  - Evaluation of commercial data
  - Cost-effective approaches for the U.S. Government

# Challenges: Data Communication & Dissemination

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- The “Data Tsunami” on the horizon
  - Transition from legacy environmental satellites to next generation satellites increasing the data flow one hundred-fold.
  - Increased infrastructure requirements
  - Recommendation: Quantify how much data will be required and available. Build robust infrastructure to handle data flow
  - Cooperative Support and Backup
  - COOP requires alternative data network pathways
  - Recommendation: Through the COPC, identify and validate all agency COOP requirements and determine whether cost effective interagency solutions are possible

# Challenges: Data Communication & Dissemination

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- **New Information Assurance (IA) Requirements:**
  - Mandated by USCYBERCOM
  - **Recommendation:** Identify and validate all IA requirements and construct an interagency approach to comply with these requirements.
- **Agency Responsibilities:**
  - Responsibility for dissemination of Himawari-8 data is unresolved
  - **Recommendation:** Identify data communication and dissemination shortfalls between the agencies. Negotiate and document appropriate interagency agreements. Engage budgetary authorities to fully fund solutions.

# Challenges: Data Exploitation

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- Data assimilation for models
  - A significant amount of satellite data are not used in the NWP models due to timeliness issues
  - Recommendation: Improve data retrieval infrastructure to reduce data latency
  - Differing data processing needs and architectures across the agencies impede efficiency among the Centers.
  - Recommendation: Review data processing and product uses to determine whether efficiencies can be derived from expanded product sharing

# Conclusions

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- Coordination between Federal Agencies, EOP, and International groups exists but needs improvement
  - Several avenues of communication exist and need to be used
  - Requirements, Budgetary, and acquisition processes are well established within agencies but not across agencies
  - Strong international partnerships exist and need to benefit all US agencies
- Many successes have been achieved through interagency coordination:
  - COPC network improvements, IJPS, DSCOV, COSMIC / COSMIC-2, GPM
- ...But challenges still exist:
  - Data gaps: Capabilities, Coverage, Commercial sources
  - Data communication/dissemination: Data Tsunami, COOP, IA
  - Data exploitation: Data assimilation and Product generation
- Several potential solutions were recommended for consideration
  - Agencies should prioritize and commit to specific approaches

*The FWE agencies need to work together to solve environmental satellite issues beyond the reach or scope of individual agencies.*

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# METEOROLOGICAL OBSERVING SYSTEMS INTERAGENCY FRAMEWORK

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- 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

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- [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"

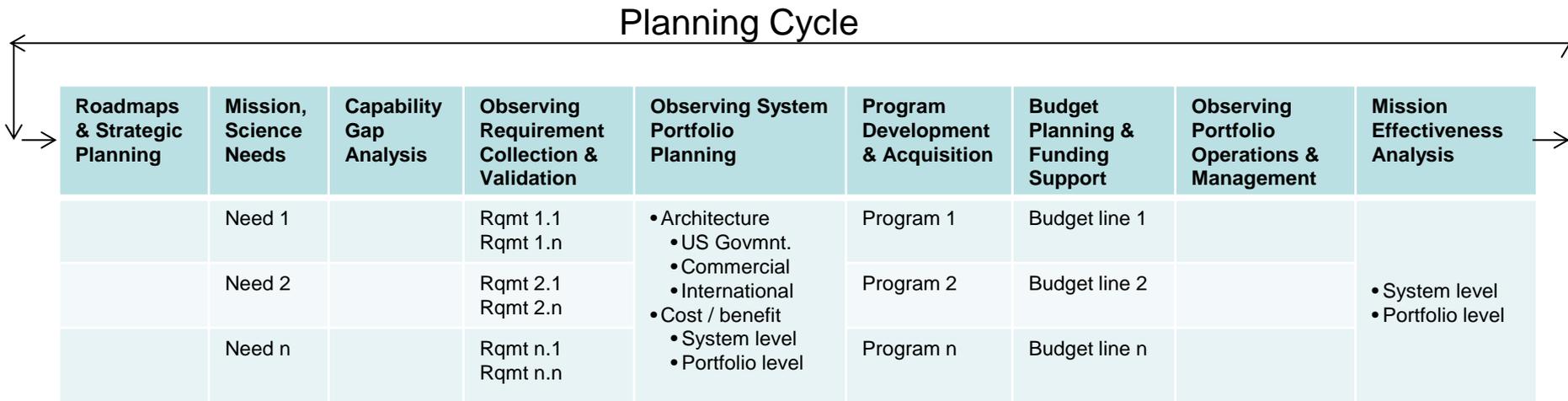
# Proposed Meteorological Observing Framework

## What's a Framework?

- Structure of organization and process
- Conceptual 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, identify potential synergies, and provide recommendations to improve effectiveness in the execution of the planning cycle across the agencies.



- Agencies will employ their internal methods and procedures for each of the process activities Shown above.
- “Observing System Portfolio Planning” should have an interagency component

# 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
	Need 1		Rqmt 1.1 Rqmt 1.n	<ul style="list-style-type: none"> <li>•Architecture</li> <li>•US Govmnt.</li> <li>•Commercial</li> <li>•International</li> <li>•Cost / benefit</li> <li>•System level</li> <li>•Portfolio level</li> </ul>	Program 1	Budget line 1		<ul style="list-style-type: none"> <li>• System level</li> <li>• Portfolio level</li> </ul>
	Need 2		Rqmt 2.1 Rqmt 2.n		Program 2	Budget line 2		
	Need n		Rqmt n.1 Rqmt n.n		Program n	Budget line n		

Cost (Requires acquisition professionals to consider purchase, maintenance, life cycle, data processing and distribution costs)		Benefits	Analysis/Action
Single Agency	Multiple agency		
Single Agency Purchase	Partner with one or more agencies	<ul style="list-style-type: none"> <li>• Number/type of priority mission requirements met</li> <li>• Number/type of priority mission requirements partially met</li> <li>• Number/type of priority mission requirements met where this ob is sole source</li> <li>• Other lower priority requirements met</li> </ul>	<ul style="list-style-type: none"> <li>• Judgment to determine if it is a reasonable cost</li> <li>• Satisfied due diligence requirements</li> <li>• Create agreements for resource sharing to enact the acquisition sharing</li> </ul>
Commercial Buy			
International agreement/Payment in Kind	International agreement/Payment in Kind		
	Combined partnership		

Internal agency benefit/analysis

Done by Interagency Coordination

# Status

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- OFCM conducted an initial Exploratory meeting
- OFCM developed, coordinated, and approved the JAG/MOF ToR
- JAG / MOF conducted a second meeting on Sep 6, 2016
- JAG / MOF developed a conceptual Framework
  - JAG / MOF brief progress at the Sep 29<sup>th</sup> ICMSSR meeting
  - JAG / MOF brief progress at the Oct 20<sup>th</sup> FCMSSR Meeting

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# FCMSSR MEETING PREP

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- FCMSSR Meeting is scheduled for Oct 20, 2016 2:00-4:00pm in HCHB, 12015/12017
  - Second FCMSSR meeting of the year (4<sup>th</sup> in the past 2 years)
  - Last Met April 19, 2016
- Proposed Agenda Items:
  - Approval of FCSSR Charter
  - Approval of New Fed Plan Process
  - Meteorological Observation Framework
  - Environmental Satellite Coordination
  - ESPC Briefing
  - Determination of next FCMSSR date

# FCMSSR Charter Status

Agency	ICMSSR Concur	FCMSSR Concur
USDA		
DOC	-----	X
NWS		-----
NESDIS		-----
OAR		-----
DOD	-----	
USAF		-----
USN		-----
DOE		
DHS	-----	X
FEMA		-----
USCG		-----
S&T		-----
DOI		X

Agency	ICMSSR Concur	FCMSSR Concur
DOS		
DOT	-----	
FAA		-----
FHWA		-----
NASA	-----	
EARTH		-----
HELIO		-----
NSF		
EPA	X	X
NSTB		
NRC		
OMB		
OSTP	X	X

X: Concurrence Received; -----: Not Required

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# **Action Item Review / Next Meeting**

**The Secretariat will document any action items taken during the meeting and schedule the next meeting in coordination with the cochairs.**

# FCMSSR Action Items

AI #	OPR	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 <b>meteorological data and observing systems</b> to include use of commercial and foreign sources.	Open	11/15/2015
2015-1.2	ICMSSR	Evaluate the status of <b>MPAR</b> 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	11/15/2015
2016-1.1	OFCM	Work with OMB and agency budget personnel to develop a proposal for adjusting the scope, contents, and process of the annual " <b>Federal Plan for Meteorological Services and Supporting Research</b> " to ensure that it becomes a functional product for interagency coordination and budget development.	Open	09/01/16
2016-1.2	OFCM	Coordinate with OSTP and revise the <b>FCMSSR charter</b> to develop mutually supporting roles and responsibilities between the CENRS and FCMSSR with particular attention to defining the concept of "supporting research" for meteorological service agencies.	Open	10/01/16

# ICMSSR Action Item Review

AI #	Responsible Office	Text	Status	Due Date
2015-1.6	OFCM	Update the Terms of Reference documents for all Committees, Working Groups and Joint Acton Groups subordinate to the ICMSSR to include formalized engagement with OSTP.	Open	04/01/17
2016-1.7	OFCM	Revise the FCMSSR Charter as discussed during ICMSSR mtg 2016-1 and send it to the ICMSSR members for final concurrence before sending to the FCMSSR	Open	10/29/16
2015-2.1b	OFCM	OFCM will collect and compile their input for a presentation on OGC at the next ICMSSR meeting. 6/1: Documented in Mtg ROA as an ongoing ICMSSR function	Closed	05/01/16
2016-2.1	OFCM, ICMSSR Members	Organize and conduct a meeting with OMB and interested ICMSSR members to set objectives for a new version on the annual Federal Plan for Meteorological Services and Supporting Research and establish a new process for producing the document.	Closed	06/30/16
2016-2.2	OFCM, NWS, FAA, DHS	Continue interagency engagement on MPAR and the related radio-frequency spectrum auction. Regularly present updates to the ICMSSR and FCMSSR. (replaces AI 2015-1.2)	Open	09/29/16
2016-2.3	COES, COPC	Revise the briefing on “Interagency Coordination of Environmental Satellite Issues” to address the key challenges of data coverage gaps, data dissemination, data exploitation, and coordination of independent requirements and acquisition processes. Present the revised briefing at the next ICMSSR meeting and be prepared to give the presentation at the October FCMSSR meeting.	Closed	09/29/16

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# Wrap Up

