
Interagency Coordination of Environmental Satellite Issues

*Committee for Operational Environmental Satellites (COES)
Meeting 2016-2*

June 29, 2016

Interagency Coordination of Environmental Satellite Issues

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 29th) and be prepared to give the presentation at the October FCMSSR meeting (Oct 13th).

Agenda:

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

- **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
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Background: Coordination among the Federal Agencies – Agency Roles

- 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, but relies on NASA for satellite procurement
 - 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
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Background: Coordination with the EOP (OMB, 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.
 - **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
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Background: Coordination with International Partners and Groups

- **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.
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Successes: COPC

- OFCM's Committee for Operational Processing Centers (COPC) facilitating operational-level coordination
 - Established policies and management structure for environmental data acquisition, processing and exchange
 - Routine collaborative efforts between NOAA, USAF, and USN operational centers optimized shared access to observations (satellite and in situ), model outputs, and resultant products to meet agency missions
 - Established a second connection between the DOD and NOAA operational processing centers. (Boulder's David Skaggs Research Center and Buckley AFB to the DOD OPCs.)
 - Short term goal is to increase reliability, redundancy, and capability of this very important agency data exchange.
 - Long term goal is to exchange data through the DISA mandated NIPRNet Federated Gateway [NFG] /Mission Partner Gateway [MPG].
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Successes: Space Weather

- Interagency coordination led to broad Federal support for the DSCOVR and COSMIC-2 missions
 - OSTP requested the National Space Weather Program Council determine impacts and provide recommendations for replacement of ACE for L1 solar wind monitoring and loss of NPOESS Low-earth Orbit space weather sensors
 - Resulting interagency-approved reports
 - Provided the foundation for the DSCOVR program – the first new operational orbit for NOAA since geosynchronous coverage started in the 1970s.
 - Provided federal consensus on the interagency – international partnership for the COSMIC-2 program between NOAA, AF and Taiwan
 - The unified, coordinated approach helped inform the President's Budget requests and support the individual agency budgets for these programs
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Successes: GAO Recognizes the Value of Coordination

- GAO-16-252R “Defense Weather Satellites: Analysis of Alternatives Is Useful for Certain Capabilities, but Ineffective Coordination Limited Assessment of Two Critical Capabilities” March 10, 2016.
- Provided recommendations for improving interagency coordination of environmental satellite issues

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Objective 2: Collaboration with NOAA on International Partner Capabilities *(continued)*

- One potential vehicle for formalizing coordination and collaboration between DOD and NOAA is the recently re-established Committee for Operational Environmental Satellites, led by NOAA’s Office of the Federal Coordinator for Meteorology.
 - The committee is intended to help achieve interagency coordination in the planning for and use of operational environmental satellites. DOD representatives have participated in quarterly meetings, according to officials.
 - While the committee does not necessarily focus on international partner issues, one proposed objective of the committee is to establish a dialogue with other groups, including international organizations. Further, DOD officials have stated that the committee is one way DOD can connect with NOAA’s international affairs officials.

Challenges

- 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
 - How are the data exploited by the users
 - Data assimilation for models
 - Product generation
 - Visualize information for rapid decisions?
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Challenges: Observing Gaps

- Joint Requirements Oversight Council Memo 092-14
“Review of Space Based Environmental Monitoring Analysis of Alternatives Final Report Results”
 - 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:
 - DoD should provide as much insight as possible into their pursuit of prioritized observational gaps to allow possible external agency input at critical junctures of the DoD acquisition process.
 - Improved interagency dialog is necessary to identify and prepare for possible civil and international observational solutions to DoD needs.
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Challenges: Observing Gaps

- **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
 - **Recommendations**
 - Near-Term solution will continue to be utilization of EUMETSAT data (Metop, Meteosat 7, and 8)
 - Long-Term solutions will require high-level DoD policy solutions including reliance on NOAA foreign relationships, DoD-unique assets
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Challenges: Observing Gaps

- Polar Orbiter coverage of the early morning (0530) orbit
 - Pending USAF decision on DMSP F20
 - What to do after DMSP coverage ends
 - Recommendations
 - Improve satellite data and unconventional data sources
 - Improve data assimilation and model performance to enable use of satellite data from non-optimized orbits.
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Challenges: Observing Gaps

- 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: Interagency dialog would prove useful in assessing commercial solutions for environmental satellite data needs of all federal agencies
 - Evaluation of commercial data
 - U.S. open data policy and international data sharing obligations
 - Cost-effective approaches for the U.S. Government
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Challenges: Data Communication and Dissemination

- The “Data Tsunami” on the horizon
 - Transition from legacy environmental satellites to next generation satellites increasing the data flow tenfold
 - Increased infrastructure requirements
 - Recommendation: Extensive and detailed long-range planning and investment
 - Cooperative Support and Backup
 - COOP requires alternative data network pathways
 - Recommendation: Identify and validate all agency COOP requirements and determine whether cost effective interagency solutions are possible
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Challenges: Data Communication and Dissemination

- New Information Assurance (IA) Requirements:
 - Mandated by USCYBERCOM
 - Recommendation: Identify and validate all IA requirements and determine whether cost effective interagency solutions are possible
 - Agency Responsibilities:
 - Responsibility for S-NPP and JPSS data flow to the Navy centers is in dispute and unresolved
 - 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.
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Challenges: Data Exploitation

- Data assimilation for models
 - A significant amount of satellite data are not used in the NWP models due to timeliness and quality issues
 - Recommendation: Continue to work to improve data retrieval infrastructure to improve data latency
 - Differing data processing needs and architectures across the agencies impede efficiency among the Centers.
 - Recommendation: Improve participation in and support to the JCSDA. Mission should be model agnostic.
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Challenges: Data Exploitation

- **Product Generation**
 - It is important to recognize and prepare for how satellite data is used for product generation aside from NWP models.
 - A wide range of requirements are met through exploitation of satellite data.
 - Cal/Val and quality control issues are key to successfully exploit these data
 - **Recommendation: Continue to support funding for application and product generation**
 - **Visualize information for rapid decisions**
 - Various types of satellite imagery are used for a wide variety of human and automated applications.
 - It is important to recognize and prepare for how satellite data is used for product generation aside from NWP models
 - **Recommendation: Continue to support technical training for personnel tasked with visualize satellite data exploitation.**
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Conclusions

- **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
 - Stronger connections to OSTP are being explored
 - Strong international partnerships exist and need to be used to benefit all US agencies
 - CGMS is a key group for international coordination and dialog
 - **Many successes have been achieved through interagency coordination:**
 - COPC and COPC network improvements
 - Space Weather missions including DSCOVR and COSMIC-2
 - GAO recognition of the value of interagency coordination
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Conclusions

- Many challenges still exist:
 - Data gaps: Capabilities, Geographic and orbital coverage, Commercial sources
 - Data communication/dissemination: Data Tsunami, COOP, IA, Agency responsibilities
 - Data exploitation: Data assimilation, Product generation, Visualizations for decision making
 - 15 potential solutions were recommended for interagency consideration
 - Conclusions
 - The FWE agencies need to work together to solve environmental satellite issues beyond the reach or scope of individual agencies.
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BACK-UP

Background: COES

- The Committee for Operational Environmental Satellites (COES) shall advance the goals of the ICMSSR to achieve interagency coordination in the planning for environmental satellite systems supporting operational services.
 - Re-activated in 2013 as a means to improve interagency coordination after the termination of the NPOESS tri-agency agreement
 - Provides an interagency forum and structure for discussion and examination of multi-agency environmental satellite issues and developments affecting the Federal Weather Enterprise (FWE).
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COES Objectives

- Ensure interagency review and coordination of approved requirements for operational environmental satellite programs.
 - Promote an open dialog concerning environmental satellite systems development, satellite data systems architecture, continuity plans, data exploitation readiness plans.
 - Consider potential use of research satellite capabilities to augment operational systems in meeting user needs, and plans to transition research data into operational products and new applications.
 - Facilitate working-level relationships between Federal members and other stakeholders to effectively resolve interagency issues with regard to the availability of environmental satellite data and products from future systems.
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COES Objectives

- Establish dialog with other standing groups currently engaged in various aspects of environmental satellite and data readiness and exploitation, including: U.S. Global Earth Observing (USGEO) program, Committee for Earth Observing Satellites (CEOS), Coordinating Group for Meteorological Satellites (CGMS), Geostationary Operational Environmental Satellite (GOES) User conference, and other relevant user groups.
 - Coordinate with the Committee for Operational Processing Centers (COPC) on issues of mutual interest, i.e. data availability and data assimilation, and share information.
 - Address other matters as directed by the PC/NOPC (*now ICMSSR*).
 - Provide regular updates to the PC/NOPC (*now ICMSSR*) and other elements of the Federal Coordination Infrastructure as necessary.
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Coordination among the Federal Agencies (cont)

- DoD has established the Principal DoD Space Advisor (PDSA) Staff.
 - Supports planning, program assessment, architecture development, and related activities to integrate DoD, civil, commercial, and Intelligence Community (IC) space capabilities.
 - Serves as the SecDef Space Council and is the principal advisor to both the SecAF in her role as the PDSA, on space issues including policy and strategy formulation, international engagement, industrial base support, and commercial partnerships.
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Interagency Coordination of Environmental Satellite Issues

ICMSSR Action Item 2016-1.5.

Schedule a presentation at the next ICMSSR meeting on interagency coordination and cooperation on environmental satellite issues. Following the ICMSSR briefing, determine whether the topic should be brief to FCMSSR.

Responsible Office: OFCM

Due Date: March 31, 2016.

Status: Consulted with USGEO. Developing a presentation for the June 1, 2016 ICMSSR meeting

Coordination with International Partners and Groups

- Coordination Group for Meteorological Satellites (CGMS)
 - US participants: (NOAA, NASA)
 - The objective of the CGMS is the global coordination of the operational meteorological satellite systems, including protection of in orbit assets, contingency planning, improvement of quality of data, support to users, facilitation of shared data access and development of the use of satellite products in key application areas.
 - The coordination is pursued from an end-to-end perspective, through development of multi-lateral coordination and cooperation across all meteorological satellite operators in close coordination with the user community (WMO, IOC-UNESCO and other users).
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Coordination with International Partners and Groups

- Committee on Earth Observing Satellites (CEOS)
 - US participants: (NOAA, NASA)
 - Established in 1984 and set up under the aegis of the G7 Economic Summit of Industrial Nations to:
 - Optimize the benefits of space-based Earth observation through cooperation of CEOS Agencies in mission planning and in the development of compatible data products, formats, services, applications and policies
 - Aid both CEOS Agencies and the international user community by, among other things, serving as the focal point for international coordination of space-based Earth observation activities, including the Group on Earth Observations and entities related to global change
 - Exchange policy and technical information to encourage complementarity and compatibility among space-based Earth observation systems currently in service or development, and the data received from them, as well as address issues of common interest across the spectrum of Earth observation satellite missions
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