



Third Workshop on the Use of GIS/OGC Standards in Meteorology

15-17 November 2010

Met Office, Exeter, UK

Sample of GIS/OGC Activities at NOAA

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National Oceanic and Atmospheric Administration

National Weather Service

Office of Science and Technology, Systems Engineering Center



Topics



Samples of GIS/OGC Activities at NOAA

NextGen - General and MDL

IOOS

Environmental Satellite Data/Services

NWS GIS/Geospatial Project

NPP/GOES-R/JPSS

Overarching Support

NOAA organizational support for data management and data standards



NextGen - OGC



NextGen 4-D Weather Data Cube – General

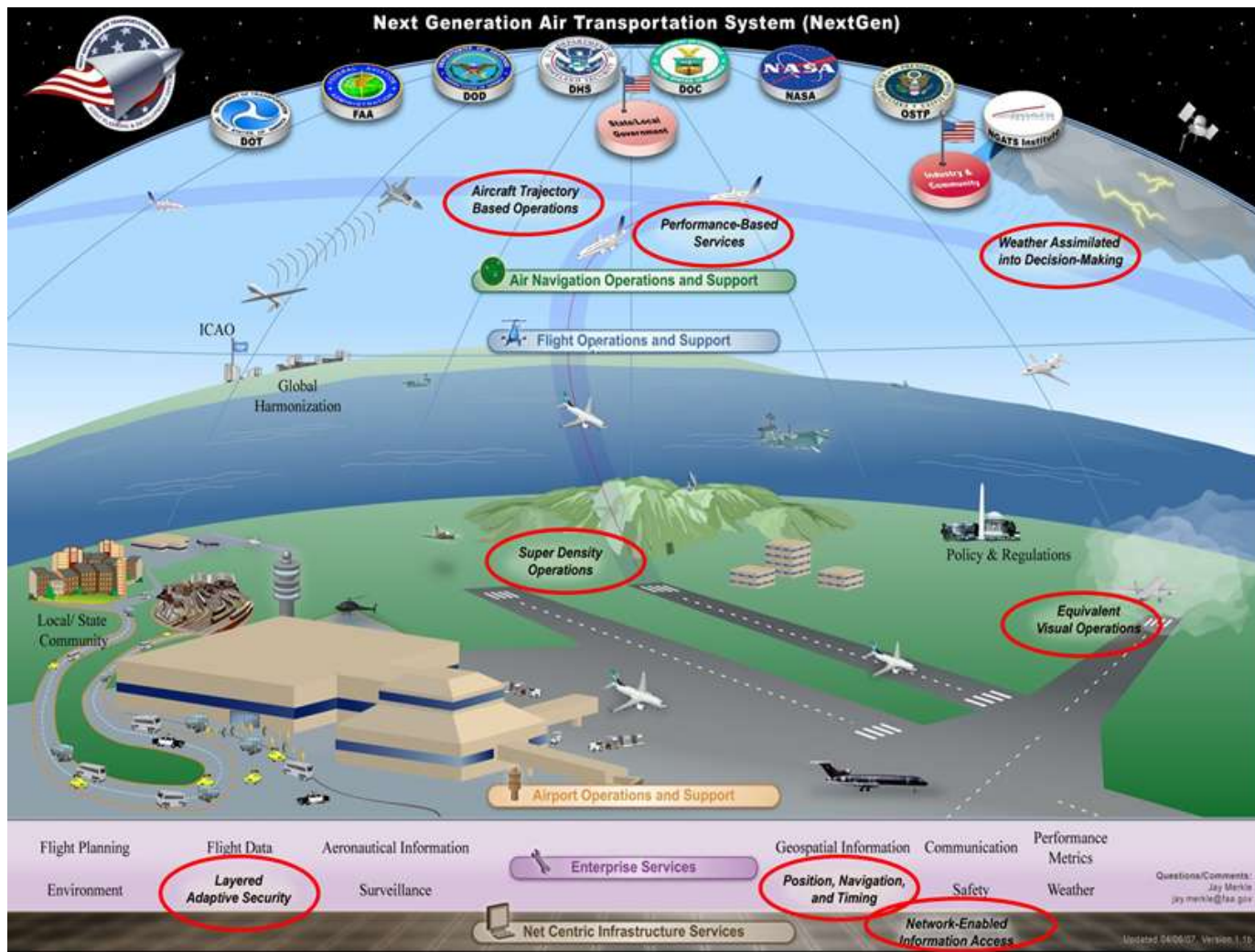
It is anticipated that the Next Generation Air Transportation System (NextGen) 4-Dimensional (4-D) Weather Data Cube will be a net-enabled virtual repository of weather information, utilizing OGC standards, such as WCS, WFS, WMS, and OGC-compatible standards such as AIXM/WXXM.

It is expected the cube will improve **access** to weather information and improve the integration of weather information into decision support systems, for NOAA and NextGen, and toward a global-interoperable Air Transport System (ATS).

It is anticipated that the cube will help provide a “common weather picture” for users (consistent and reliable weather information) and an improved approach to the storage of observation and forecast data.

Cube development has been a “System of Systems” approach, facilitating adoption of unifying standards across NOAA.

NextGen





NextGen – OGC (*continued*)



OGC Standard	Version	Example Usage
WCS	1.1.2	Gridded Coverages (e.g., NDFD)
WFS	2.0	Point Observation Features (e.g., MDCRS)
WMS	1.3	Images
GML	3.2.1	Features expression (e.g., within WFS)
SensorML	1.0	Sensor Metadata

Successful NextGen “capability evaluation” held in September 2010, demonstrated:

- distributed registry search and remote data discovery
- interagency information exchange (exchange of model, radar, sensor, etc.)
- system-of-systems “virtual repository” cube concept; visualization

NOAA/NextGen exploring OWS sponsorship.

NOAA Link for further “NextGen weather” information:

<http://www.weather.gov/nextgen/index.shtml>



NextGen – OGC *(continued)*



NWS Meteorological Development Laboratory's Participation in NextGen 2010 Capability Evaluation

- * Focus on secure connections among agencies
- * Registry/Repository (reg/rep)
 - Provided data discovery
 - ebXML
- * Web Coverage Service (WCS)
 - Provided gridded meteorological datasets
 - Official NWS gridded forecasts (e.g., wind speed, convective hazard)
 - Gridded forecast guidance from Localized Aviation MOS Program (LAMP, e.g., ceiling height, visibility, thunderstorm probability)
 - netCDF underlying data format



NextGen – OGC *(continued)*



NWS/MDL: Planned NextGen Work for 2011

- * Offer reg/rep and WCS on open internet as well as secure inter-agency connection
- * Enhance WCS
 - Support character-string encoded weather elements (weather and hazards)
 - Support GRIB2 as underlying encoding
 - Include all MDL gridded guidance
- * Contribute to ESRL Web Feature Service
 - Guidance Terminal Aerodrome Forecasts (TAF)
 - Probabilistic TAFs



Integrated Ocean Observing System (IOOS)



IOOS – OGC

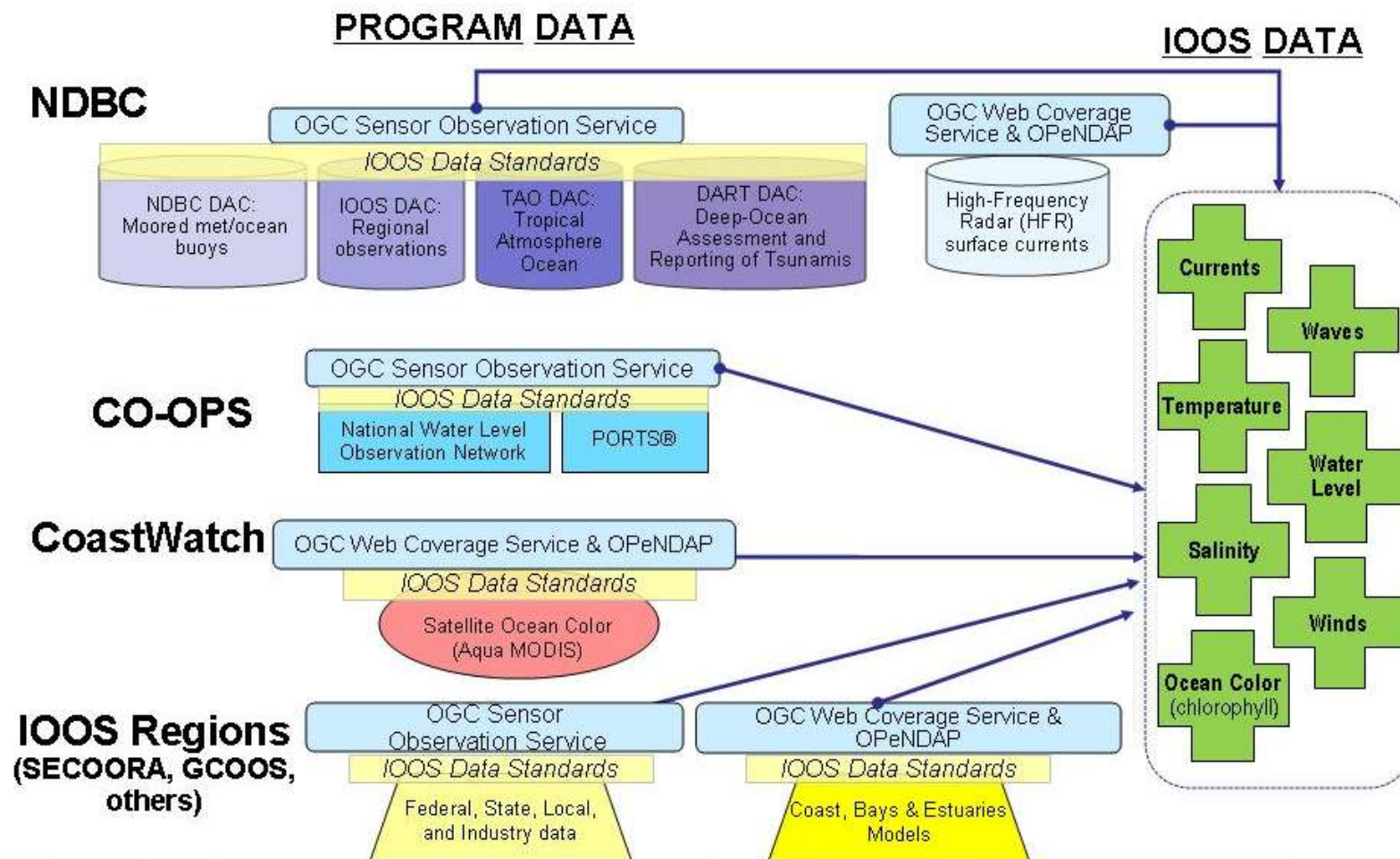


The Integrated Ocean Observing System (IOOS®) is a federal, regional, and private-sector partnership working to enhance our ability to collect, deliver, and use ocean information. IOOS delivers the data and information needed to increase understanding of our oceans and coasts, so decision makers can take action to improve safety, enhance the economy, and protect the environment.

For more information on IOOS: <http://www.ioos.gov/>



IOOS - Integration of Data Variables for DIF Project (Completed FY2010)





IOOS – OGC Standards



OGC Standard	Version	Application/Product/Service	
WCS (provided by THREDDS)	1.0.0	Regular Grids (radar, satellite, model outputs)	
SOS*	1.0.0	In-situ features (buoys, piers, floats, ships, ...)	
WMS	1.1.1	Images	
SensorML	1.0.1	Sensor Metadata (with SOS)	
CS/W		Catalog Service	
GML	3.2	IOOS GML profile v0.6.1	
SWE Common Data Model**	2.0	XML encoding for SOS	

* For more information on IOOS SOS: <http://sdf.ndbc.noaa.gov/sos/>

** Implementation scheduled for Q2 FY11



NOAA Environmental Satellite Data/Services



NOAA Environmental Satellite Data/Services



Access to near-real-time environmental satellite information (including NPP, GOES-R, JPSS, and more) will be provided through the NOAA National Environment Satellite, Data, and Information Service (NESDIS) “Product Distribution and Access” System. This system is scheduled to be developed and tested in the 2011-2015 time frame, and it is expected to provide web services, such as:

- WMS and WCS (for data access and transfer)
- Catalog Services Specification (searching and retrieving data, services and information)



NWS GIS/Geospatial Project



NWS GIS/Geospatial Project



Products that NWS is Hosting Through WMS (Version 1.x)

- Watches/Warnings/Advisories
- Level 3 Radar* Products from RIDGE
- River gage (observations and forecasts from AHPS)
- Flood Outlook Product
- NCEP Convective and Fire Weather Outlook Products
- NDFD
- Hurricane point forecasts, track cone, psurge, probabilistic wind
wind swaths

The gridded products are also in WCS (Version 1.x)

** Radars include WSR-88D, TDWR, ARSR-4 and ARSR-11.*



NWS GIS/Geospatial Project

Current Server Activities

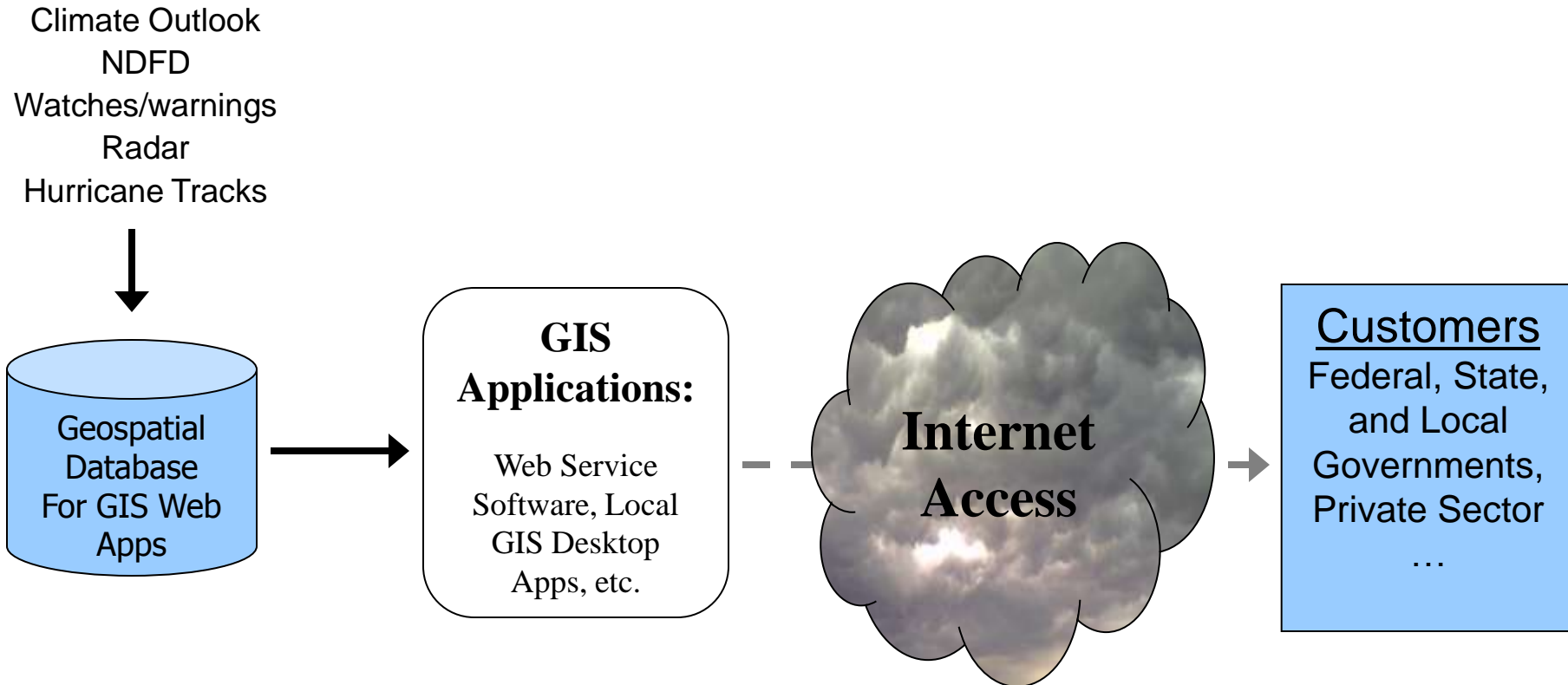


- Service is on single machine single point of failure considered "pseudo operational"
- Radar/warnings
WMS: http://gis.srh.noaa.gov/ArcGIS/services/Radar_warnings/mapserver/WMServer
WFS: http://gis.srh.noaa.gov/ArcGIS/services/Radar_warnings/mapserver/WFSServer
- Atlantic/Caribbean Hurricane
WMS: <http://gis.srh.noaa.gov/ArcGIS/services/atStormViewer/mapserver/WMServer>
WFS: <http://gis.srh.noaa.gov/ArcGIS/services/atStormViewer/mapserver/WFSServer>
- Eastern Pacific Hurricane
WMS: <http://gis.srh.noaa.gov/ArcGIS/services/epstormViewer/mapserver/WMServer>
WFS: <http://gis.srh.noaa.gov/ArcGIS/services/epStormViewer/mapserver/WFSServer>
- Flood Outlook Product (FOP)
WMS: <http://gis.srh.noaa.gov/ArcGIS/services/FOP/mapserver/WMServer>
WFS: <http://gis.srh.noaa.gov/ArcGIS/services/FOP/mapserver/WFSServer>



NWS GIS/Geospatial Project

Current Data Flow



Notes

1. Data provided in OGC-compliant formats: WFS, WCS, WMS, KML.
2. Customers supported by GIS mailing list and an ad-hoc GIS team.



NOAA GIS Committee



Organizational Oversight and Support for Data Management – *Including Standards*



NOAA GIS Committee



NOAA GIS Committee

"The purpose of the NOAA GIS Committee is to lead the effort to evaluate the need for, feasibility of, and design options for developing a NOAA-wide GIS architecture."

NOAA GIS Committee Charter

"This NOAA-wide GIS framework should address both technical issues such as hardware, software, information technology architectures, data standards, metadata development, and methods of data exploration and delivery in addition to issues related to improving the training of and collaboration among NOAA's GIS user community."
- *Excerpt from NOAA GIS Committee Charter*

Coordinated NOAA participation in Federal Geographic Data Committee and Geospatial Line of Business

http://www.cio.noaa.gov/IT_Groups/noaa_cio_GIS_Committee.html



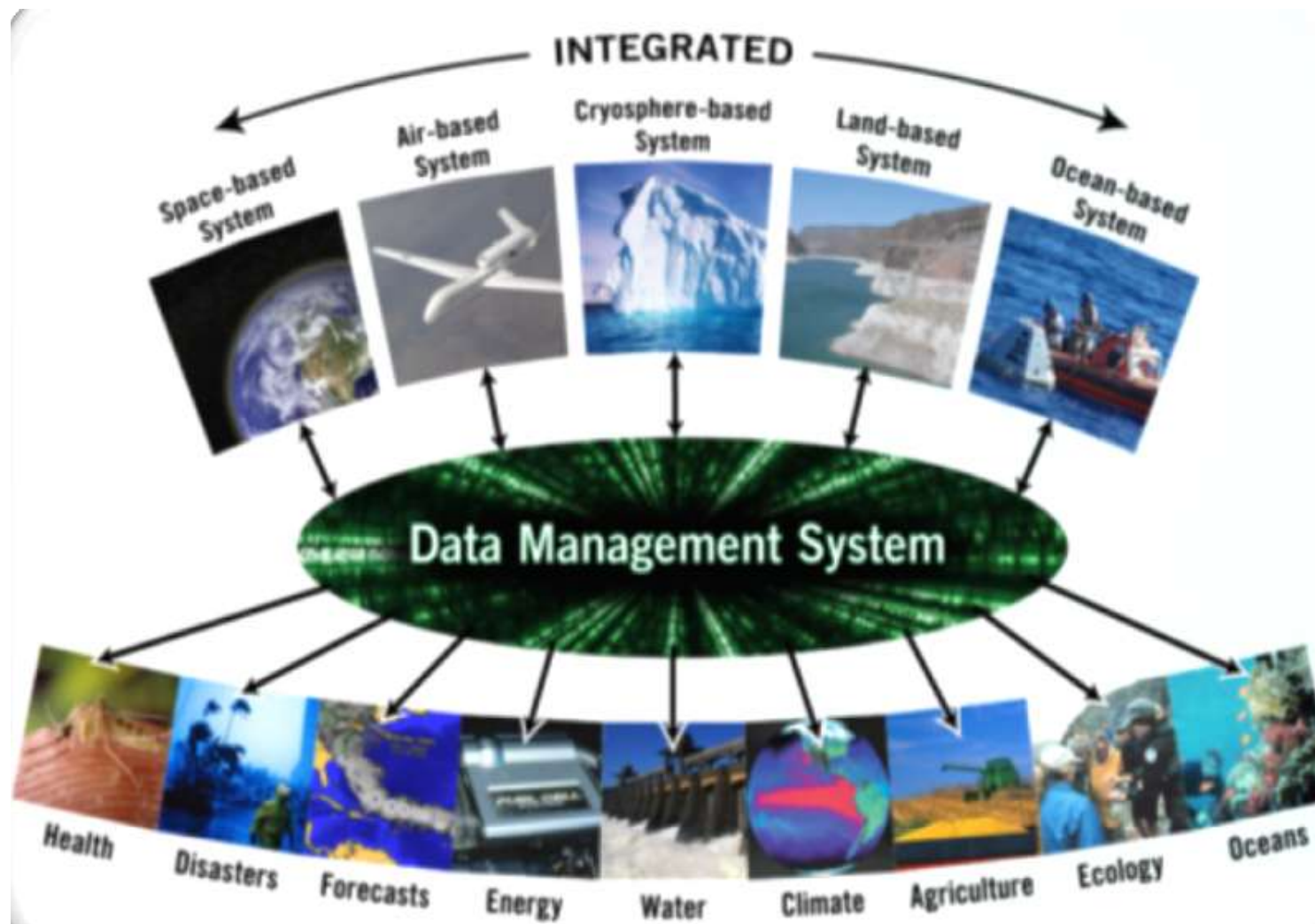
NOAA Data Management



Organizational Oversight and Support for
Data Management – *Including Standards*

NOAA Data Management

The Concept





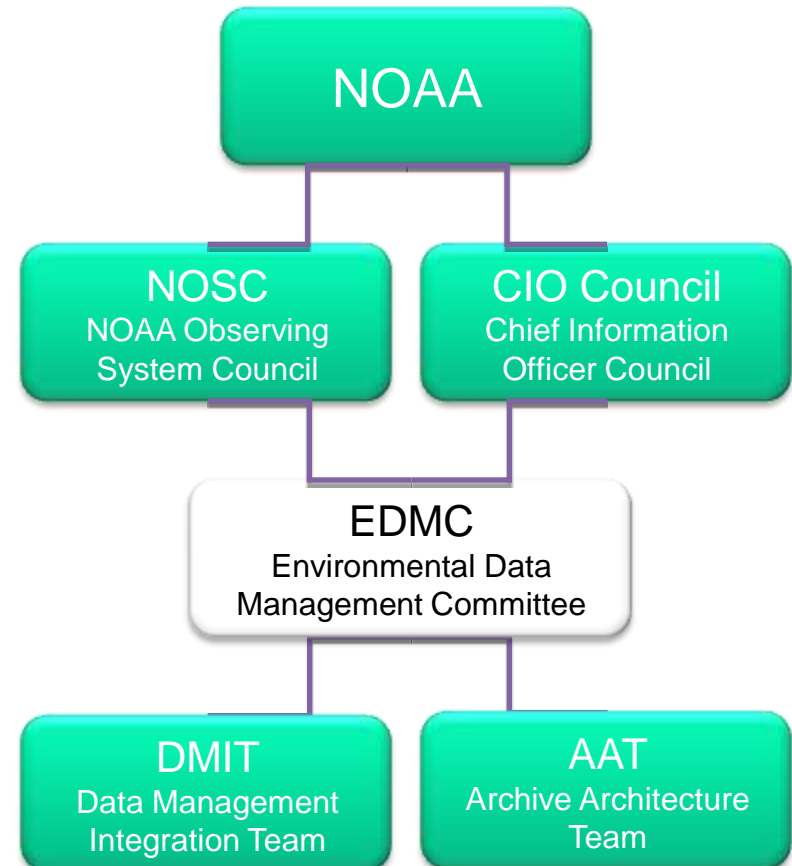
NOAA Data Management Oversight/Coordination/Technical Bodies



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fb *w* *n* *fb n*

G n

- EDMC kicked off in January 2010
- Good cross-NOAA participation
- Working collaboratively with other NOSC and CIO Council Committees
- Focus on harmonizing, leveraging, and integrating effective data management efforts across NOAA





NOAA Data Management

New Policies Fostering Consistency



Revision of NOAA-wide Policy

c y n c

- Maintains NOAA's policy of "full and open access" to environmental data
- Provides mechanism for EDMC to develop procedural directives for more detailed guidance
- Presents an end-to-end lifecycle framework for the management of environmental data





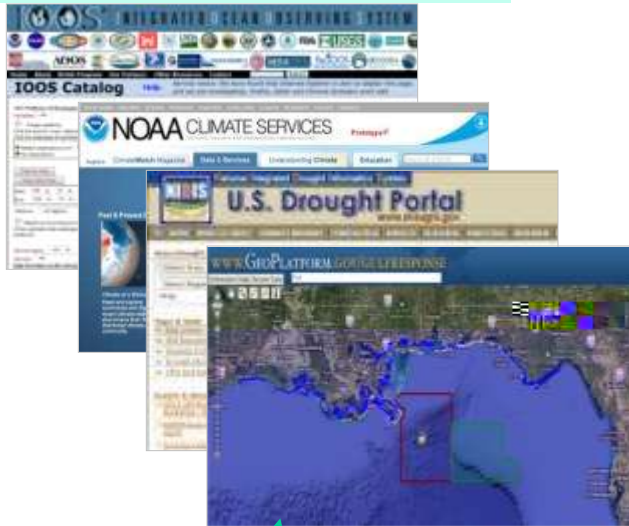
NOAA Data Management Enhancing Data Access



Client Tools /



NOAA Portals /



GEOSS



Geospatial One-Stop

Data.go



Standard Access Services

NOAA Metadata Records

NOAA's Environmental Data & Information Infrastructure



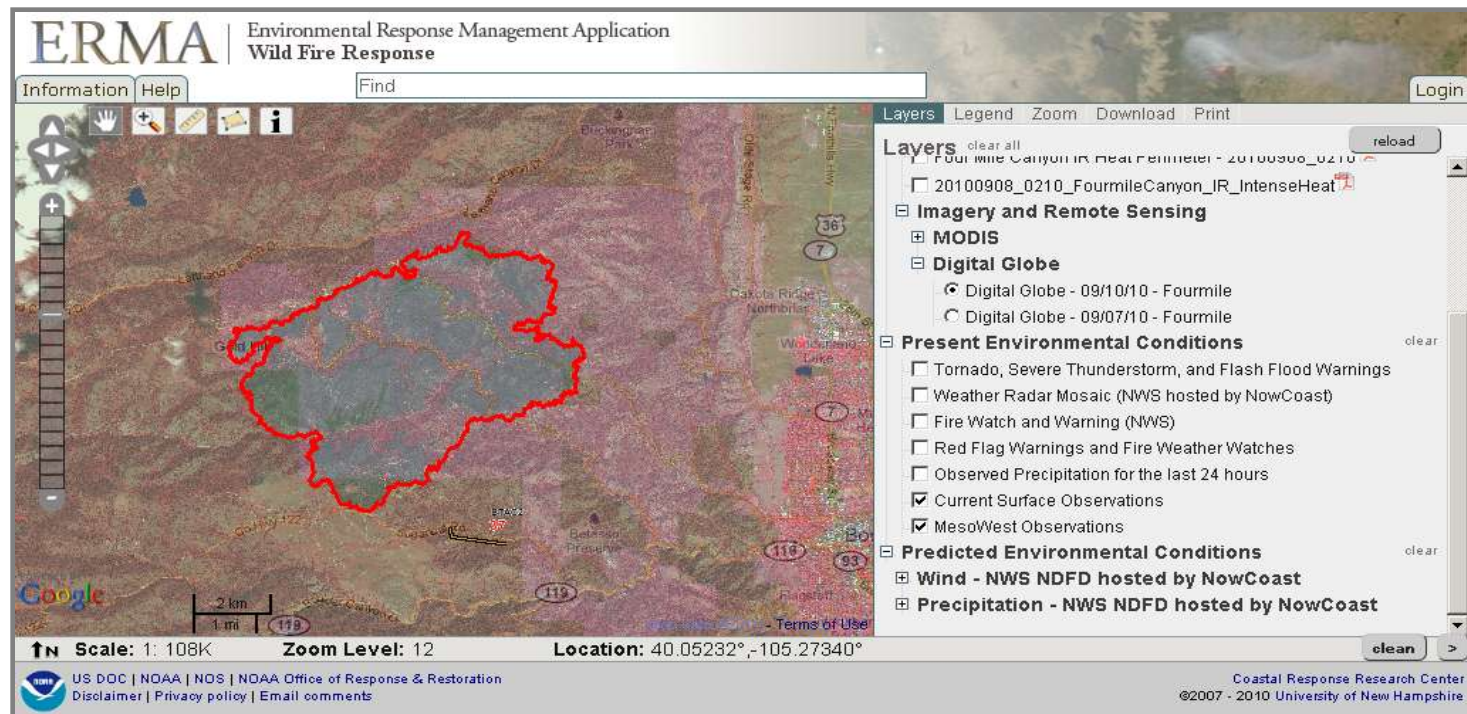
ERMA[®]

Enhanced Decision Support



The Environmental Response Management Application is a web-based data management platform for integrating geospatial information (including near-real-time weather, currents, hazards, and static data) in an easy-to-use format. Provides public access to geospatial information for visualization, analysis, and decision support.

Developed by NOAA and the University of New Hampshire with the Environmental Protection Agency, Coast Guard, and the Department of Interior.





Thank You



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Notice

Plans, schedules and projections in this slide package are subject to FY2011 (and beyond) funding.



Acronyms



ARSR	Air Route Surveillance Radar
DHS	Department of Homeland Security
ERMA	Environmental Response Management Application
GIS	Geographic Information System
GOES-R	Geostationary Operational Environmental Satellite
IOOS	Integrated Ocean Observing System
JPSS	Joint Polar Satellite System
LAMP	Localized Aviation MOS Program
MDL	Meteorological Development Laboratory
NCEP	National Centers for Environmental Prediction
NDFD	National Digital Forecast Database
NESDIS	National Environmental Satellite, Data, and Information Service
NOAA	National Oceanic and Atmospheric Administration
NPP	NPOESS Preparatory Project
NWS	National Weather Service
OGC	Open Geospatial Consortium
PDA	Product Distribution and Access
RIDGE	Radar Integrated Display with Geospatial Elements
SOS	Sensor Observation Service
TAF	Terminal Aerodrome Forecast
TDWR	Terminal Doppler Weather Radar
USDA	US Department of Agriculture
WCS	Web Coverage Service
WFS	Web Feature Service
WMS	Web Map Service
WSR-88D	Weather Surveillance Radar - 1988 Doppler (NEXRAD)