NOAA
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FY 2006
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#1 New E-Government (E-Gov) Applications

Below are two NOAA examples of an e-government application that could be showcased on the E-Gov link from the Commerce Home Page.

1.a.1.
Line Office: NOAA / NOS
Name of E-Gov Application: **National Geodetic Survey (NGS) Online Positioning User Service (OPUS)**
OPUS URL: http://www.ngs.noaa.gov/OPUS/

Describe how the initiative is transforming operating unit operations.

- Since 2002, NOAA's Online Positioning Users Service (OPUS) has transformed the way that GPS users across the country and world can obtain highly accurate positioned coordinates. OPUS allows users, such as professional surveyors, to submit their GPS observations to NOAA, where the data is processed to determine corresponding 3-dimensional positional coordinates. Each OPUS solution is estimated to save the user six hundred dollars over traditional positioning methods. There have been over 450,000 OPUS solutions processed since the service began operating just 4 years ago. OPUS is completely automatic and requires only a minimal amount of information from the user.
- This tool allows anyone with a single geodetic quality GPS receiver to position themselves in the National Spatial Reference System to an accuracy of 2 centimeters with just 2 hours of data. Further research is ongoing to reduce the amount of field time to just minutes. The number of solutions has grown from about 1,000 per month in FY 2002 to over 13,000 per month in FY 2006.

Explain how your operating unit maintains an ongoing dialogue with interested parties to find innovative ways to use information technology for the initiative.

- OPUS solutions are based on data gathered from GPS Continuously Operating Reference Stations (CORS). The CORS website is http://www.ngs.noaa.gov/CORS/. CORS is comprised of a nationwide network of permanently operating GPS receivers. NOAA provides access to GPS data from this network free of charge via the Internet. The primary objective of CORS and OPUS is to enable GPS users to determine precise positional coordinates relative to the National Spatial Reference System. These services allow OPUS users to achieve centimeter- and decimeter-level accuracy.
- CORS User Forums and Workshops are held across the country on a regular basis, at which extensive interaction between NOAA and CORS/OPUS users takes place. This interaction leads to improvements in CORS/OPUS and in their web accessibility.
- NOAA is in the process of identifying and surveying representatives from individual counties across the country to determine if we are meeting their geodetic positioning needs. Local users

have the opportunity, through an online survey, to provide comments and suggestions on how to improve CORS/OPUS and other positioning products and services.

Identify any external partners who collaborate on the initiative.

- The CORS network, which provides the data that OPUS solutions are based on, includes sites operated by more than 175 organizations, including other Federal agencies, state and local governments, universities, the private sector, foreign governments and others who share the goal of making more accurate positioning available worldwide.
- Positioning assistance to the reconstruction efforts in Iraq: Recently, NOAA provided critical assistance to the U.S. Army in the design, development and implementation of the Iraqi Geospatial Reference System (IGRS). The IGRS was modeled after the National Spatial Reference System in the United States, which is managed by NOAA and provides a consistent national coordinate system and to support mapping, charting, navigation, boundary determination, property delineation, infrastructure development, resource evaluation surveys, and scientific applications. The IGRS will serve as the basis for reconstruction projects all around Iraq. Currently, six Iraqi CORS are fully operational. Army, Air Force, Marine, and civilian surveyors from many nations and disciplines are beginning to use the CORS stations and NOAA's Online Positioning User Service for projects all around Iraq.

Identify improved performance (e.g., outcome measures) resulting from the initiative that improve your operating unit's ability to meet its objectives and strategic goals.

- The percent of U.S. Counties that are fully or substantially enabled with accurate positioning capacity (a GPRA Outcome Performance Measure) is directly related to OPUS use across the Country and has increased from 25% at the end of FY2004 to over 40% at the end of FY2006.

Quantify any cost savings and/or cost avoidance achieved.

- Over $270 million (using an estimated savings of $600 per OPUS solution) in cost savings has been realized by users of GPS through the use of OPUS to obtain accurate positions.
- Use of OPUS/CORS dramatically reduces survey project time and cost. Before the advent of GPS, it could take up to six months of field work to complete a survey project involving the setting of 30 positioning monuments. Today, the time has been reduced to less than one month. This has reduced the average estimated cost of setting a survey mark to approximately $800 today as opposed to almost $15,000 in 1984 (see attached graphic for further examples of cost savings).

1.a.2
Line Office : NOAA/ NOS
Name of E-Gov Application: **Office of Ocean and Coastal Resource Management/Estuarine Reserves Division (OCRM/ERD) EstuaryLive Program**
EstuaryLive URL: www.estuaries.gov

Frequency of release: The website is updated approximately weekly from June to October, which is when the EstuaryLive program is marketed. Updates are frequently provided for teachers to access the broadcast. After the broadcast in late September, the website is maintained and updated on a monthly basis.

Background on the EstuaryLive Program

EstuaryLive is a live, interactive, field-based experience that brings estuaries to the audience through the Internet. The program showcases our nation's estuaries—the precious ecosystems where fresh water from rivers mixes with salt water from the ocean. This collaborative effort between the National Oceanic and Atmospheric Administration's (NOAA) National Estuarine Research Reserve System, the U.S. Environmental Protection Agency's (EPA) National Estuary Program, the National Estuarine Research Reserve Association (NERRA), and many local partners has raised the estuarine and coastal literacy of thousands of students, teachers, and other viewers.

EstuaryLive is a unique education program produced each year to provide students with the opportunity to tour the nation's estuaries. The program is developed primarily for a K–12 audience, with an emphasis on middle and high school classrooms. In addition, many colleges and universities participate. The field trips offered throughout the two-day exploration allow teachers to bring estuarine and coastal environment into the classroom.

Naturalists from NOAA's National Estuarine Research Reserves and EPA's National Estuary Programs take students on a journey through each ecosystem. Students interact with the tour guides by emailing questions during the field trips. Because of its interactive nature, EstuaryLive is the next best thing to an actual field trip. Students in the classroom have the ability to ask questions—including what something feels like, smells like, or even tastes like.

EstuaryLive provides an opportunity for students around the world to: experience, in real-time, a field trip to the unique habitat of an estuary; compare different estuaries throughout the nation; interact with research scientists, education professionals, and natural resource managers; and understand estuarine ecological, social, and economic principals. This program aims to increase students' understanding and awareness of estuaries and introduces students to learning through technology. EstuaryLive also brings to life real research in the Reserves to educate about the scientific method and the role and responsibilities students can play to become better stewards of their environment.

One of the most exciting aspects of EstuaryLive is the technology involved in its production. EstuaryLive uses state-of-the-art satellite technology to broadcast remote field trips over the Internet and KU band satellites. Curricula tailored to each field trip and locality, as well as curriculum and activities to help compare these ecosystems, is available on www.estuaries.gov for teachers to help prepare their classroom and to provide follow-up materials for the program.

Describe how the initiative is transforming operating unit operations.

The EstuaryLive program enables the Estuarine Reserves Division and the National Estuarine Research Reserve System to fulfill their educational mission (mandated in the Coastal Zone Management Act) on a broad scale. By using interactive Web and satellite delivery systems, EstuaryLive expands the reach of the 27 local reserves to schools, teachers and students far beyond their geographic boundaries, bringing the importance of estuarine science even to non-coastal states. This, in turn, has transformed the traditional location-based educational effort into a national educational effort and an engagement with educational policy-makers at the highest levels.

Explain how your operating unit maintains an ongoing dialogue with interested parties to find innovative ways to use information technology for the initiative.

The EstuaryLive program has opened an ongoing dialogue with all sectors of the science and environmental education communities, and, in fact, has even brought some of those sectors closer together. The Estuarine Reserves Division uses the registration process as well as feedback surveys and focus groups to stay abreast of teachers' needs and interests and ensure that the EstuaryLive program continues to fulfill specific educational goals. These interactions have helped as well to inform the development of additional educational programs and products that are tied to national educational goals and priorities.

Identify any external partners who collaborate on the initiative.

Currently, EstuaryLive is a partnership between the National Estuarine Research Reserve System (NOAA/NERRS), EPA National Estuary Program (NEP), National Estuarine Research Reserve Association (NERRA), and many local partners. EPA has been an active partner and has provided substantial financial support. At the local level, many partnerships have been developed with other organizations for EstuaryLive. The list below includes organizations who partnered with the National Estuarine Research Reserves and National Estuary Programs for both EstuaryLive and National Estuaries Day events in 2004.

Local Partners for both EstuaryLive and National Estuaries Day in 2004:

- Alaska SeaLife Center Mystic Aquarium
- Audubon Society National Public Radio
- Bay View State Park New Haven Land Trust
- Cape Code Cooperative Extension NOAA's Pascagoula Lab
- Comcast Cable Ohio State University
- Cooperative Extension Service Oregon Department of Fish and Wildlife
- Coos Watershed Association Oregon Institute of Marine Biology
- Eckerd College Oregon Parks and Recreation Department
- Florida State University Marine Lab Pass Christian Library
- Freeflight People for Puget Sound
- Friends of Old Woman Creek Rutgers University
- Friends of South Slough Sea Grant
- Gulf Coast Community Foundation Seattle Aquarium
- Gulf of Mexico Program South Carolina Educational Television
- Gulf Islands National Seashore Stony Brook Harbor Joint Village Coastal Commission
- Hempstead Harbor Protection Committee TNC University of Southern Mississippi
- Hillsborough Community College University of Tampa
- JL Scott Marine Education Center U.S. Coast Guard
- Long Island Seaport and Eco Center U.S. Fish and Wildlife Service
- Louisiana Science and Nature Center Wampanoag Tribe
- Marine Life Oceanarium Waterfront Center
- McCoys River Tours Weedon Island Preserve
- Mississippi Dept. of Env. Quality Western Washington University
- Mississippi Dept. of Marine Sciences Wolf River Canoes and Kayaks
- Mississippi Power Wolf River Conservation Association
- Mote Marine Lab Woods Hole Oceanographic Institute Sea Grant
- York River State Park, Virginia Dept. of Conservation

Identify improved performance (e.g., outcome measures) resulting from the initiative that improve your operating unit's ability to meet its objectives and strategic goals.

Goal 3 of the NERRS strategic plan is to *"Enhance people's ability and willingness to make informed decisions and take responsible actions that affect coastal communities and ecosystems."* This purpose is clearly addressed by the goals of Estuary Live which are to: (1) increase students' understanding and awareness of estuarine environments to become stewards of the environment; and (2) introduce students to learning through technology. The objectives of Estuary Live are for: (1) teachers to increase their ability to teach about estuaries; and (2) students gain an understanding of the concepts of estuarine ecology.

Expected outcomes for teachers:

- Increase their content knowledge of estuaries, including why estuaries are important.
- Initiate or expand their use of technology as an instructional tool for the classroom.
- Increase their ability to incorporate educational materials from the estuaries.gov website.
- Increasingly use the telecast as the highlight of their teaching.
- Learn that EstuaryLive is an ongoing, interactive program that they can use each year.
- Encourage inquiry in their classrooms by having students submit questions during the
- program.

Expected outcomes for students:

- Define "estuary" and understand the basic concepts of estuarine ecology.
- Identify some of the important functions of estuaries, including benefits to people.
- Understand some of the factors that influence the health of estuaries.
- Identify actions they can take to improve the health of estuaries.
- Understand the main differences between estuaries.
- Increase their ability to interact through web-based communication tools.

1.b.1 Below are updates to existing NOAA E-Gov applications currently being showcased on the E-Gov link from the Commerce Home Page.

1.b.1. Line Office**:** NOAA/NESDIS

Name of E-Gov Application: **Beacon Registration**
Beacon Registration URL: http://www.beaconregistration.noaa.gov/

Describe how the initiative is transforming operating unit operations.

The web-based registration and incident feedback reporting initiative for the Search and Rescue Satellite-Aided Tracking (SARSAT) program is transforming how NOAA collects and updates information. In summary, NOAA is realizing two main areas of benefit: a) improved information accuracy due to less transcription errors, and b) saving of resources resulting in accommodating more users with the same staff and allowing staff to focus on improving quality of information instead of data entry.

Explain how your operating unit maintains an ongoing dialogue with interested parties to find innovative ways to use information technology for the initiative.

NOAA uses specific public and industry forums to educate the public about the availability of its web-based services and to gather requirements. NOAA uses events such as the Experimental Aircraft Association's (EAA) Air Venture and Aircraft Owners and Pilot Association's (AOPA) Expo to engage the public on its web-based registration program and teams with industry at its annual Beacon Manufacturers Workshop to increase participation and hear from user advocacy groups (e.g., Equipped to Survive).

Identify any external partners who collaborate on the initiative**.**

NOAA partners with the U.S. Air Force and U.S. Coast Guard on the initiative. These two organizations help define requirements and share in the funding of the initiative.

Identify improved performance (e.g., outcome measures) resulting from the initiative that improve your operating unit's ability to meet its objectives and strategic goals.

This initiative will directly improve SARSAT's "Effectiveness of Registration Information" performance measure by improving the accuracy of data collected and freeing up resources to improve the quality of the information.

Quantify any cost savings and/or cost avoidance achieved.

Analysis completed prior to the implementation of the initiative projected that about $90K would be saved on an annual basis with the use of a web-based registration capability (based on a 50% user acceptance – the actual user acceptance level is approximately 48%).

1.b.2 . Line Office**:** NOAA/NESDIS

Name of E-Gov Application: **NOAA National Data Centers' Online Store** (OLS)
Online Store URL: http://ols.nndc.noaa.gov/plolstore/plsql/olstore.main?look=1

The National Virtual Data System (NDVS) has been replaced with the NOAA National Data Centers' Online Store.

Describe how the initiative is transforming operating unit operations.

The Online Store (OLS) is an online store offering data products from the National Climatic Data Center, National Geophysical Data Center, National Oceanographic Data Center and **the National Coastal Data Development Center (URL: http://www.ncddc.noaa.gov/)**

OLS is a web base system that replaced the Customer Ordering Management Processing System (COMPS) that was in use by the Data Centers. Instead of mail or telephone requests, the customer can enter the request online for faster service.

Quantify any cost savings and/or cost avoidance achieved.

OLS provides for improved quality of service to meet the expectations and demands of the customers. It reduces delays in the delivery of data, information, and products,.and services to the customers. With

continued reduction in number of NCDC customer service representatives and planned redirection of staff resources to new activities, the customer service support will not be impacted.

1.b.3. Line Office: NOAA/ NOS

Name of Application: **National Ocean Service (NOS) Data Explorer (DE) Geospatial Data Portal**
NOS Data Explorer URL: oceanservice.noaa.gov/dataexplorer

Enterprise GIS is a National Ocean Service (NOS) effort to coordinate and distribute spatial data resources and advancements in spatial data processing in a unified and coordinated manner. Released to the public in July, 2004, the *NOS Data Explorer* is a web-based gateway that allows users to search for all NOS geospatial data dispersed among various program offices within NOS through a single interface. The interface for this gateway is based on ESRI's Metadata Explorer extension to ArcIMS. Additional enhancements to the site were made to incorporate geospatial Web services into a unified data discovery and delivery portal for all NOS datasets. The system works very much like a library's electronic card catalogue system. A user can search the portal by key word or theme to find those spatial data sets within NOS matching the search criteria. Once the search has been executed, users are provided with a range of options for access to the data: reviewing the FGDC metadata, linking to the host site for further research about the dataset, viewing the dataset online and, where available, downloading the data layers and creating composite custom maps with other datasets dynamically through the implementation of the ArcIMS WebServices architecture.

Describe how the initiative is transforming operating unit operations.

NOS Data Explorer is a valuable resource for users seeking NOS geospatial data. Users can search over 800 FGDC compliant metadata records, and link to nearly 85 different datasets, 38 which provide downloadable data layers. The site is an important step in our agency's requirement to further advance the FGDC's National Spatial Data Infrastructure and the President's E-Government Initiative, Geospatial One Stop. (Note – The NOS Data Explorer site uses the same software and technology as the Geospatial One-Stop portal, version 1).

It truly is a one-of-a kind system within NOAA right now. It provides a single point of access for searching, displaying, and obtaining NOS datasets from one site even though the data remains within the home program office. This greatly simplifies how NOS customers obtain data from our offices - no longer do they need to navigate a series of Web sites if they want data from multiple programs or offices. In addition, we have been working with the CIO Council and GIS staff from each of the NOAA line offices on the possibility of extending the *NOS Data Explorer* concept to other parts of NOAA.

Explain how your operating unit maintains an ongoing dialogue with interested parties to find innovative ways to use information technology for the initiative.

The design team maintains an ongoing dialogue with interested parties through a variety of outreach efforts in order to find innovative ways to use information technology for the *NOS Data Explorer* site. A few examples include demonstrating and presenting the Web site at the annual ESRI International User Conference, the annual ESRI Federal User Conference, and providing a link to the site from the NOS Home page for users seeking NOS geospatial data. The NOS Data Explorer design team members actively participate in several FGDC, Geospatial One-Stop (GOS) and Open GIS Consortium (OGC) subcommittees/working groups in order to keep up on the latest information technology and standards activities available to date.

Identify any external partners who collaborate on the initiative.

Collaboration with external partners includes: ESRI, the Geospatial One-Stop design team, as well as Federal, State and Local agencies and others in the academic communities. For example: As agency IT Security policies continue to demand a safer environment for our Web applications, additional security scans are being run against these applications. Last year, we scanned the *NOS Data Explorer* site using an application scanning product which resulted in a vulnerability that was traced back to the ESRI ArcIMS out of the box version of the software application. We then worked with ESRI technical developers and our NOS ITSO on a solution to the vulnerability. ESRI was then able to pass this security issue and solution information on to other federal agencies and partners.

Identify improved performance (e.g., outcome measures) resulting from the initiative that improve your operating unit's ability to meet its objectives and strategic goals.

The NOS Mission is "*to provide products, services, and information that promote safe navigation, support coastal communities sustain marine ecosystems, and mitigate coastal hazards."* Prior to *NOS Data Explorer* application, users had to navigate to multiple Web sites to find NOS's suite of geospatial data. There was no single interface for previewing composite data at a single location, as well as a variety of data delivery approaches. This resulted in a complex and time consuming method for users to discover and download NOS geospatial data. The NOS Data Explorer allows ability to search, view, download and create interactive maps with NOS's geospatial data including geodetic control, nautical charts, shoreline, bathymetry, marine boundaries, tides and water levels data and much more.

Identify improved performance (e.g., outcome measures) resulting from the initiative that improve your operating unit's ability to meet its objectives and strategic goals.

The *NOS Data Explorer* internet mapping service demonstrates a cohesive and integrated approach to GIS across NOS by providing a single portal for access to all NOS data, therefore avoiding duplicative efforts by the NOS program offices. It also uses the same software and technology as the E-Government Geospatial One-Stop (GOS) portal, all NOS metadata is automatically harvested by GOS, and therefore provides the most current NOS data holdings more accessible to the larger geospatial community.

#2: Information Released to Public on a Regularly Scheduled Basis

2.a. We are providing the information below on additional regularly released NOAA information to the public that is not currently identified on the Commerce Web Site (url: http://www.osec.doc.gov/cio/oipr/web_pub_sched.htm).

Line Office	Title of the Information (Data Type)	Frequency of the Release	URL
NOAA/NESDIS	Operational Significant Event Imagery (OSEI) Image of the Day	Daily	http://www.osei.noaa.gov/OSEIiod.html

NOAA NMFS	Fishery Market News	Quarterly, Monthly, Weekly and Daily	http://www.st.nmfs.gov/st1/market_news/index.html
NOAA NMFS	U.S. Foreign Trade in Fishery Products	Monthly and Annual	http://www.st.nmfs.gov/st1/trade/index.html
NOAA NMFS	Recreational Fisheries Statistics	Annual	http://www.st.nmfs.gov/st1/recreational/index.html
NOAA NMFS	Commercial Fisheries Statistics	Annual	http://www.st.nmfs.gov/st1/commercial/index.html
NOAA NMFS	Fisheries Statistics of the US	Annual	http://www.st.nmfs.gov/st1/fus/fus04/index.html
NOAA/ NOS	CO-OPS' and NDBC's Joint IOOS Web Portal – POSIDIN	As Needed	http://opendap.co-ops.nos.noaa.gov/content/
NOAA/ NOS	CO-OPS Web Services	Daily	http://opendap.co-ops.nos.noaa.gov/axis/
NOAA / NOS	CO-OPS Operational Forecast System (OFS) models	Hourly	http://opendap.co-ops.nos.noaa.gov/netcdf/
NOAA/ NWS	NOAAWatch (NOAA Storms and Hazards Portal)	Daily	http://www.noaawatch.gov/
NOAA/NWS	Weather Forecast (The above is already on DOC website. The NWS urls cited below are tabs on this website to get the detail information)	Four times daily: 4 am; 11 am; 4 pm; & 10 pm (local time)	http://www.weather.gov/
NOAA/NWS	Warnings, watches, alerts & advisories	Available on a real time basis.	http://www.weather.gov/
NOAA/NWS	Graphical Forecasts	Daily	http://www.weather.gov/forecasts/graphical/sectors/
NOAA/NWS	National Maps	Updated daily at 7:00 am EST	http://www.weather.gov/outlook_tab.php

NOAA/NWS	National Radar Mosaic Sectors	Daily	http://www.weather.gov/radar_tab.php
NOAA/NWS	Air Quality Forecast Guidance	Shows Air Quality Guidance as 1-hr and 8-hr ozone concentration averages for the N.E. US updated twice daily.	http://www.weather.gov/aq/
NOAA/NWS	NOAA Satellite Imagery	IR Imagery used to determine cloud features both at day & night.	http://www.weather.gov/sat_tab.php?image=ir

2.b. Updates from existing examples

1. NOAA's National Weather Service (NWS) makes all of its products available on the Internet. Almost all NWS meteorological and hydrologic data and forecasts are refreshed with completely new data within 48 hours. The primary NWS site where these data can be accessed is http://weather.gov <http://weather.gov/>. Forecast data are issued several times daily by NOAA's NWS forecast offices. Watches, warnings, advisories, and alerts are made available on a real time basis. This information is made available on NWS Internet sites in multiple formats (graphic, tabular, text, XML) via automated processes. Internet dissemination of NWS products is a key piece of the Public/Private Weather Enterprise; many private sector companies use NOAA/NWS data to develop products and services for public use.

2. NESDIS provides timely access to global environmental data from satellites and other sources to promote, protect, & enhance the Nation's economy, security, environment, & quality of life. NESDIS also maintains an active outreach effort to keep an open dialog between its data centers and users. The principal portal for NESDIS information is http://www.nesdis.noaa.gov/. Site content is updated regularly ranging from many times per day for satellite imagery, to monthly for programmatic updates.

#3: Progress to Date for Pending Searching of NOAA Files Intended to the Public on NOAA's Web Sites

3.a A listing of deployed search engines (HTDig, Google, FirstGov, etc.).

All NOAA Lines Offices are migrating to a consistent search engine. It is FirstGov.gov. The migration was for all NOAA main web pages by April 2006.

3.b. A listing of the web development standards (mega tagging, keywords, alt tags, use of taxonomies, etc.) implemented by NOAA that makes NOAA's online content more searchable and accessible to various search engines.

- **NOAA uses the standards that are on the DOC policy on Searchable Web Pages, at** http://www.osec.doc.gov/webresources/policies/policy14_searchable_webpages.htm.
  - **Provide a search function**. Major Web Sites must include a search function. This may be in the form of a search box or a link to a search page.
  - **Use HTML/XHTML or XML <title> tags to describe the content of Web pages**. All DOC Web pages must contain a unique page title in the head section that specifically relates to the contents of that page.

- **Use Standard Metadata on Major Web Sites**. As provided in OMB guidance, organizations should follow the recommendation of the Interagency Committee on Government Information (see Webcontent.gov - Use Standard Metadata) and use metadata syntax consistent with the Dublin Core Metadata standards.

  At a minimum, the following **six meta tags, following Dublin Core format, are required:**

  - **Title** - This tag is different from the HTML/XHTML or XMLtitle tag, but the same title text should be used.
    - *Example*: <meta name="DC.title" content="Home page of NOAA's National Weather Service" />
  - **Description** - A brief description of the contents and purpose of the individual page.
    - *Example:* <meta name="DC.description" content="NWS Home page." />
  - **Creator** - The content owner; this should be the name of the organization.
    - *Example*: <meta name="DC.creator" content="US Department of Commerce, NOAA, National Weather Service" />
  - **Date Created** - The original creation date of the page in ISO8601 format (YYYY-MM-DD).
    - *Example:* <meta name="DC.date.created" scheme="ISO8601" content="2001-01-01" />
  - **Date Reviewed** - The date the page contents were last reviewed in ISO8601 format (YYYY-MM-DD).
    - *Example:* <meta name="DC.date.reviewed" scheme="ISO8601" content="2005-09-22" />
  - **Language** - Declares to users the natural language of the document being indexed. Search engines which index Web sites based on language often read this tag to determine which language(s) is supported. This tag is particularly useful for non-English and multiple language Web sites. If the content is in more than one language, the element may be repeated.

- *Example:* <meta name="DC.language" scheme="DCTERMS.RFC1766" content="EN-US" /

- If organizations choose to use additional metadata, they should choose from Dublin Core standards, where possible.

  Organizations should include subject and keyword metadata if it is helpful for improving search relevancy and for content classification.

- **Robot Exclusion Protocol:**

  - In those instances where organizations determine that sites should not be indexed or indexing should be limited, they may use the Robot Exclusion Protocol.

#4 : Research and Development Activities

NOAA does fund research and development (R&D) through entities of the federal government such as laboratories, centers, or by funding non-federal institutions through grants, cooperative agreements, or other means.

4.a. The description of how this R&D information is disseminated is below.

4.a.1: Office of Atmospheric Research's (OAR) primary means of disseminating scientific results is through the scientific literature, specifically, through peer reviewed journal articles. These journal articles then serve as the basis for OAR's contributions to scientific assessments, both national and international, as well as results we disseminate through our websites.

4.a.2.: The National Environmental Satellite, Data and Information Service's (NESDIS) Center for Satellite Applications and Research (STAR) is its science arm, which acquires and manages the nation's operational Earth-observing satellites. NESDIS provides data from these satellites, and conducts research to make that possible. See: http://www.orbit.nesdis.noaa.gov/star/index.php

The Cooperative Research Program (CoRP) manages a coast-to-coast research coalition of the federal government and universities, working together on remote sensing of the environment in these focus areas:

Conduct investigations of the Earth with satellite observations
Design observing systems for satellites
Develop algorithms, products and applications for satellite data
Simulate new observations from satellites
Calibrate the data from new instruments, and calibrate one satellite with another
Design new processing systems (such as data compression)
Verify the accuracy of satellite data and data from the field
See the CoRP website: http://www.orbit.nesdis.noaa.gov/star/CoRP_index.php

4.b. List of NOAA R&D information available through RaDiUS, Science.gov and other means.

- **RaDiUS** (**R**esearch **a**nd **D**evelopment **i**n the **U**nited **S**tates) (https://radius.rand.org) is the most comprehensive database of information on the Research and Development (R&D) activities that are funded by the United States *Federal Government*. **RaDiUS** was developed by RAND, in cooperation with the National Science Foundation (NSF), to support the work of the White House Office of Science and Technology Policy (OSTP), the National Science and Technology Council (NSTC), federal agencies, and all others interested in the federal R&D portfolio. In March 2005, RaDiUS was formally recognized by the Office of Management and Budget (OMB) in the Executive Office of the President as a central component of OMB's implementation of Section 207(g) of the E-Government Act of 2002 (Public Law 107-347). (url: https//radius.rand.org)

- **Science.gov** (http://www.science.gov) is a gateway to authoritative selected science information provided by U.S. Government agencies including research and development results

Line Office	Identify the Web Site with R&D information	Application Name	URL
NOAA/OAR	Science.gov; Earth & Ocean Sciences; Climate, Weather, and Meteorology	**Aeronomy Laboratory (AL)** As of October 1, 2005, the Aeronomy Laboratory has merged into the Earth System Research Laboratory (ESRL) as part of the Chemical Sciences Division (CSD). Conducts scientific research on the chemical and dynamical processes of the Earth's atmosphere processes of the Earth's atmosphere	http://www.al.noaa.gov
NOAA/OAR	Science.gov; Earth & Ocean Sciences; Climate, Weather, and Meteorology	**Air Resources Laboratory (ARL)** As of October 1, 2005, the Surface Radiation Research Branch, formerly of the Air Resources Laboratory,	http://www.arl.noaa.gov

		has merged into the Earth System Research Laboratory (ESRL) as part of the Global Monitoring Division. Carries out research on processes that affect the quality of the atmosphere - primarily related to transport, transformation and removal of trace substances	
NOAA/OAR	Science.gov; Earth & Ocean Sciences; Climate, Weather, and Meteorology; Oceans & Oceanography	**Atlantic Oceanographic and Meteorological Laboratory (AOML)** Conduct a basic and applied research program in oceanography, tropical meteorology, atmospheric and oceanic chemistry, and acoustics	http://www.aoml.noaa.gov
NOAA/OAR	Science.gov; Earth & Ocean Sciences; Climate, Weather, and Meteorology; Oceans & Oceanography	**El Nino Theme Web Site** Access to information about El Nino	http://www.pmel.noaa.gov/tao/elnino/nino-home.html
NOAA/OAR	Science.gov; Earth & Ocean Sciences; Climate, Weather, and Meteorology	**Forecast Systems Laboratory (FSL)** As of October 1, 2005, the Forecast Systems Laboratory has become the Global Systems Division (GSD) of the Earth System Research Laboratory (ESRL). Conducts atmospheric and oceanic research	http://www.fsl.noaa.gov
NOAA/OAR	Science.gov; Earth & Ocean Sciences; Climate, Weather, and	**Geophysical Fluid Dynamics Laboratory (GFDL)** Research expands the	http://www.gfdl.gov

	Meteorology; Oceans & Oceanography	scientific understanding of the physical processes that govern the behavior of the atmosphere and the oceans as complex fluid systems	
NOAA/OAR	Science.gov; Earth & Ocean Sciences; Climate, Weather, and Meteorology	**National Severe Storms Laboratory (NSSL)** Conducts research to improve accurate and timely forecasts and warnings of hazardous weather events such as blizzards, ice storms, flash floods, tornadoes, and lightning	http://www.nssl.noaa.gov
NOAA/OAR	Science.gov; Earth & Ocean Sciences; Climate, Weather, and Meteorology; Oceans & Oceanography	**Pacific Marine Environmental Laboratory (PMEL)** Carries out interdisciplinary scientific investigations in oceanography and atmospheric science and offers access to its ocean data	http://www.pmel.noaa.gov
NOAA/OAR	Science.gov; Earth & Ocean Sciences; Climate, Weather, and Meteorology; Oceans & Oceanography	**Tropical Atmosphere Ocean Project (TAO)** Real-time data from moored ocean buoys for improved detection, understanding and prediction of El Nino and La Nina	http://www.pmel.noaa.gov/tao
NOAA/OAR	Science.gov; Earth & Ocean Sciences; Climate, Weather, and Meteorology; Climate Change	**Climate Diagnostics Center (CDC)** Identifies the nature and causes for climate variations on time scales ranging from a month to centuries	http://www.cdc.noaa.gov
NOAA/OAR	Science.gov; Earth & Ocean Sciences;	**Climate Information Project (CIP)**	http://www.ogp.noaa.gov/mpe/csi/cip

	Climate, Weather, and Meteorology; Climate Change	Promotes the use, distribution, and production of climate information	
NOAA/OAR	Science.gov; Earth & Ocean Sciences; Climate, Weather, and Meteorology Climate Change;	**Climate Monitoring and Diagnostics Laboratory (CMDL)** As of October 1, 2005, the Climate Monitoring and Diagnostics Laboratory has merged into the Earth System Research Laboratory (ESRL) as part of its Global Monitoring Division (GMD)**.** Conducts research related to atmospheric constituents that are capable of forcing change in the climate of the Earth or that may deplete the ozone layer	http://www.cmdl.noaa.gov
NOAA/OAR	Science.gov; Earth & Ocean Sciences; Climate, Weather, and Meteorology; Climate Change	**Environmental Technology Laboratory (ETL)** As of October 1, 2005 the Environmental Technology Laboratory has merged into the Earth System Research Laboratory as part of the Physical Sciences Division. As part of our transition, the ETL Optical Remote Sensing Division will be moving to the ESRL Chemical Sciences Division. Collaborate with colleagues around the world to create advanced remote sensors to meet environmental challenges	http://www.etl.noaa.gov
Multi-agency NOAA/OAR NOAA/NESDIS	Science.gov; Earth & Ocean Sciences;	**Coral Reef Conservation Program**	http://www.coralreef.noaa.gov

NOAA/NOS	Climate, Weather, and Meteorology; Oceans & Oceanography	The CRCP is a partnership between the NOAA Line Offices working on coral reef issues, including the National Ocean Service (NOS), the National Marine Fisheries Service (NMFS), the Office of Oceanic and Atmospheric Research (OAR) and the National Environmental Satellites, Data and Information Service (NESDIS). Links to NOAA offices that are part of the CRCP can be found in the CoRIS library.	
NOAA/OAR	Science.gov; Earth & Ocean Sciences; Climate, Weather, and Meteorology; Oceans & Oceanography	**Ocean Explorer** These pages offer a comprehensive look at NOAA's 200-year history of ocean exploration **Office of Ocean Exploration** This office is responsible for coordinating NOAA's Ocean Exploration Initiative **National Undersea Research Program (NURP)** Provides a unique national service by providing undersea scientists with the tools and expertise they need to work in the undersea environment **Vents** **C**onducts research on the impacts and	http://oceanexplorer.noaa.gov http://explore.noaa.gov http://www.oar.noaa.gov/oceans/ocean_nurp.html http://www.pmel.noaa.gov/vents

		consequences of submarine volcanoes and hydrothermal venting on the global ocean	
NOAA/OAR	Science.gov; Earth & Ocean Sciences; Climate, Weather, and Meteorology; Oceans & Oceanography	Sea Grant Nonindigenous Species Site (SGNIS) National information center that contains a comprehensive collection of research publications and education materials produced by Sea Grant programs and other research institutions across the country on zebra mussels and other aquatic nuisance species	http://www.sgnis.org
NOAA/NESDIS	CoRP.gov	Center for Satellite Applications and Research	http://www.orbit.nesdis.noaa.gov/star/index.php
NOAA/NESDIS	Science.gov	Geomagnetism	http://www.ngdc.noaa.gov/seg/geomag/