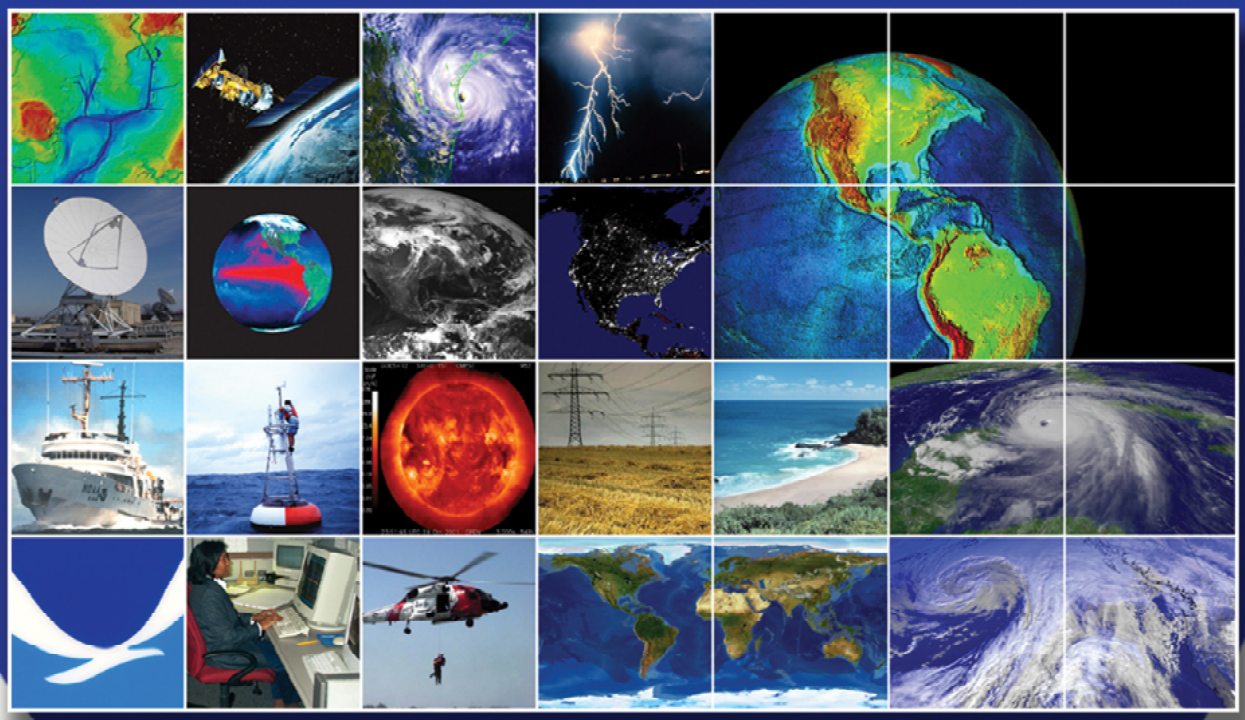
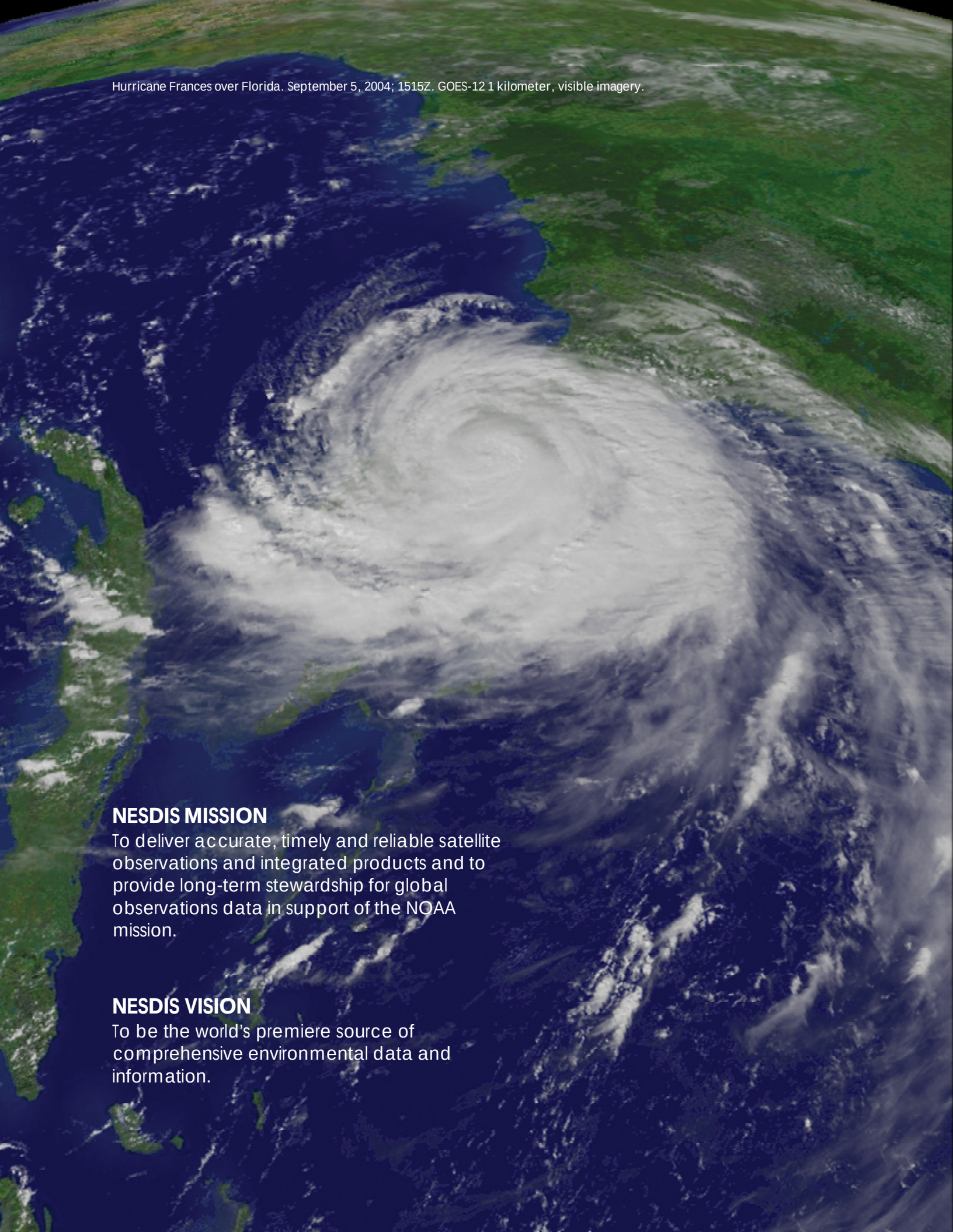
NOAA Satellite and Information Service Annual Report

National Environmental Satellite, Data, and Information Service (NESDIS)



ANNUAL REPORT
2004



Hurricane Frances over Florida. September 5, 2004; 1515Z. GOES-12 1 kilometer, visible imagery.

NESDIS MISSION

To deliver accurate, timely and reliable satellite observations and integrated products and to provide long-term stewardship for global observations data in support of the NOAA mission.

NESDIS VISION

To be the world's premiere source of comprehensive environmental data and information.

A Letter from the Assistant Administrator…

Our accomplishments for 2004 are exemplary, thanks to the employees at NOAA's Satellite and Information Service (NESDIS).

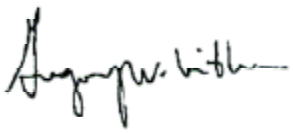
Our employees provided extensive, real-time support to Federal, state, and local agencies in detecting and analyzing significant hurricane activity this year. Of special note is support during Hurricanes Bonnie, Charley, Frances, Ivan, Jeanne, and Karl.

When wildfires broke out in Alaska, NOAA's Fairbanks Command and Data Acquisition Station met the call. The station provided real-time satellite imagery for firefighters and backup support to the National Aeronautics and Space Administration Earth Observation Satellite when NASA's station at Poker Flats, Alaska, was evacuated due to the fires. The Fairbanks station also served as the base of operations and housed over 800 fire fighters during the season.

NOAA's National Data Centers developed over 100 new climate, oceanic, and geophysical data products during the year. In response to user demand for more timely, high-quality information, NOAA's National Climatic Data Center has developed a new automated quality control processing system that integrates data from several NOAA observing systems (surface, radar, satellites), greatly enhancing data quality and timeliness.

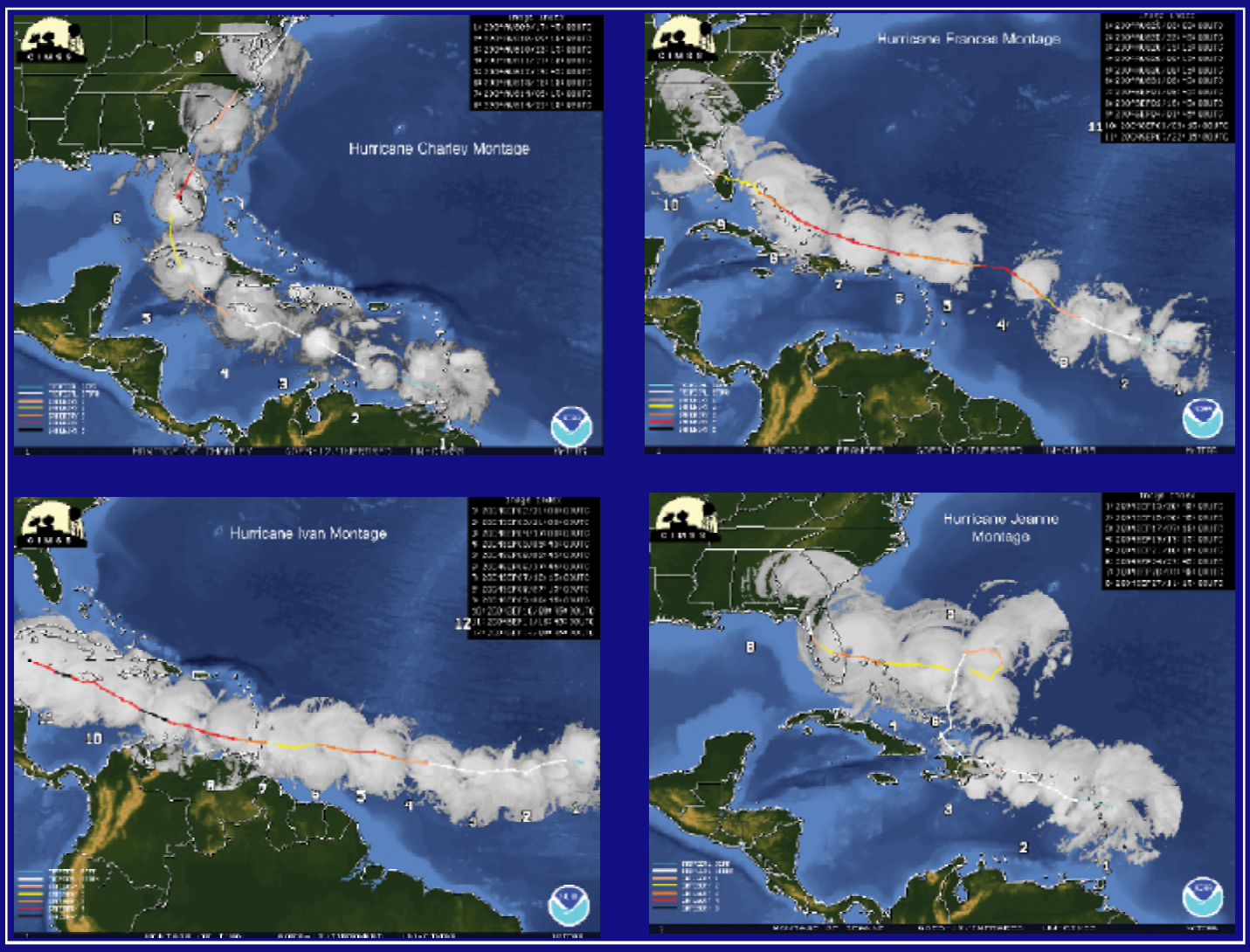
Building on work begun last year, we continue to actively support NOAA's international leadership on the development of the Global Earth Observation System of Systems (GEOSS). NOAA also was instrumental in the development of a draft Strategic Plan for the U.S. Integrated Earth Observations System. At the NOAA level our NOAA Observing Systems Council published the "Strategic Direction for NOAA's Integrated Global Environmental Observation and Data Management System" in July 2004.

The accomplishments described in this report serve our national and the global communities by providing comprehensive and easily accessible satellite products, environmental information, and assessments of the environment. I salute our employees and am indeed proud of their professionalism, dedication to duty, and accomplishments for 2004.

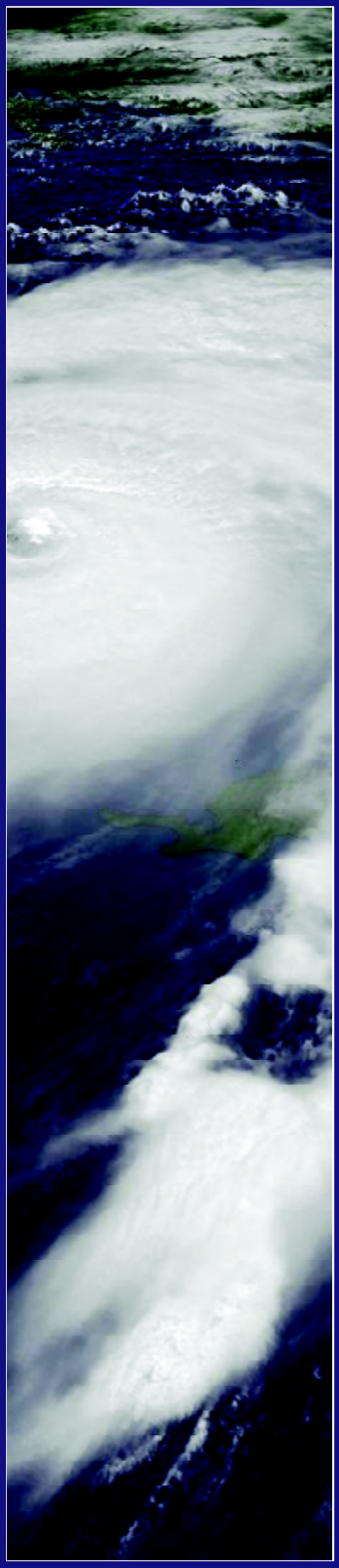


Gregory W. Withee
Assistant Administrator for Satellite and Information Services

2004



Hurricane Season



Introduction

The National Oceanic and Atmospheric Administration (NOAA) mission is to understand and predict changes in the Earth's environment and conserve and manage coastal and marine resources to meet our Nation's economic, social, and environmental needs. NESDIS supports this mission with a focus on NOAA's mission goals.

Goal 1: Protect, restore, and manage the use of coastal and ocean resources through an ecosystem approach to management.

Goal 2: Understand climate variability and change to enhance society's ability to plan and respond.

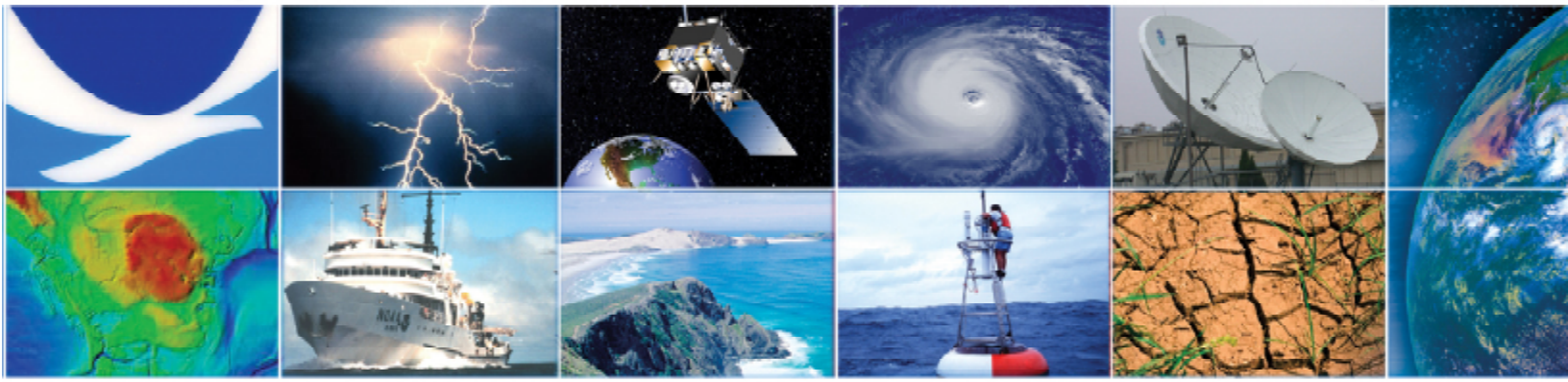
Goal 3: Serve society's needs for weather and water information.

Goal 4: Support the Nation's commerce with information for safe, efficient, and environmentally sound transportation.

Goal 5: Provide critical support for NOAA's mission.

This annual report highlights key achievements in 2004 that have resulted in numerous benefits to the Nation. NESDIS provides global environmental data from satellites and other sources to NOAA and other Federal agencies, the Nation as a whole, and international partners. These data are used to provide severe storm warnings, short- and long-term weather forecasts, climate analyses, satellite-aided search and rescue, and other services. NESDIS contributes to the national economy with data that support resource management in areas such as energy, water, transportation, and global food supplies.

This report, organized according to NOAA's mission goals, highlights our accomplishments that support these goals. It also provides an update on the following NOAA cross-cutting priorities: developing, valuing, and sustaining a world-class workforce; integrating global environmental observations and data management; ensuring sound, state-of-the-art research; promoting environmental literacy; and exercising international leadership.



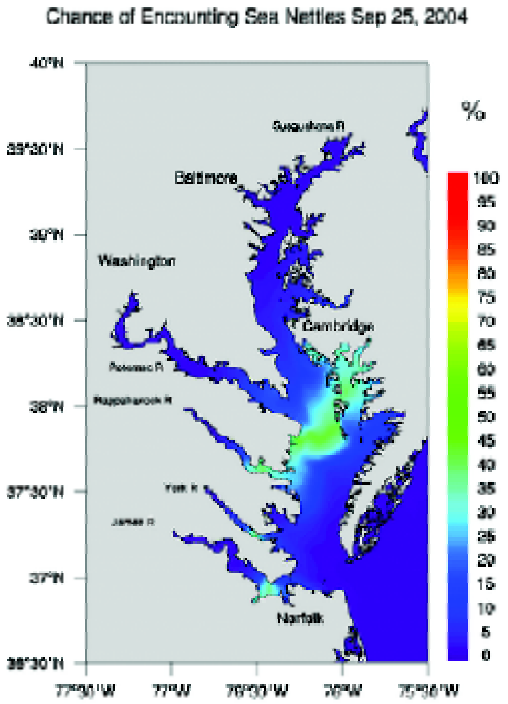
GOAL1...

Protect, restore, and manage the use of coastal and ocean resources through an ecosystem approach to management.

Coastal areas are among the most developed in the Nation. More than half the population lives on less than one-fifth of the land in the contiguous United States. Coastal counties, including those along the Great Lakes, are growing three times faster than counties elsewhere, adding more than 3,600 people a day to their populations. Coastal and marine waters support over 28 million jobs and provide a tourism destination for 180 million Americans each year. The value of the ocean economy to the United States is over $115 billion. The amount added annually to the national economy by commercial and recreational fishing industries is over $48 billion, with an additional $6 billion in direct and indirect economic impacts from aquaculture. With its Exclusive Economic Zone of 3.4 million square miles, the United States manages the largest marine territory of any nation in the world. NESDIS provides data and information used to restore and protect ocean, coastal, and Great Lakes resources. NESDIS is continuing to improve the accuracy of forecasts of significant ecological events.

Sea Nettles in the Chesapeake Bay

The environmental conditions associated with the presence of sea nettles in the Chesapeake Bay are relatively well established. Sea nettles, *Chrysaora quinquecirrha*, seasonally infest the Chesapeake Bay and affect many activities there. Knowing where and when to expect them may help to alleviate this problem. Given the salinity and temperature preferences of sea nettles, scientists at NOAA's Satellite and Information Service (NESDIS) Office of Research and Applications have developed an experimental procedure that produces maps illustrating the probable distribution patterns of the sea nettles. The maps are produced by applying a habitat model to surface salinity estimated from a numerical hydrographic model of the Chesapeake Bay, and sea-surface temperature derived from the hydrographic model or NOAA satellite imagery. The maps identify locations where environmental conditions are favorable to sea nettles. This project represents collaboration among scientists from the University of Maryland Center for Environmental Science, the Virginia Institute of Marine Science at the College of William and Mary, and NOAA.

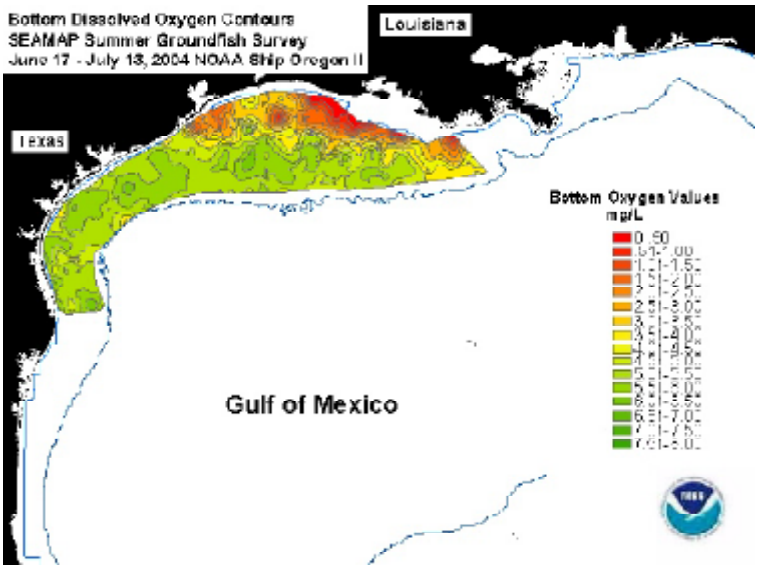


This nettle prediction map was generated using model-generated estimates of salinity and sea-surface temperatures. Sea-surface temperatures derived from NOAA satellite data will be used in the future.

Please visit: http://coastwatch.noaa.gov/seanettles/index.html

Early Look at Gulf of Mexico Dead Zone

In July 2004, the NOAA National Coastal Data Development Center, NOAA Coast Watch Regional node, and NOAA Fisheries offices in Stennis Space Center, Mississippi, formed a partnership to provide online, near-real-time data about dissolved oxygen from the seasonal hypoxic area, or "dead zone" in the Gulf of Mexico. Hypoxia occurs when the amount of dissolved oxygen in the water becomes too low to support most marine life, including shrimp, crabs, and fish. Mostly a summertime phenomenon, this "dead zone" begins to form in June. It extends from the mouth of the Mississippi River westward to Texas. Although hypoxia in the Gulf of Mexico has appeared naturally for thousands of years, its geographic area has increased significantly since the early 1980s.



NOAA provides near-real-time data about dissolved oxygen from the seasonal hypoxic area, or "dead zone" in the Gulf of Mexico.

Please visit: http://www.ncddc.noaa.gov/Habitat/coastwatch

Restoration Portal Website

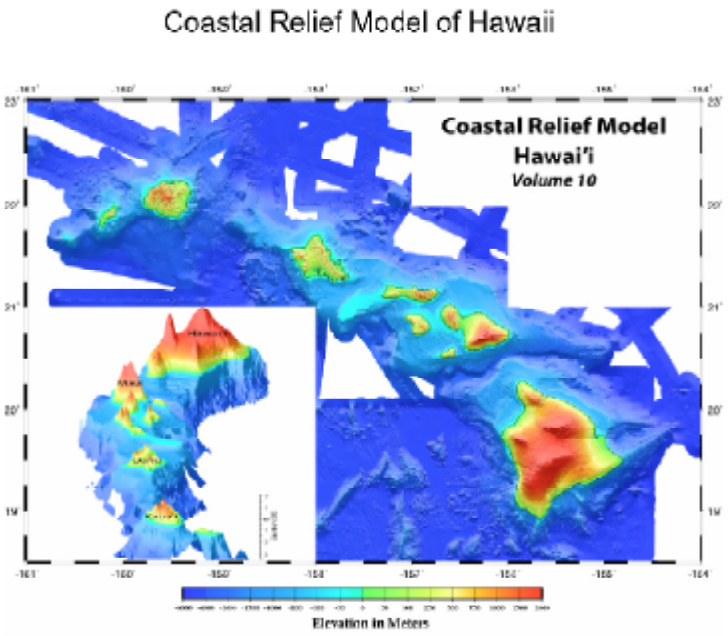
The NOAA Central Library is an active partner in the NOAA Restoration Portal Web site. The NOAA Restoration Center enhances living marine resources to benefit the Nation's fisheries by restoring their habitats. This Web site provides centralized access to information about NOAA restoration programs, projects, and activities through a single point-of-entry. Publications, Web sites, and audiovisual resources are dynamically displayed from the NOAA Library Catalog using a Microsoft.Net framework. Using international standards to allow easy searching and retrieving from remote databases streamlines the existing method used within NOAA for similar Web offerings. Because the system dynamically generates pages directly from the NOAA Library Catalog database,all information is up-to-date.

The NOAA Central Library is an active partner in the NOAA Restoration Portal Web Site, a focal point for marine and estuarine habitat information.

Please visit: http://www.restoration.noaa.gov/

Coastal Relief Model of Hawaii Produced

NOAA's National Geophysical Data Center (NGDC) continued to address the need for topographic-bathymetric relief models that integrate land and seafloor elevations. In 2004, NGDC completed coastal relief models for Puerto Rico and Hawaii. For Hawaii, single beam hydrographic, multibeam bathymetric, LIDAR, and Shuttle Radar Topography data were combined to produce the coastal relief model.



The Coastal Relief Model for Hawaii is now complete.

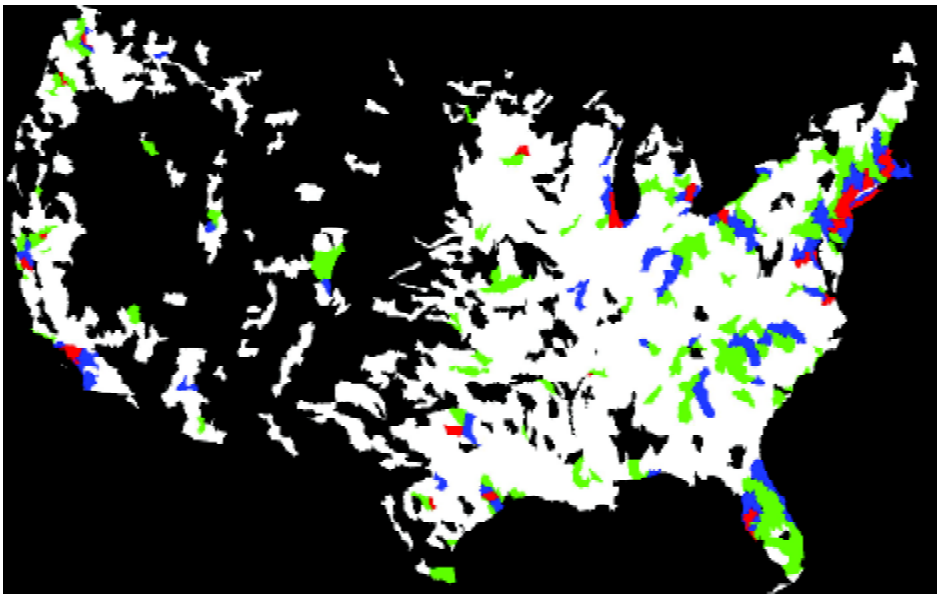
The data are available online or as a custom product and provide users a unique set of information for mapping and understanding the coastal relief environment.

Please visit: http://www.ngdc.noaa.gov/mgg/coastal/coastal.html

Data Show U.S. Impervious Surface Area is Slightly Smaller than Ohio

The construction and maintenance of impervious surfaces such as buildings, roads, parking lots, and roofs, constitutes a major human alteration of the land surface, changing the local hydrology, climate, and carbon cycling. Previously, Impervious Surface Area (ISA) maps were available for only a few areas, due in part to the technical challenges and cost constraints of using high spatial resolution data for direct mapping of constructed surfaces. As an alternative, the National Geophysical Data Center used existing national coverage data sources to model the percent cover of ISA on a one-kilometer grid for the conterminous United States. The data sources included satellite observed nighttime lights, three classes of Landsat derived urban land cover, and the U.S. Census Bureau road vectors. The three national coverage datasets were re-sampled to a one-kilometer equal-area reference grid, and the ISA model was calibrated using 80 aerial photographs selected on urban-to-rural transects from 13 U.S. cities. Results indicate that total ISA of the conterminous United States is 112,610 (+/- 12,725) square kilometers, which is slightly smaller than the state of Ohio (116,534 km^2), and slightly larger than the total area of herbaceous wetlands (98,460 km^2) of the conterminous United States.

Please visit: http://dmsp.ngdc.noaa.gov/html/download_isa2000_2001.html



Environmental impacts of ISA (increases in stream discharge, surface water temperatures, water pollution, stream channel modifications, and biodiversity losses) begin once ISA exceeds 10 percent surface cover, and are generally severe where ISA exceeds 30 percent. Key:
0-1% = black
1-10% = white
11-20% = green
21-40 % = blue
greater than 40% = red

GOAL2...

Understand climate variability and change to enhance society's ability to plan and respond.

Climate shapes the environment, natural resources, economies, and social systems that people depend upon worldwide. While humanity has learned to contend with some aspects of the climate's natural variability, major climatic events, combined with the stresses of population growth, economic growth, and land-use practices, can impose serious consequences on society. The 1997-98 El Niño, for example, had a $25 billion impact on the U.S. economy – property losses were $2.6 billion, and crop losses approached $2 billion. Long-term drought leads to increased and competing demands for fresh water with related effects on terrestrial and marine ecosystems, agricultural productivity, and even the spread of infectious diseases. Decisions about mitigating climate change also can alter economic and social structures on a global scale. NESDIS maintains data stewardship to provide researchers, policy makers, and the public with critical data. NESDIS also contributes data and information on climate variability and change, and their effect on commerce.

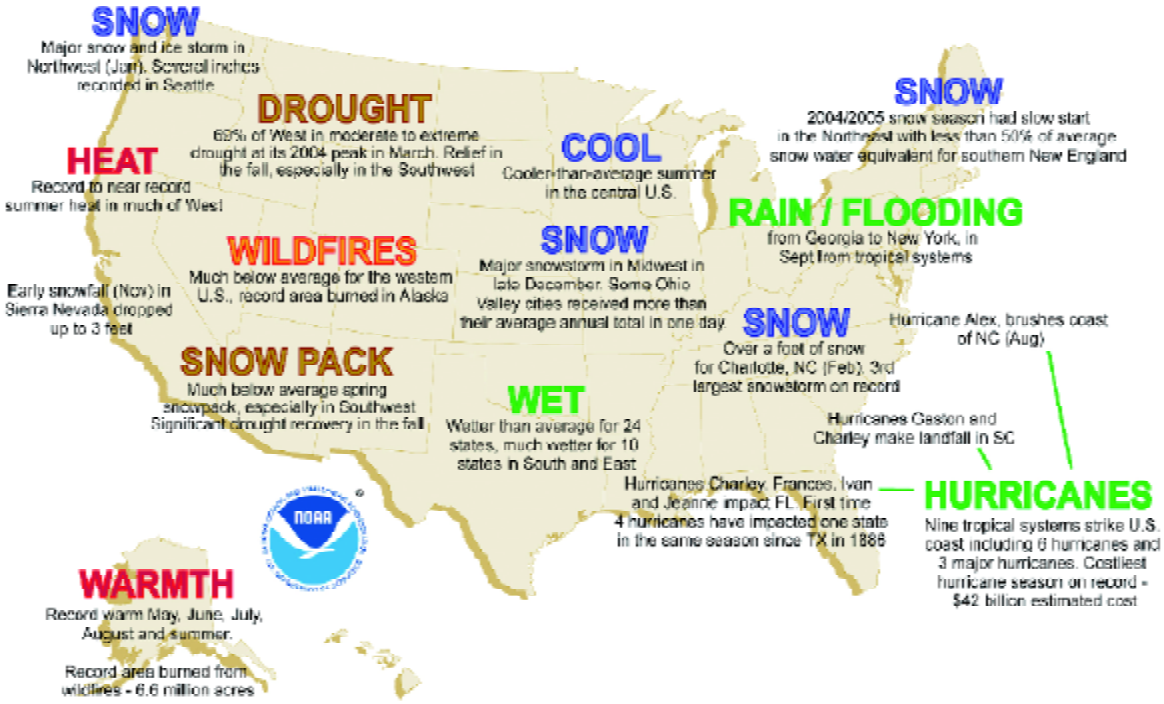
End-of-year: State of the Climate Report for 2004

NESDIS' National Climatic Data Center (NCDC) issued the Web-based Annual State of the Climate report for 2004 on December 16. This report provides information on global and U.S. temperature and precipitation including analyses of trends and extremes using an array of long-term records from land and ocean surface observations as well as satellites. Also provided in this report are a summary of hurricane and tropical cyclone activity, the progress of a developing El Niño episode, and information on severe drought and wildfire activity.

Temperatures were again warmer than average across much of the world's land and ocean surfaces. The global temperature for 2004 is expected to be no less than the 4th warmest on record, continuing a trend of warmer temperatures that resulted in an increase of approximately 1 degree F since 1900 and a rise almost three times that rate since 1976. Other global events in 2004 include: a record number of typhoons impacting Japan, below normal monsoon rainfall in India, a severe heatwave in Australia during the late summer, and a developing El Niño that is expected to continue into early 2005.

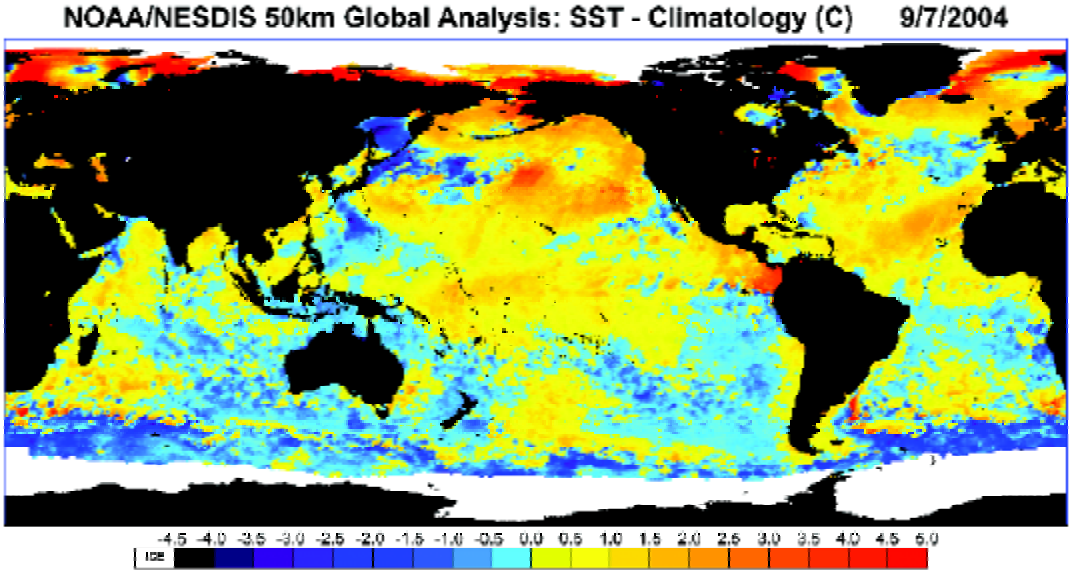
The 2004 annual average temperature for the United States is expected to be warmer than average. Much of the contiguous United States experienced a cooler than average summer, while Alaska had its warmest summer on record. Large parts of the West remained in drought near year's end, although some relief occurred with above average precipitation in the fall from parts of Colorado and New Mexico westward. Precipitation totals for 2004 were above average in many parts of the country, particularly in the South and East, where several land-falling hurricanes and tropical storms contributed to the above average totals. In all, nine storms, including six hurricanes, affected the Unites States. Four of the six hurricanes made landfall on or near the Florida coast, making it the only state since Texas in 1886 to sustain the impact of four hurricanes in one season.

Significant U.S. Weather and Climate Events for 2004



El Niño Returns

On September 10, 2004, NOAA declared that El Niño was back and that there was evidence that conditions were developing in the Tropical Pacific. This new event is expected to last through early 2005. It was not clear what impacts, if any, this event will have on ocean temperatures along the West Coast of South America and on temperature and precipitation in the United States. Using NOAA satellite data, scientists noted that sea surface temperatures were more than 0.5 degrees C above average in the Central and Western equatorial Pacific during August 2004. By early September, positive sea surface temperature departures greater than 0.5 degrees C (~1 degree F) were found between 160 E and 120 W, with departures greater than 1 degree C extending from 170 E eastward to 140 W.



NESDIS produces operational sea surface temperature anomaly charts twice a week in near real-time.

New Climate Reference Network

In January 2004, NOAA commissioned the U.S. Climate Reference Network (CRN), a new climate monitoring network of high-precision, state-of-the-art instruments for measuring two key primary parameters, surface air temperature and precipitation, as well as solar radiation, and wind speed. The CRN grew from 45 stations in January to 75 stations by the end of CY 2004. Hourly observations are transmitted in near real-time by NOAA's Geostationary Operational Environmental Satellites to NOAA's National Climatic Data Center in Asheville, N.C. The observations are available online in near real-time to users worldwide.

The CRN will provide the United States with a first-class observing network for the next 50 to100 years, and will serve as a benchmark for climate monitoring. The network will play a key role in detecting and monitoring climate change in the United States. It will help industry and all levels of government decision-makers to develop policies that are affected by changes in the Nation's climate. As a result of the CRN, scientific uncertainty on long-term temperature and precipitation trends has been reduced from 5 percent to 3.5 percent for temperature, and from 16 percent to less than 10 percent for precipitation.

CRN site installation.

Please visit: http://www.ncdc.noaa.gov/oa/climate/uscrn/

New Products for Ocean Climate

The Ocean Climate Laboratory of NOAA's National Oceanographic Data Center has produced two new products as part of the International Ocean Atlas and Information Series: "Climatic Atlas of the Arctic Seas: Database of Barents, Kara, Laptev, and White Seas -- Oceanography and Marine Biology" and "36-Year Time Series (1963-1998) of Zooplankton, Temperature, and Salinity in the White Sea." Produced in conjunction with foreign partners, this series helps support and promote national policies and interests in ecosystem management, climate change, Earth observations, and weather forecasting through this international exchange of information. The "Climatic Atlas of the Arctic Seas: Database of Barents, Kara, Laptev, and White Seas -- Oceanography and Marine Biology" was produced in association with the Murmansk Marine Biological

A comprehensive series of oceanographic and biological observations in the Barents, White, Kara, and Laptev Seas can be used for long-term global change monitoring.

Institute, Russian Academy of Sciences, in July 2004. This atlas and the accompanying CD-ROM present primary data on meteorology, oceanography, and hydrobiology from the Barents, Kara, Laptev, and White Seas, which were collected by scientists from different countries during the period 1810-2001.

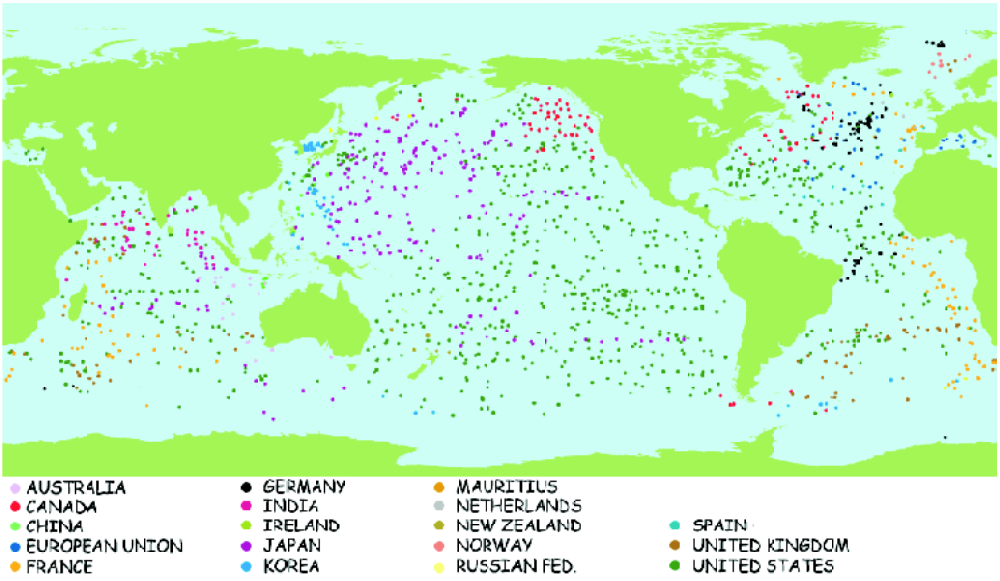
Please visit: http://www.nodc.noaa.gov/OC5/PDF/ATLAS/english58.pdf

The "36-Year Time Series (1963-1998) of Zooplankton, Temperature, and Salinity in the White Sea" atlas and accompanying CD-ROM were done in association with the White Sea Biological Station, Zoological Institute, Russian Academy of Sciences. The study describes the seasonal and long-term dynamics of oceanographic parameters and plankton abundance, giving special consideration to long-term trends.

A collection of zooplankton from the White Sea Biological Station.

Please visit: http://www.nodc.noaa.gov/OC5/WH_SEA/index1.html

Increased Distribution of Argo Data for ocean climate observing



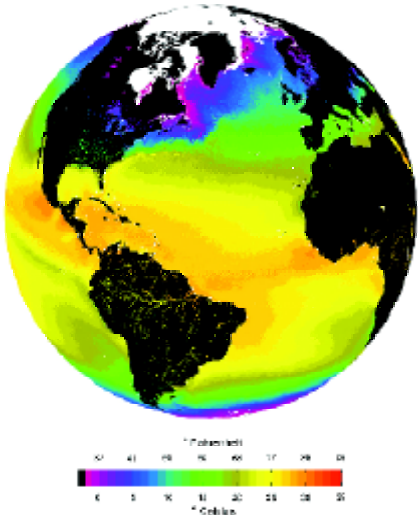
Argo is a major component of the global ocean observing system

Argo, an array of floats, is a major component of the global ocean observing system that will ultimately consist of an array of 3,000 free-drifting profiling floats. Deployed Argo floats transmit data every 10 days to a national Argo Data Assembly Center. The center aggregates the data and sends it forward to the two Global Data Assembly Centers (in France and California). The National Oceanographic Data Center's (NODC) acquires the data for archiving. The NODC operates the Global Argo Data Repository, ensuring that the Argo data collection is preserved and maintained in a permanent archive and is accessible. The Argo database currently consists of about 106,500 individual station files; additional files are generated and loaded into the database daily. Monthly Argo data requests increased from 287 in March 2003 to 87,654 in August 2004. The number of distinct hosts served monthly increased dramatically from 35 to 640 during the same period.

Please visit: http://www.nodc.noaa.gov/argo

20 Years of Global Sea Surface Temperature Data Reprocessed

Collaborators from NOAA's National Oceanographic Data Center (NODC), the University of Miami's School of Marine and Atmospheric Science, and the NASA JPL Physical Oceanography Distributed Active Archive Center (PO.DAAC) partnered to produce and distribute a 20-year time series of global, 4 km resolution sea surface temperature (SST) climate data records. This partnership has significantly improved the Pathfinder SSTs by reprocessing data from the Advanced Very High Resolution Radiometer aboard NOAA's polar-orbiting satellites to twice the previously available resolution. This new Pathfinder product is available from 1985-2004 on daily, weekly, 8-day, monthly, and annual averaging periods, along with corresponding climatologies. Initial results from this dataset include a 0.23 °C reduction in uncertainty over the NESDIS operational climatology and improved coral reef coverage from a previous best of 61 percent to over 98 percent. To reach the broadest array of users, the Pathfinder data are being made available through partnerships with the U.S. Geological Survey National Atlas, the NOAA Operational Model Archive and Distribution System, the National Virtual Ocean Data System, and through the PO.DAAC online browse, subset, and download systems. The NODC distribution systems alone have already resulted in over 2,200 users accessing more than 1.5 terabytes of Version 5.0 Pathfinder data.



An example of sea surface temperature climatology derived from the AVHRR Pathfinder Version 5.0 dataset (SST in degrees C.)

Please visit: http://www.nodc.noaa.gov/sog/pathfinder4km

A monk seal is equipped with a device that enables scientists to track its movement via Argos.

Argos Data Collection and Location System Grows to Meet the Needs of the Climate Observation Community

The Argos Data Collection and Location System consists of an instrument aboard NOAA's Polar-orbiting Operational Environmental Satellites and in-situ data collection platforms equipped with sensors and transmitters. The system is administered under a joint agreement between NOAA and the French space agency, Centre National d'Etudes Spatiales (CNES). The NOAA Satellite and Information Service Office of Satellite Data Processing and Distribution manages the program. In 2004 the Argos Data Collection System grew by 19 percent — from 9,700 platforms in 2003, to 12,100 in 2004. While most commonly used for tracking animal migration, an increase in use for measuring climate related information has taken place. For example, more than 4,000 Argos platforms are floating, drifting, or moored in the oceans, transmitting data and positions to users ashore for weather forecasting, weather modeling, climate prediction, pollution monitoring, polar research, and ocean circulation research. Argos is also used to track wildlife.

Please visit: http://noaasis.noaa.gov/ARGOS/

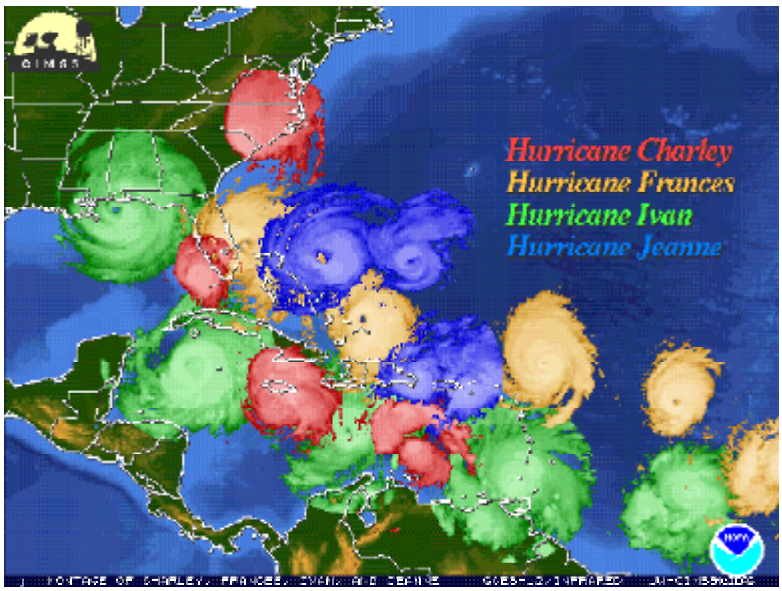
GOAL3...

Serve society's needs for weather and water information.

Floods, droughts, hurricanes, tornadoes, tsunamis, and other severe weather events cause $11 billion in damages each year in the United States. Weather is directly linked to public safety, and nearly one third of the U.S. economy (around $3 trillion) is sensitive to weather and climate. With so much at stake, NOAA's role in understanding, observing, forecasting, and warning of environmental events is expanding. With our partners, we seek to provide decision makers with key observations, analyses, predictions, and warnings for a range of weather and water conditions, including those related to water supply, air quality, and space weather. Businesses are getting more sophisticated about how to use this weather and water information to improve operational efficiencies, manage environmental resources, and create a better quality of life. NESDIS is deploying new multi-use observing systems and implementing more research findings into NOAA operations with less transition time. NESDIS is providing real-time and near real-time data to assist forecasters and water managers.

NESDIS Monitors Hurricanes During Active 2004 Season

Public demand for satellite imagery reached record levels in 2004 as four hurricanes made landfall in Florida over a six-week period during the peak of the 2004 Hurricane Season. NOAA's Satellite and Information Service, Office of Satellite Data Processing and Distribution, achieved a record in terms of number of Web "hits" and amount of data distributed to the public. On September 15, 2004, as Hurricane Ivan was about to make landfall on the U.S. Gulf Coast, the Satellite Services Division served a 24-hour total of 2.52 Terabytes, and a weekly access count of 228,992,085 users.



The Office of Satellite Operations provided extensive, real time support to federal and local agencies in detecting and analyzing significant hurricane activity during the season. In support of the active hurricane season, satellite operations were reconfigured to provide rapid-scan 5-minute imaging during Hurricane Frances, with a 99.9% delivery rate for 584 images; and during Hurricane Charley, with a 100% delivery rate for 469 images.

Please visit: http://www.ssd.noaa.gov **and** http://www.ssd.noaa.gov/PS/TROP/trop-atl.html

The Fairbanks Command and Data Acquisition Station provided host to a team of 800 firefighters during the summer of 2004.

Fairbanks Command and Data Acquisition Station Critical to Fighting Alaska Wildfires

During the summer of 2004, Alaska experienced numerous wildfires. At the request of the National Forest Service, the Satellite and Information Service Fairbanks Command and Data Acquisition Station hosted a team of more than 800 firefighters on the facility grounds. The National Forest Service asked to use the station as its command center for the fire fighting operations, and dispatched firefighters and equipment from the facility to battle blazes, which scorched more than three million acres. The Forest Service and Alaskan State Police provided extra security to augment the station's security staff. All fire fighting activities were conducted on a non-interference basis with the station's satellite command and control activities. The Fairbanks station provided real-time satellite imagery for firefighters and backup support to National Aeronautics and Space Administration's Earth Observing System (NASA EOS) spacecraft when NASA's station at Poker Flats, Alaska, was evacuated due to the fires.

Please visit: http://www.fcdas.noaa.gov/

National Polar-orbiting Operational Environmental Satellite System

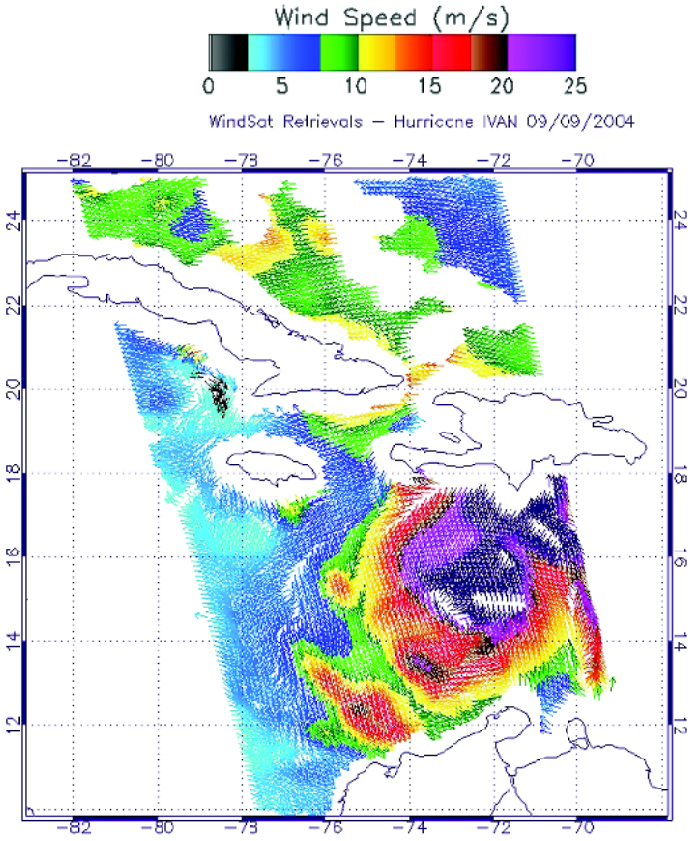
The Svalbard, Norway, ground station, which allows high data rate relay of satellite downlinks back to the United States for processing, was completed in 2004. A delegation from NOAA participated in the official acceptance of the fiber optic cable line from Svalbard to the Norwegian mainland. The fiber optic cable is a vital element of NOAA's use of the Svalbard ground station to support the National Polar-orbiting Operational Environmental Satellite System

Svalbard, Norway, ground station completed.

(NPOESS) Preparatory Project (NPP). NPP is a risk reduction mission designed to function as a bridge between the NASA EOS program and NPOESS for the development of advanced atmospheric sounding instruments.

Risk Reduction Satellite Windsat/Coriolis Data Released

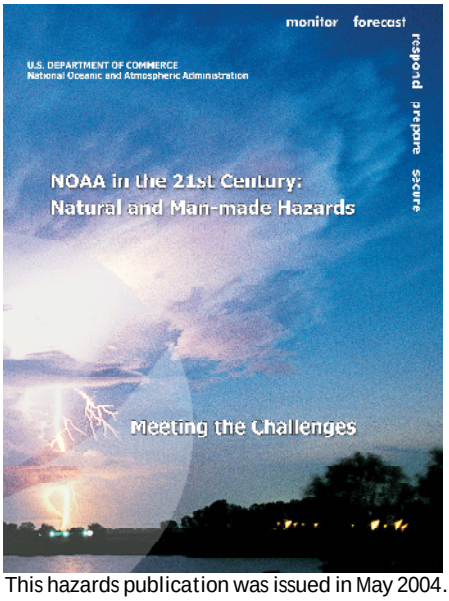
The Windsat/Coriolis spacecraft was launched in 2003. Windsat/Coriolis is an interagency cooperation success story. The Naval Research Laboratory, with cooperation from NASA, the Air Force, and NOAA, is demonstrating the concept of polarimetric radiometry to measure ocean surface wind speed and wind direction by modifying a space test program satellite bus for the Windsat/Coriolis payload. The Windsat/Coriolis mission measures the ocean surface wind field at a horizontal resolution of 25 km using a 1.9-m diameter reflector. These data are important to forecasting intensity of hurricanes and support the understanding of ocean winds in weather globally. This satellite is currently using the Svalbard and Fairbanks Ground Stations to transmit data.



Wind vectors from Windsat/Coriolis during Hurricane Ivan, September 2004.

NOAA Hazards Publication

In 2004, NESDIS's National Geographic Data Center served as the project lead for "NOAA in the 21st Century: Natural and Man-made Disasters," which was published in May 2004. NOAA will focus expertise on the areas outlined in this document: monitor and assess; forecast and warn; respond and recover; prepare and mitigate; and secure and protect. NOAA carries out a daily mission of monitoring weather, oceans, coasts, and fisheries, as well as developing forecasts, and distributing information for economic and public benefit. NOAA operates a complex network of observing systems that enable us to meet our mission. These technical capabilities, as well as first-class Earth scientists of all disciplines, offer enormous possibilities for understanding and mitigating natural hazards.



This hazards publication was issued in May 2004.

Please visit: http://www.ngdc.noaa.gov/noaa_pubs/noaa_hazards.shtml

GOAL 4...

Support the Nation's commerce with information for safe, efficient, and environmentally sound transportation.

Safe and efficient transportation systems are crucial to the U.S. economy. The United States maritime transportation system ships over 95 percent of the tonnage and more than 20 percent by value of foreign trade through U.S. ports, including 48 percent of the oil needed to meet America's energy demands. At least $4 billion is lost annually due to economic inefficiencies resulting from weather-related air traffic delays. Improved surface weather forecasts and specific user warnings would reduce the 7,000 weather-related fatalities and 800,000 injuries annually from accidents on roads and highways. The injuries, loss of life and property damage from weather-related accidents cost an average of $42 billion annually. NESDIS data are used to determine the safety of airline routes and flight plans. In the marine industry, NESDIS data reduce the risk of damage to ships and cargo. For surface transportation, NESDIS data are used to issue weather forecasts and warnings. NESDIS also administers the Commercial Remote Sensing Licensing and Enforcement Program, and the Search and Rescue Satellite-aided Tracking system.

Cospas-Sarsat Has Active Year

This year was another busy one for the Cospas-Sarsat program, which uses NOAA satellites and Russian satellites to detect and locate emergency signals from beacons carried by vessels, aircraft, and outdoor adventurers in distress. At press time, there were 260 lives saved in the United States in 2004, bringing the U.S. total to 4,917, and the worldwide total to more than 18,000 since 1982. Some accomplishments include installation of a new ground system to allow NOAA to receive alerts from geostationary satellites, international decision to include India as a space segment provider; and participation in the joint United Nations – United States Workshop on Cospas-Sarsat.

On July 1, 2004, Cospas-Sarsat began providing a new capability for relaying ship security alerts. The Ship Security Alerting System (SSAS) covertly alerts National Authorities of acts of terrorism and piracy by having a discrete means to transmit a security alert to a dedicated response center via the Sarsat system. NOAA's Sarsat Program was instrumental in the development of the technical standard for SSAS beacons.

During 2004, new ground stations were installed and commissioned into the Cospas-Sarsat network at the Guam, Hawaii, California, and Suitland, Maryland, sites. In addition, Sarsat added three new geostationary ground station terminals at the U.S. Mission Control Center in Suitland to receive Sarsat alerts from NOAA's Geostationary Operational Environmental Satellites. This is the first time NOAA has had this capability. Previously, these alert data were provided by the Canadian Mission Control Center.

In March 2004, Sarsat initiated a secured Virtual Private Network (VPN) service with the U.S. Air Force Rescue Coordination Center at Langley Air Force Base, Virginia. The VPN connection provides new capabilities to transmit distress alerts originating within the contiguous United States at a lower

cost. The VPN is particularly important for improving the distress alerting traffic for Personal Locator Beacons (PLBs) and was the first major step in establishing a nationwide, automated PLB response network with each of the contiguous 48 states. In August 2004, Vermont became the first state to connect to the automated PLB alerting system.

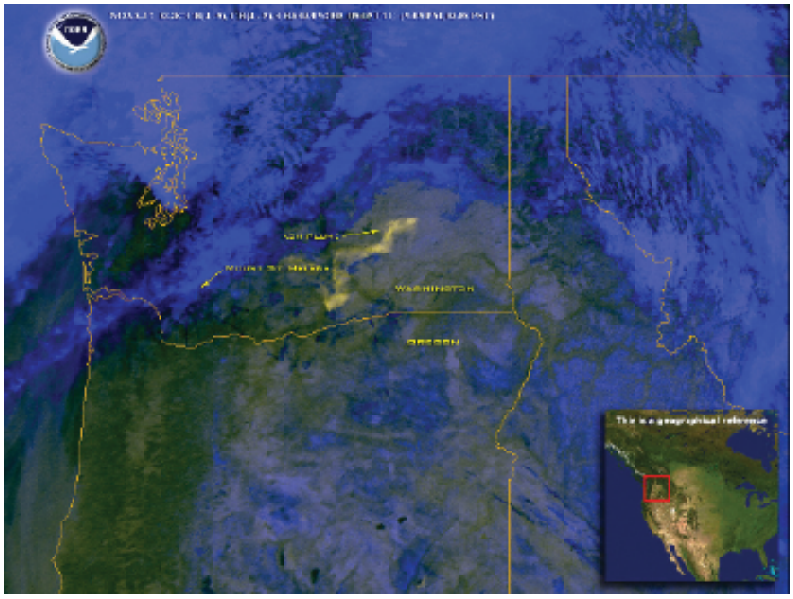
The U.S. Coast Guard demonstrates a rescue.

2004 also saw Sarsat unveil a new capability to provide Rescue Coordination Centers (RCCs) with an option to provide feedback via the Internet for all distress alerts. Previously, this was done either through faxing in hardcopy forms or via e-mail. This service assists the RCCs with more timely and accurate reporting and helps NOAA meet the requirements of the Government Paperwork Elimination Act.

Please visit: http://www.sarsat.noaa.gov/

NOAA Monitors Mount St. Helen's Eruption

When Mount St. Helens erupted in October 2004, NOAA responded with satellite images and atmospheric models to track the dispersion and trajectory of ash clouds. In addition, with the Federal Aviation Administration, NOAA issued notices to warn pilots of the location of the ash. NOAA operates two Volcanic Ash Advisory Centers, one in Anchorage, Alaska, the other in Camp Springs, Maryland. The centers issue advisory statements, including graphics and text messages about the location and size of the ash clouds, which are distributed through several global networks and posted online in real-time. It is critical that pilots know in advance where the ash clouds are headed, to avoid risks, and keep passengers safe.



A plume of steam and ash from Mt. St. Helen's is seen drifting southeast from the mountain about an hour after eruption.

Please visit: http://www.osei.noaa.gov/ and http://www.ssd.noaa.gov/VAAC/vaac.html

Commercial Remote Sensing

Pursuant to the 1992 Land Remote Sensing Policy Act and Administration policy on foreign access to remote sensing space capabilities, NOAA issued new operating licenses to Northrop Grumman and ORBIMAGE in 2004. These licenses represent a continued effort to fulfill the fundamental goal of the President's policy on U.S. commercial remote sensing to advance and protect U.S. national security and foreign policy interests by maintaining the Nation's leadership in remote sensing space activities and enhancing the U.S. remote sensing industry. Accomplishing this goal will also foster economic growth, contribute to environmental stewardship, and enable scientific and technological excellence. NOAA also approved license foreign agreements representing significant new investment and business partnerships to support international business plans and worldwide distribution of geospatial data. Three U.S. firms, Space Imaging, DigitalGlobe, and ORBIMAGE, are now operating four separate satellite systems, providing a variety of valuable data products to government and private sector users.

Imagery from Commercial Space Providers Licensed by NOAA

Commercial satellite imagery companies provided a detailed view of damage from the hurricanes of 2004.

Space Imaging

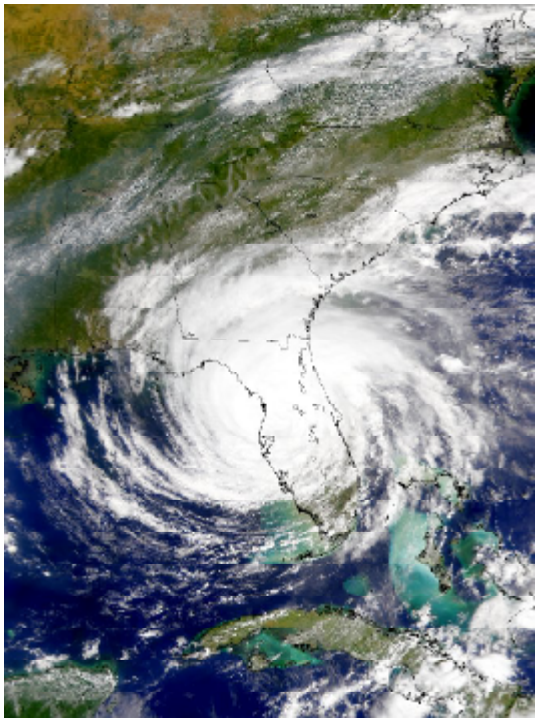
Pensacola Historic Village, Florida, Side-by-Side Comparison Images

Space Imaging released these before-and-after satellite images of hurricane damage at Pensacola, Florida's Historic Village along Pensacola Bay and the Chico Bayou area just to the west. Damage from Hurricane Ivan can be easily discerned when comparing the "before" one-meter resolution image collected January 4, 2003, to the "after" image collected September 18, 2004. There is a considerable amount of debris strewn across the ground in the "after" image. Credit: Space Imaging

Digital Globe

Gonaives, Haiti

This is a natural color, 60-centimeter (2-foot) high-resolution QuickBird satellite image featuring the flooding in Gonaives, Haiti, after the passing of Hurricane Jeanne. Image collected September 23, 2004. Credit: Digital Globe



Hurricane Jeanne

This image of Hurricane Jeanne, a Category 4 storm, was collected by ORBIMAGE's OrbView-2 "SeaWiFS" satellite on September 26, 2004, at approximately 2:00 p.m. EST. The image shows Jeanne swirling over Florida. Credit: ORBIMAGE

ORBIMAGE

Athens Olympic Sports Complex

ORBIMAGE's newest satellite provided a different type perspective of the 2004 Olympic venue. Shown here is the Athens Olympic Sports Complex, collected by ORBIMAGE's OrbView-3 satellite on February 5, 2004, six months before the 2004 Summer Olympic Games. The Complex includes the Olympic Aquatic Centre, the Olympic Indoor Hall, the Olympic Stadium, the Olympic Tennis Centre, and the Olympic Velodrome. Credit: ORBIMAGE

GOAL 5...

Provide Critical Support for the NOAA Mission

Strong, effective, and efficient support activities are necessary for NOAA to achieve our mission goals. Our facilities, environmental satellites, data-processing systems, computing and communication systems, financial and administrative offices, and our approach to management provide the foundation of support for all of our programs. This foundation must support U.S. homeland security by providing services in response to national emergencies. To achieve our mission goals, we must also commit to organizational excellence through management and leadership across a corporate NOAA. NESDIS is committed to organizational excellence in facilities, infrastructure, security, human capital, and administrative services

An aerial view of the facility being built in Suitland, Maryland.

Work Progressing on New Satellite Facility in Suitland, Maryland

Since breaking ground in April 2003, construction has steadily progressed on a new facility to house NOAA's satellite command and control functions, and data processing and distribution activities that are central to the NESDIS mission. By the end of fiscal year 2004, construction was 60 percent complete. The building, which will be located in Suitland, Maryland, is scheduled to open in 2005. It has already earned several awards, including a General Services Administration Design Excellence citation for its unique and advanced architectural design. The new facility will house five mission critical operational centers and a satellite operations center that will operate around the clock, 365 days per year. The centers support global data collection activities for meteorology, oceanography, solid earth-earth geophysics, and solar-terrestrial sciences. In addition, it will house the U.S. Mission Control Center for the Search and Rescue Satellite-aided Tracking program, and the National Ice Center, a joint NOAA/DOD mission to track ice floes and issue warnings to the Nation's maritime force.

GOES-8 De-orbited; NOAA-11 Deactivated

NOAA retired two satellites in 2004: the geostationary satellite GOES-8 (East) and the polar-orbiting satellite NOAA-11.

GOES-8, which was boosted into super-geosynchronous orbit on May 5, 2004, had a long and successful life. GOES-8 tracked some of the most memorable tropical cyclones on record—from the famous parade of storms in 1995, when five tropical cyclones were active in the Atlantic at the same time—including the deadly Hurricane Mitch, which devastated parts of Central America in 1998. Launched on April 13, 1994, GOES-8 was replaced by GOES-12 for the GOES-East mission in April 2003. Built by Space Systems/Loral in Palo Alto, California, the original design lifetime for GOES-8 was five years. It was the first spacecraft launched in the GOES I-M series of satellites, which was the first NOAA tri-axis stabilized spacecraft, replacing the older spinning design. This created new challenges in navigation and control of the satellite, but also allowed more imaging capabilities both in time and spatial resolution.

The NOAA-11 satellite, launched on September 9, 1988, was deactivated on June 16, 2004, after 15 years of operation. NOAA officially shut down critical components and transmitters for the polar-orbiting satellite after it had circled the Earth more than 80,000 times. From 1988 to 1994, NOAA-11 supplied the Nation with images crucial to accurate weather and climate forecasting. Shutting down the transmitters and other equipment will keep NOAA-11, which is now in permanent orbital storage, from interfering with other satellite frequencies.

Please visit: http://www.oso.noaa.gov/

GOES-R Takes Shape

Planning for the next generation of geostationary satellites, GOES-R moved forward in the fall of 2004. Contracts to investigate the end-to-end architecture were awarded, and the information used to prepare a Design/Risk Reduction program. A number of instrument contracts were active in 2004 as well. GOES-R will be the follow-on system to the GOES-I-P. Operating as a single end-to-end program with new and enhanced capabilities, the GOES-R system will provide environmental information over a greater geographical location in less time and at higher resolutions. These satellites will provide critical atmospheric, oceanic, climatic, solar and space infrared and imaging data of the entire United States surface and atmosphere to support all of NOAA's mission goals in ecosystems, climate, weather and water, and commerce and transportation.

Please visit: http://www.osd.noaa.gov/goes_R/index.htm

NOAA-N Prime Recovery

In the aftermath of the NOAA-N prime accident, September 6, 2003, at the Lockheed Martin plant in Sunnyvale, California, NOAA established a series of interagency teams to investigate options for the replacement of the NOAA-N prime satellite. NOAA, with NASA, implemented new oversight at the contractor's site and insisted on the implementation of new safety and product assurance measures to prevent similar accidents in the future. After several months of deliberations, NOAA management, with concurrence from the Department of Commerce, decided to rebuild the NOAA-N prime satellite.

NOAA and NASA have successfully negotiated a contract modification with Lockheed Martin to rebuild the satellite and launch it by December 31, 2007.

NOAA has also decided to repair two instruments that were damaged in the accident and provide them to EUMETSAT for flight on Metop-3. This action ensures that NOAA will meet its responsibilities under our joint agreements with EUMETSAT for sharing the polar satellite mission.

Cross-cutting Priorities

In meetings with NOAA's stakeholders and employees to identify strategic directions for the next decade, both groups emphasized that we must make our core priorities more relevant and effective to support our goals. As a result, NOAA has selected five essential activities where corporate policy and guidance can ensure that our goals coordinate in important areas. Each of these cross-cutting priorities is guided by a NOAA council, responsible for developing agency-wide policies and procedures in that area.

The areas are:

- *Developing, Valuing, and Sustaining a World-class Workforce*
- *Integrating Global Environmental Observations and Data Management*
- *Ensuring Sound, State-of-the-art Research*
- *Promoting Environmental Literacy*
- *Exercising International Leadership*

Developing, Valuing, and Sustaining a World-class Workforce

People are our most critical asset. Accomplishing NOAA's challenging goals requires an inclusive, diverse, highly skilled, motivated, and effective workforce that reflects the communities we serve. We must develop and maintain a culture that empowers people by encouraging creativity, initiative, risk-taking, and open debate. As society evolves, it is imperative that we continue to have the scientific, technical, and administrative expertise necessary to maintain our leadership.

Diversity

One of the key elements of any successful organization is the diversity of its people. Diversity strengthens our work groups, our work products, and our agency's reputation.

To further strengthen our commitment to diversity, NESDIS has maintained a dedicated and effective Diversity Council. The council seeks to ensure a supportive and inclusive work environment that celebrates

individual differences and values all employees. Chaired by NESDIS Deputy Assistant Administrator Dr. Colleen Hartman, the council's membership includes senior leaders and employees from all line and staff offices. During 2004, the council sponsored several successful initiatives such as EEO and Diversity training programs, employee recognition events, cultural awareness programs, alternative recruitment efforts, and the development of a Diversity Action Plan. The council also supported several student employment programs, which further enhanced the diversity and culture of the organization.

Please visit: http://www.nesdis.noaa.gov/About/Diversity/diversity.html

NOAA Leadership Competencies Development Program

Five NESDIS employees completed training in the NOAA Leadership Competencies Development Program (LCDP) in April 2004. The employees in Class III were: Ajay Mehta, Ingrid Guch, Benjie Spencer, Robert Tye, and John Pereira. NESDIS participants in Class IV, which began in 2004, are: Robert Bassett, Vince Grano, Eric Miller, and Thomas Renkevens. LCDP is a competitive, 18-month program that provides a series of training and developmental experiences for a cadre of NOAA individuals who have high potential for assuming greater leadership responsibilities in the next three to five years. The program fosters a shared understanding of our agency and its mission, vision, and objectives. The LCDP provides a framework for developing future senior leaders with NOAA-wide capability.

Graduates of the LCDP Program, April 2004.

Please visit: http://lcdp.noaa.gov/

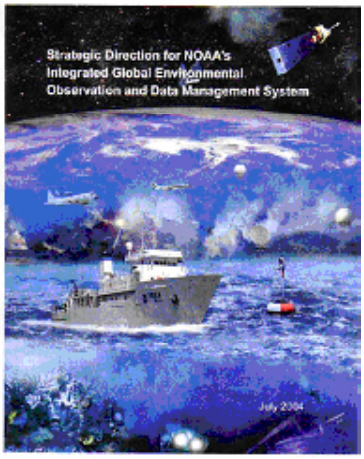
Integrating Global Environmental Observations and Data Management

Earth observations are intrinsic to NOAA's mission. We depend on an observing system for virtually every activity – from fundamental research and discovery to long-range operational forecasting to short-term warnings of immediate hazards to day-to-day regulatory decisions. An integrated Earth observation and data management system will enable NOAA's resources to be applied more efficiently and effectively by reducing duplication, improving coverage, and providing networks to disseminate information when and where it is needed around the world. Through our participation and leadership in national and international global data collection and reporting efforts, we can further integrate NOAA's observing systems, data, and quality control with efforts of other nations to guarantee the best quality and coverage of Earth observing data.

Draft National Plan for Integrated Earth Observation System released

NOAA played an instrumental role in the development of the draft Strategic Plan for the U.S. Integrated Earth Observation System, which was released for public comment by the White House Office of Science and Technology Policy on September 8, 2004. This document, created by the Interagency Working Group on Earth Observations, represents the collaborative efforts of 15 Federal agencies and three

White House offices. It describes an approach to developing a system that will, over time, benefit people and economies around the world by improving the ability to monitor, understand and predict changes to the Earth. NESDIS was a key participant in formulating and drafting this document. The release of this draft marks a significant milestone in the ongoing development of a Global Earth Observation System, involving 54 governments, including the European Commission, and 33 participating organizations. When finalized, it will be the U.S. contribution to the international strategic plan.



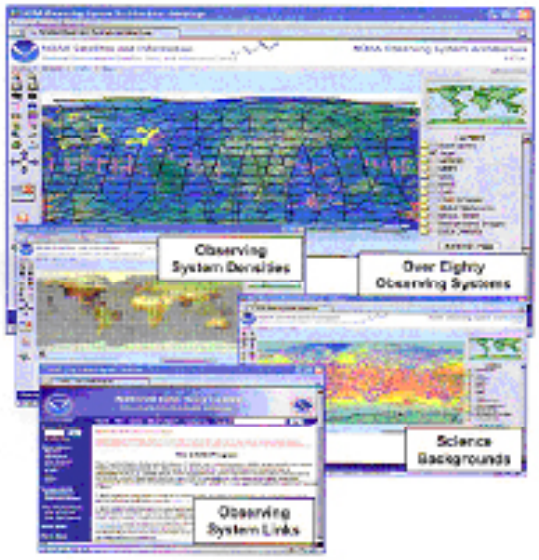
NOAA Observing Systems Publication

NOAA Lays out Plan for its Integrated Earth Observation and Data Management System

NESDIS' National Geophysical Data Center served as project coordinator for the NOAA Observing Systems Council "Strategic Direction for NOAA's Integrated Global Environmental Observation and Data Management System" published in July 2004. This 68-page, full-color document sets the stage for the development of NOAA's integrated observation and data management system. It provides an overview of the process being used to examine requirements and prioritize observations. It describes how NOAA is addressing several challenges associated with this effort, and presents an initial observing system inventory. As part of this effort, NOAA has documented the observation requirements across all NOAA programs and goal teams. This significant accomplishment will allow NOAA to take the next steps toward developing an integrated observation and data management system for the benefit of the Nation and the world. An appendix includes a "Catalog of NOAA's Observing Systems" which was derived from the NOAA Observing System Architecture (NOSA) Database, and input from NOSA's principal investigators.

NOAA Observing Systems Architecture

The NESDIS and National Weather Service Assistant Administrators are co-chairs of the NOAA Observing Systems Council (NOSC), which directs the development of the NOAA Observing Systems Architecture (NOSA). This far-reaching, long-term effort is designed to fulfill NOAA's cross-cutting priority — the creation of an integrated global environmental observation and data management system. This effort will ultimately integrate from the local to the international level, the observing systems and the corresponding systems used to manage the environmental data. This will provide a much better capability to understand our planet and contribute to many other societal benefits. Achieving integration will ensure that people with environmental data and information needs have access to what they want, when they want it, and in the format they need.



The NOAA Observing System Architecture Interactive Map, developed by NOAA's National Geophysical Data Center, provides a spatial portal to over 80 NOAA Observing Systems. The portal provides links to existing observing system and total observatory density maps and integration of science parameters as backgrounds.

Please visit: http://nosa.noaa.gov/

Ensuring Sound, State-of-the-art Research

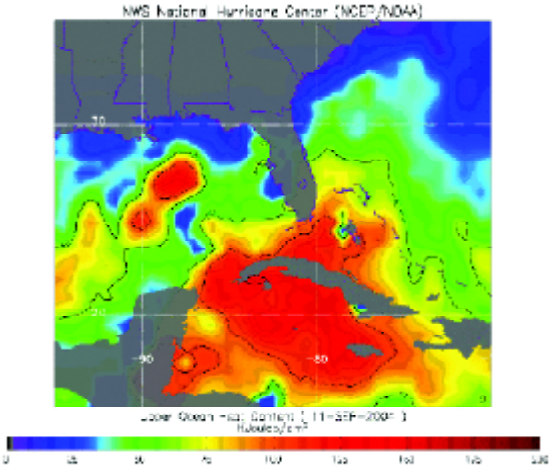
NOAA is a science-based agency with regulatory, operational, and information service responsibilities. To fulfill these responsibilities, we must direct and maintain a vigorous and forward-looking research enterprise that includes a healthy academic component. Success in achieving our vision depends on how well we understand Earth's dynamic, natural systems, and how well we assess the effects of human activities upon those systems. A strong economic and social science capability is also needed so that we can analyze and understand evolving user requirements, priorities, and benefits of our information, services, and products. Long-term, visionary research will be critical to recognizing emerging issues and opportunities and for managing future environmental, ecological, and societal needs. Each year, discovery and research at NOAA contribute significantly to a more complete understanding of the complex behavior of the atmosphere and oceans. This new knowledge leads to continual improvements in predicting the weather, understanding climate behavior, projecting future climate variability and change, and applying ecological principles to environmental management.

Improvements in Operational Hurricane Intensity Forecasts Using Satellite Observations

A methodology for analysis of ocean heat content was developed in 2004 and incorporated into the Statistical Hurricane Intensity Prediction Scheme (SHIPS) model. The National Hurricane Center in Miami has two basic models for hurricane intensity forecasts. Because hurricane intensity changes depend on a wide range of physical processes that are not well measured, the most reliable model over the past few years has been the SHIPS model. The SHIPS forecast is based on statistical relationships between intensity changes and properties of the storm environment such as sea surface temperature (SST) and the vertical wind shear along the forecast track. To improve the SHIPS model, new input derived from NOAA geostationary and polar-orbiting satellite observations was added to the prediction based on work performed by the Office of Research and Applications.

After experimental testing during the 2002 and 2003 hurricane seasons, the new version of SHIPS was made operational for the 2004 hurricane season. This work showed reduction in Pacific SHIPS intensity errors by up to 8 percent for the entire 2004 hurricane season. The GOES data in combination with the ocean heat content input also improved the Atlantic forecasts.

Including the SHIPS intensity forecast model, NESDIS successfully transitioned 14 experimental products into operations in 2004. Among the projects transitioned from research to operational product status were the Coral Reef Bleaching Indices, global snow cover mapping, and surface vector winds from the NASA QuikScat sensor.



This figure shows the ocean heat content in the Caribbean and Gulf of Mexico during the time when Hurricane Ivan moved through this area. The ocean heat content is derived from the sea surface temperature (SST) and the sub-ocean temperature structure estimated from satellite altimetry observations, which provides a better estimate of the total energy available to a tropical cyclone than the SST alone.

Promoting Environmental Literacy, including Outreach and Education

As a global leader in oceanic and atmospheric sciences, NOAA has a responsibility to improve public understanding of our planet's dynamic air and water systems and the effect those systems have on all aspects of people's lives. We work with partners in educational institutions and organizations, government agencies at all levels, and private industry to build environmental literacy. We seek to educate and inform present and future generations about the changing Earth and its processes, to inspire youth to pursue scientific and technical careers, and to improve the public's awareness, understanding, and use of NOAA products and services.

The "Wooly Magma Create a Felted Earth" project taught participants about the structure of the Earth.

Boulder Laboratories' 50th Anniversary Celebration

In conjunction with the 50th Anniversary celebration of the Department of Commerce laboratories in Boulder, Colorado, NOAA's National Geophysical Data Center (NGDC) participated in hosting a Science Festival in September 2004. Students from several area schools were hosted, and the Boulder labs were open to the general public. Numerous NGDC staff participated in exhibits, demonstrations and one-on-one interactions with students and adults. A steady stream of visitors viewed graphic presentations, discussed data and science issues with NGDC staff, and took home popular NGDC posters at the exhibit tent. Especially popular was the "Wooly Magma Create a Felted Earth Booth." This hands-on project taught participants about the structure of the Earth, as they each created a model of it. More than 100 participants successfully created a "Wooly Magma" to take home.

Washington Stakeholders Forum

A Stakeholders Forum, hosted by NOAA Administrator Vice Admiral Conrad C. Lautenbacher (U.S. Navy, Ret.) was held April 16 in Washington, D.C. The purpose of the forum was to apprise stakeholders of NOAA plans and developments and obtain stakeholder input and recommendations for consideration as part of the NOAA strategic planning process. Gregory W. Withee, assistant administrator for

Left: Attendees gather at the Grand Hyatt Hotel in Washington, D.C., for the Stakeholders Forum in April 2004. Right: NOAA Administrator Vice Admiral Conrad C. Lautenbacher (U.S. Navy, Ret.) addresses the Stakeholders Forum in Washington, D.C., in April 2004.

satellite and information services, met with stakeholders and obtained recommendations with regard to their future needs, products and services.

Exercising International Leadership

A world with rapidly shifting political, cultural, and economic dynamics requires Federal agencies involved in world affairs to cultivate fresh approaches and new services to maintain U.S. leadership. Because the influence and use of Earth's oceans and atmosphere affect the economies and ecosystems of every nation, the domain of NOAA's activities naturally extends across national and continental boundaries. Whether leading worldwide collaboration in integrating global observations, guiding regional activities in managing marine and water resources, or collaborating in scientific endeavors, NOAA plays a major role in international efforts to meet environmental and ecosystem challenges. Consequently, we recognize the value of our international partners, as we learn from their experiences and benefit by working together on common issues. Internationally, we support and promote policies and interests in ecosystem-based management, climate science, Earth observation, water management, and weather forecasting.

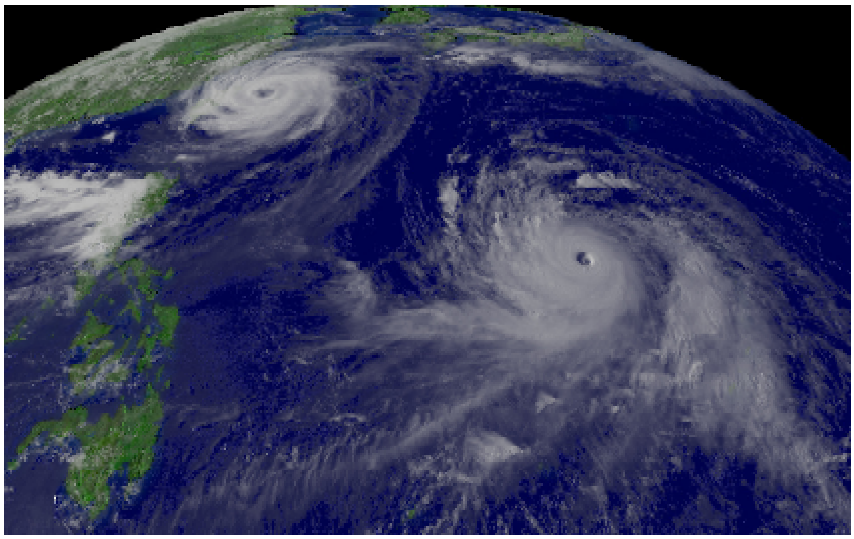
International Leadership in Earth Observations

NOAA continues to exercise international leadership in the development of a coordinated, comprehensive, and sustainable Global Earth Observation System of Systems (GEOSS). As one of four Co-Chairs of the Intergovernmental *ad hoc* Group on Earth Observations (GEO), NOAA has been directly involved in shaping developments leading to approval of a GEO Framework Document at the April 2004 Earth Observation Summit II in Tokyo and initiating work on a 10-Year Implementation Plan for GEOSS.

NOAA Provides Leadership for World Summit on Sustainable Development Follow-up Program

NOAA led the World Summit on Sustainable Development (WSSD) Follow-Up Programme on behalf of the Committee on Earth Observation Satellites (CEOS) during the past year. NOAA orchestrated cooperation between Module I (Education, Training and Capacity Building), Module II (Water Resources Management), and Module III (Disaster Management and Conflicts) of the Follow-Up Programme related to space technology in support of sustainable development in response to the WSSD Plan of Implementation. This cooperation culminated at a workshop in Pretoria, South Africa, in November 2004 on remote sensing and water resource management in Africa. NOAA is also working to strengthen CEOS' WSSD-recognized Type II partnership in "Earth Observation Education and Training," through its participation and networking at the 12th Session of the Commission on Sustainable Development in April 2004. NOAA continues to share information about NOAA's data and its uses as a facilitator of the African Advisory Group to CEOS, a network of remote sensing experts in Africa committed to advancing the role of satellite data in environmental decision-making in Africa.

Cooperation with Japan on Geostationary Backup



This imagery shows Super Typhoon Chaba located south-southwest of Iwo Jima and Typhoon Aere located southwest of Naha, Okinawa. August 24, 2004 08:06:39; GOES-9 1 km visible imagery.

In 2004 NOAA continued to back up Japanese geostationary satellite GMS-5 with NOAA's Geostationary Operational Environmental Satellite-9 (GOES-9), as established through an agreement signed in 2002. NOAA's cooperation with the Japan Meteorological Agency (JMA) provides continuity of satellite services for Japan and the entire Western Pacific as well as U.S. civilian and military assets, and U.S. territories in the region. NOAA is also working with JMA to develop a mutual long-term backup mechanism to ensure continuous geostationary satellite coverage over the United States and the Western Pacific.

U.S.-India Remote Sensing Cooperation

NOAA played an active role in the June 2004 U.S.-India Conference on Space Science, Applications and Commerce in Bangalore, India. Highlights included an agreement in principle by India for the installation of a National Polar-orbiting Operational Environmental Satellite System ground station in India, and agreement on both sides to pursue broader cooperation in data exchange and modeling, as well as to investigate satellite instrument collaboration.

Ongoing Geostationary Cooperation with EUMETSAT

In 2004 NOAA successfully negotiated with EUMETSAT on an alternate method for reception and re-dissemination within the United States of data from EUMETSAT's Meteosat Second Generation-1 (MSG, Meteosat-8) satellite. After the failure of an on-board power amplifier, direct broadcast from MSG-1 was no longer a possibility. NOAA now receives MSG-1 data via high-speed line from Darmstadt, Germany, and redistributes it to authorized U.S. users.

Continued Cooperation with Meteorological Services Canada

Shown are: Thomas R. Nichols, Director General, Atmospheric and Monitoring and Water Survey Directorate, Meteorological Service of Canada (left), and Thomas R. Karl, Director, NESDIS's National Climatic Data Center.

NOAA and Meteorological Services Canada (MSC) signed the second annex of a Memorandum of Understanding (MOU) on Cooperation in Environmental Data Acquisition and Utilization. This agreement will advance and integrate the national capabilities of the United States and Canada to monitor and document North American extreme climate and weather events. Recognizing long-standing cooperation, the MOU will act as an umbrella under which joint projects between NOAA and MSC can be undertaken. NOAA and MSC are also continuing to implement

the first annex of the agreement, which created the North American Ice Service (NAIS), formalizing the nearly 20-year collaboration between the U.S. National Ice Center and the Canadian Ice Service.

FY 2004 NESDIS Budget

NESDIS has two primary areas of activity: acquisition and construction of satellites and satellite facilities, and operational satellite, data, and information services. Satellite acquisition and construction of satellite facilities account for 81.7% of the NESDIS budget. Operational satellite services and data and information services account for 18.3% of the NESDIS budget.

Polar Orbiting Systems
$386,968K (46.8%)

Geostationary Systems
$274, 632K (33.2%)

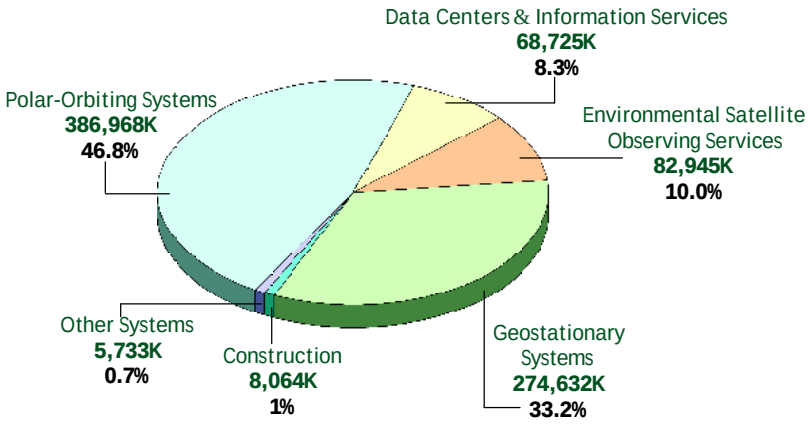
Environmental Satellite Observing Services
$82, 945K (10.0%)

Data Centers & Information Services
$68,725K (8.3%)

Construction
$8,064K (1.0%)

Other Systems
$5,733K (.7%)

Total NESDIS
$827,067K (100%)



FY 2004

A Look to 2005…

Our accomplishments in 2004 have set the stage for a successful and productive year ahead.

Two satellite launches are planned for 2005. NOAA-N, the next Polar-orbiting Operational Environmental Satellite, is planned for launch in March. The first satellite in the next series of Geostationary Operational Environmental Satellites (GOES) is planned for launch in April. These satellites, GOES-N,O,P, will use star trackers instead of Earth sensors for attitude control. They will, therefore, provide better image pointing accuracy than the current series, GOES I-M.

2005 will see increasing activity in GOES-R as we move toward a launch in 2012. The GOES-R series of spacecraft will feature new instruments and will offer twice the image resolution of the GOES I-M series. GOES-R will feature true color visible image capability, and 16 imager wavelength channels instead of five, providing views of many more layers and gases in the Earth's atmosphere. In addition, the GOES-R Hyperspectral Environmental Suite will provide hundreds of channels of Sounder data for very high quality data on temperature and humidity at different heights in the atmosphere for input to computer models. The GOES Lightning Mapper is slated to start the Design/Risk Reduction phase in 2005. Lightning sensing from geosynchronous orbit can be used for climate monitoring, storm development, ice-phase precipitation estimates; severe weather nowcasting; data assimilation and model inputs; and atmospheric chemistry.

We are progressing toward completion of the U.S. Climate Reference Network, a new climate monitoring network of high-precision, state-of-the-art instruments for measuring surface air temperature, precipitation, solar radiation, and wind speed. At the end of FY04, a total of 110 stations are planned for deployment throughout the United States, including Alaska.

We are leveraging efforts to develop a NOAA observing system architecture, and the critical role assigned with respect to implementing the President's new Commercial Remote Sensing Space Policy.

The Group on Earth Observations held the Earth Observation Summit II in Tokyo, Japan, in April 2004, where they adopted the Framework Document for a 10-Year Implementation Plan. The plan will be presented at Earth Observation Summit III in February 2005 in Brussels, Belgium.

In a new era of integrated Earth observations, we are committed to an ongoing dialogue with users in the Western Hemisphere and worldwide with regard to the need for system upgrades to ensure continuity of access to our current and future environmental satellites.

I am confident that 2005 and beyond will continue our long record of service to the public.

Colleen N. Hartman

Dr. Colleen N. Hartman
Deputy Assistant Administrator

Awards

Administrator's Awards

Administrator's Award Recipient

John J. Bates for outstanding administration and leadership in developing a new division to meet the challenges to NOAA in the area of climate applications related to remotely sensed data.

James R. Budd for outstanding leadership of the Wallops Command and Data Acquisition Station.

Martin J. Deiseroth for exemplary leadership in developing, planning, and implementing significant improvements to the NPOESS Integrated Program Office's safety and working conditions.

Brownie L. Dudley for outstanding willingness and dedication to serve NESDIS where and as needed in support of the Office of the Assistant Administrator and the NOAA mission.

Administrator's Award Recipient

Tina East for planning, coordinating, arranging, tracking and financial oversight of the renovation of the seventh and eighth floors of the World Weather Building.

Linda V. Moodie for major contributions in securing adoption of a December 2003 decision on systematic observations by the U.N. Framework Convention on Climate Change Conference of the Parties.

Regina Murray for outstanding administrative and budget support in implementing new NOAA international and interagency responsibilities.

Christopher W. Brown
Thomas F. Gross (NOS)
For developing and implementing the first ecological nowcast system to predict the distribution of sea nettles, *Chrysaora quinqecirrha*, in the Chesapeake Bay.

Douglas Namian
Carol J. Breger
Lt. Col. Keith Gilmore, USAF
Beverly C. King
Patricia Mahoney
Capt. Khalim Taha, USAF
For establishing and successfully executing a program necessary to control and account for NOAA and USAF funds appropriated to build, launch, and operate NPOESS.

Diversity SPECTRUM Award Recipient

Diversity SPECTRUM Awards

Barbara Brooks for diligently laying the foundation for success and proactively seeking a balance of training and experience by serving as a change agent in DOC, NOAA, and NESDIS for over 10 years.

Alfreda Carter for supporting the NESDIS Diversity Plan's Mission Statement and for fostering an inclusive and supportive environment where all employees are respected and can flourish.

Diversity Best Practices Award

James E. Mason for developing specialized equipment training programs for members of the organization.

NOAA Technology Transfer Award

Stephen A. Del Greco
Timothy D. Crum, Ph.D. (NWS)
Kevin E. Kelleher (OAR)
Thomas A. Sandman (NWS)
Philip G. Cragg (NWS)

For the development of a national, real-time, radar data, archival and Internet2 delivery system for universities, governments, and the private sector.

2004 Distinguished Career Awards

Linda A. Brown for outstanding achievement in managing budget and administrative initiatives with over 30 years of service to the NESDIS Office of Satellite Operations.

Larry W. Carr for continued efforts in improving logistical, property, supply and procurement throughout 25 years of dedicated service to NOAA.

Rosalind J. Ledford for 26 years of improving the administrative areas of NESDIS, including developing cost-saving solutions for training and furniture acquisition and devising best-practices methods in performance feedback.

Gold Awards

Richard W. Reynolds for distinguished achievement in innovative techniques leading to optimal use of observing systems related to sea surface temperatures.

Helen M. Wood
Sharon LeDuc
Linda V. Moodie
D. Brent Smith
Richard Ohlemacher
Kelly M. Turner
Ingrid C. Guch
Gregory W. Withee, Assistant Administrator for Satellite and Information Services
Susan Harris, Office of the Under Secretary
Carla Sullivan, Office of the Under Secretary
For organization of the landmark July 2003 Earth Observation Summit and leadership in development of a Global Earth Observation System of Systems.

Silver Awards

Dr. Laurence L. Miller for solving major scientific controversies regarding the rate and causes of 20th century global sea level rise.

William G. Pichel
James Churnside (OAR)

For the development of a technique to detect ghostnets in the open ocean using satellites and aircraft.

Bronze Awards

Eileen McVey for developing a dynamic international program to address information needs in aquaculture at the NOAA Central Library.

L. Charles Sun for the design, development and delivery of the Global Argo Data Repository at the National Oceanographic Data Center.

Pamela Taylor for contributions to the creation of requirements-based, design criteria for future environmental observing systems.

Douglas Brauer
John Cunningham
Gary Davis
Robert Masters (NWS)
Mike Mignogno
D. Brent Smith
Glenn Tallia (OGC)
For negotiation of the Joint Transition Activities Agreement, realizing major cost savings for the United States and obtaining European contributions to a joint satellite program.

John Cunningham
Douglas Namian
Glenn Tallia (OGC)
Peter Wilczynski
Douglas Brauer
James Valenti
Carol Breger
For installation of fiber communications at Svalbard, Norway resulting in timely, low-cost transmission of satellite data saving $40 million over ten years.

Parmesh Dwivedi
Roger Griffis
Thomas LaPointe
Thomas Hourigan
For leadership in implementing a coral reef information clearinghouse to meet U.S. Coral Reef Task Force requirements for NOAA and the Department.

Ralph Ferraro
Fuzhong Weng
Ingrid Guch
Joseph Askew
For creating high-quality products from the Advanced Microwave Sounding Unit that improve weather forecasting and climate monitoring.

Richard Heim, Jr.
Douglas Lecomte (NWS)

David Miskus (NWS)
Richard Tinker (NWS)
For developing new analysis techniques and synthesizing drought indicators into a single product—the U.S. Drought Monitor—used for planning and mitigation activities during the severe Central and Western drought of 2003.

Gregory Johnson
Mark Hall
Donald Allen
Steven Atkins
Patrick Belote
Charles Bryant
Michael Settles
Eric Chipman
Lance Seman
Diane Robinson
For developing and implementing the GOES-9 spacecraft operations over the far Pacific to provide environmental satellite support to the Japanese and worldwide community.

Michael Van Woert
Phil Hovey
Michael Chase (Navy)
Jonathan Hasse (Navy)
For the development of sea ice analysis algorithms at the National Ice Center which resulted in improved operational sea ice analysis and forecasting.

Katy Vincent
Timothy Stryker
Tahara Moreno
Douglas Brauer
For advancing U.S. commercial and security interests through outstanding satellite policy development, coordination, and outreach.

Gregory W. Withee, Assistant Administrator for Satellite and Information Services
D. Brent Smith
Linda V. Moodie
Michael B. Hales
Kelly Turner
Emilie Bruchon
Renee A. Leduc Clarke
For leadership and coordination of international Earth observation activities to better understand and predict changes in the global environment.

Stuart Hinson
Larry J. Griffin
Bradley A. Ballish (NWS)
William Whitmore (NWS)
Jeffrey Stoudt (NWS)
William Blackmore (NWS)
For detecting erroneous data in upper air measurements and enabling faster identification of defective radiosonde equipment, thereby saving $200,000 in costs.

Direct Services Division for leadership and management of the national SARSAT program resulting in a marked increase in the number of pilots, boaters, and outdoor enthusiasts able to use personal locator beacons for life-saving purposes.

Women of Distinction Award

Jane D'Aguanno for NOAA and NESDIS level Homeland Security tasks.
Nina Jackson for NESDIS education and outreach programs.
Carmella Davis Watkins for NCDC outreach objectives and activities.
Elaine Mason for development and implementation of the Metadata Integration and Improvement Initiative metadata system.

Emily Harrod for leading a team that produces the Polar Level 1B orbital data for the instruments on the Polar-orbiting Operational Environmental Satellite System spacecraft.

Pamela Y. Hughes for financial management at NCDC.

Employee and Team Members of the Month

January 2004 Employee of the Month
Lisa Taylor for significant organizational and leadership contributions in the areas of diversity, management, international mapping, and scientific research.

May 2004 Team Member of the Month
Clay Davenport for significant contributions to the development, improvement, and implementation of satellite-based estimates of rainfall that help warn the public of imminent danger from flash floods.

August 2004 Employee of the Month
John Canter for excellent service and dedication in creating the schedules for the GOES spacecraft.

Acronyms

AMS American Meteorological Society
AVHRR Advanced Very High Resolution Radiometer
CDA Command and Data Acquisition
CEOS Committee on Earth Observation Satellites
CNES Centre National d'Etudes Spatiales
CONUS CONtinental United States
CRN Climate Reference Network
DAAC Distributed Active Archive Center
DCS Data Collection System
DOC Department of Commerce
DOD Department of Defense
EEO Equal Employment Opportunity
EOS Earth Observing System
ESA European Space Agency
EUMETSAT European Organisation for the Exploitation of Meteorological Satellites
GEOSS Global Earth Observation System of Systems
GOES Geostationary Operational Environmental Satellite
GOS Global Observing System
HES Hyperspectral Environmental Suite
ISA Impervious Surface Area
JMA Japan Meteorological Agency
JPL Jet Propulsion Laboratory
LCDP Leadership Competencies Development Program
METEOR Russian meteorological satellite
MODIS MODerate-resolution Imaging Spectroradiometer
MSC Meteorological Services Canada
MSFC Marshall Space Flight Center
MSG Meteosat Second Generation
MTG Meteosat Third Generation
NAIS North American Ice Service
NASA National Aeronautics and Space Administration
NASDA Japanese Space Agency
NCAR National Center for Atmospheric Research
NCDC National Climatic Data Center
NCDDC National Coastal Data Development Center
NESDIS National Environmental Satellite, Data, and Information Service
NGDC National Geophysical Data Center
NMFS National Marine Fisheries Service
NOAA National Oceanic and Atmospheric Administration
NOS National Ocean Service
NOSA NOAA Observing System Architecture
NOSC NOAA Observing Systems Council
NPOESS National Polar-orbiting Operational Environmental Satellite System
NPP NPOESS Preparatory Project
NWS National Weather Service
OAR Office of Oceanic and Atmospheric Research
ONR Office of Naval Research
POES Polar-orbiting Operational Environmental Satellite
PPI Office of Program Planning and Integration
RCC Rescue Coordination Center
SARSAT Search and Rescue, Satellite-aided Tracking
SEC Space Environment Center
SHIPS Statistical Hurricane Intensity Prediction Scheme
SST Sea Surface Temperature
VPN Virtual Private Network
WMO World Meteorological Organization
WSSD World Summit on Sustainable Development

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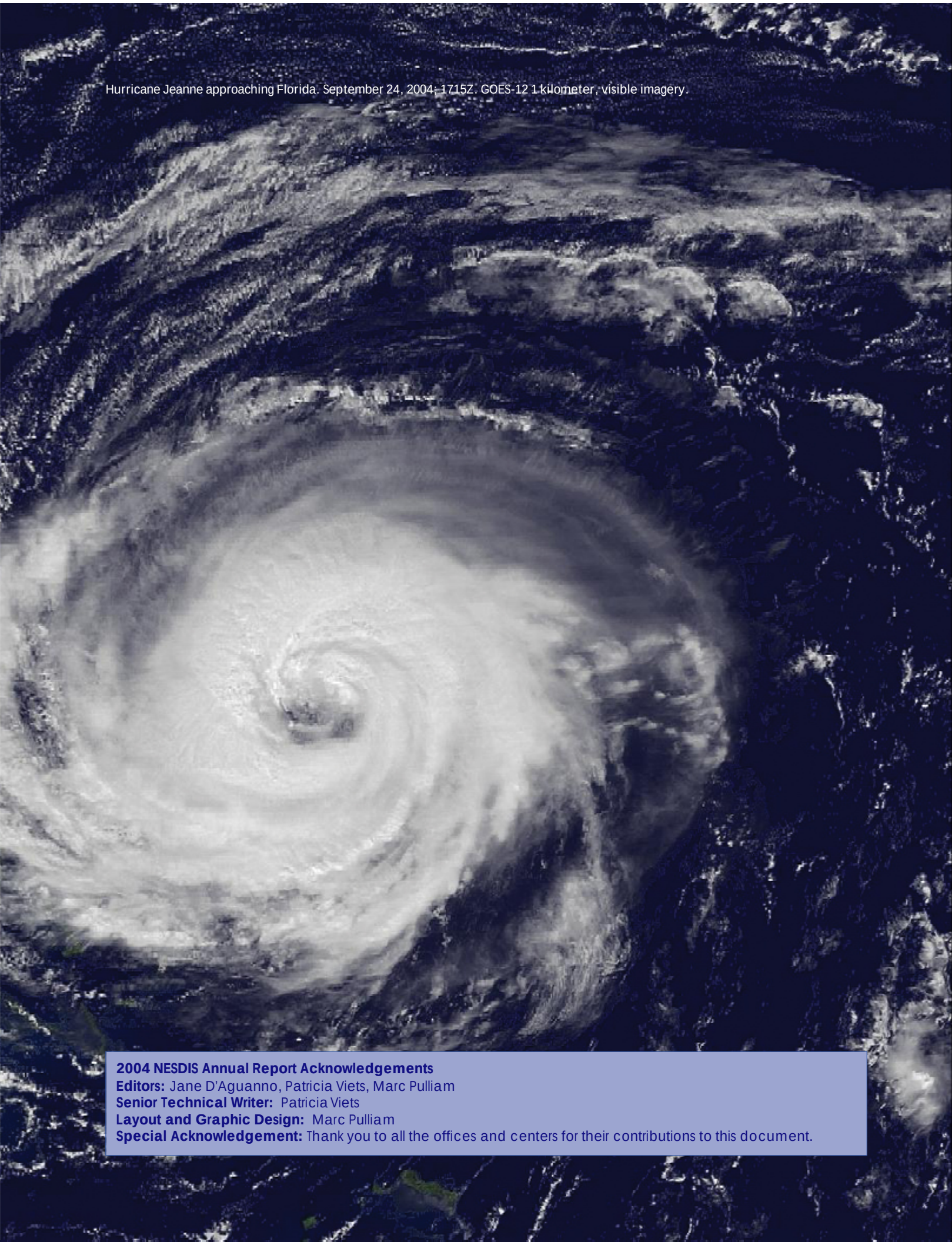

Hurricane Jeanne approaching Florida. September 24, 2004; 1715Z. GOES-12 1 kilometer, visible imagery.

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