BUDGET ACTIVITY: NATIONAL WEATHER SERVICE

For FY 2012, NOAA requests an increase of $3,097,000 and 5 FTE above the FY 2010 enacted level, after the technical transfer of programs to the new Climate Service, for a total of $987,978,000 and 4,602 FTE for the National Weather Service. The requested funding includes $16,764,000 in inflationary adjustments. The technical transfer associated with the creation of the new Climate Service line office includes $14,964,000 and 47 FTE associated with the Climate Prediction Center, the management of the TAO array, and the Cooperative Observer Network Modernization.

Base Justification for FY 2012

The National Weather Service Operations, Facilities, and Research base ($901,156,000 and 4,569 FTE) includes the following subactivities:

- Operations and Research ($791,852,000 and 4,381 FTE) includes the operations of 122 Weather Forecast Offices (WFO) and 13 River Forecast Centers (RFC) which provide up-to-date and accurate weather forecasts and warnings to the Nation.
- Systems Operation and Maintenance ($103,079,000 and 188 FTE) includes the operation of systems such as NEXRAD, the Automated Surface Observing System (ASOS) and others that collect the observations necessary to provide weather forecasts and warnings.

The National Weather Service Procurement, Acquisition, and Construction base ($100,489,000 and 29 FTE) includes the following subactivities:

- Systems Acquisition ($86,489,000 and 29 FTE) includes the NEXRAD Dual Polarization upgrade project, which will upgrade the NEXRAD radar system and NWS' operational High Performance Computing capability, which is used to run all of NOAA's operational weather models.
- Construction ($0 and 0 FTE) is to include upgrades and improvements to NOAA's Weather Forecast and Weather Service Offices (WSO).

The National Weather Service (NWS) (http://www.weather.gov/) provides weather, water, and climate forecasts and warnings for the United States, its territories, adjacent waters, and ocean areas for the protection of life and property and the enhancement of the national economy. NWS data and products form a national information database and infrastructure, which can be used by the public, other governmental agencies, the private sector, and the global community.

NWS is a world-class science-based team of professionals who work together to provide the best weather, water, and climate information in the world by:

- Producing and delivering reliable information;
- Incorporating proven advances in science and technology;
- Measuring, reporting, and evaluating our performance;
- Issuing forecasts to help reduce weather- and water-related fatalities; and
- Working with others to make the weather, water, and climate enterprise more effective.

NWS is dedicated to serving the American public by providing a broad spectrum of weather, climate, and hydrological forecast guidance and decision support services. NWS strives to meet

society's need for weather and hydrological forecast information. As more sectors of the economy recognize the impacts of weather and water on their businesses, they are becoming more adept at using sophisticated weather and water information to improve commerce. According to the American Meteorological Society, weather is directly linked to public safety, and a significant portion of the United States economy is weather-sensitive. Concern for public safety drives NWS to improve the timeliness and accuracy of warnings for all weather-related hazards. To do so, NWS weather and water predictions need to be at the limits of what science, technology, and a highly trained workforce can deliver.

NWS is committed to expanding these limits by enhancing observation capabilities; by improving data assimilation that effectively uses all the relevant data NWS and others collect; by improving collaboration with the research community through creative approaches such as community modeling; by rapidly transforming scientific advances in modeling into improved operational products; by improving the techniques used by our expert forecasters; by making NWS information available quickly, efficiently, and in a useful form (e.g., the National Digital Forecast Database); by including information on forecast uncertainty to help customers make better-informed decisions; by taking advantage of emerging technologies to disseminate this information; and by maintaining an up-to-date technology base and a workforce trained to use all of these tools to maximum effect.

The weather and water enterprise is larger than NWS. NWS depends on partners in the private, academic, and public sectors, starting with other line offices within NOAA to acquire data, conduct research, provide education and training, help disseminate critical environmental information, and provide advice to make best use of NWS information. NWS strives to work more closely with existing partners. NWS also seeks to develop new partnerships to achieve greater public and industry satisfaction with our weather and water information and to honor our commitment to excellent customer service.

NWS Weather and Hydrological Activities

- Increased accuracy in forecasting and lead time in warning for severe weather.
- Saved lives and property through more accurate and timely severe weather prediction.
- Increased satisfaction with and benefits from NOAA information and warning services, as determined by surveys and analysis of emergency managers, first responders, natural resource and water managers, public health professionals, industry, government and the public.
- Improved effectiveness of NOAA's current observing systems.
- Increased number of observations obtained and used from partners, both international and domestic.
- Increased number of observations archived, available, and accessible.
- Increased number of new multi-use observing systems deployed.
- Increased number of forecasters trained in the newest techniques.
- Increased volume of forecast and warning information formatted to clarify the uncertainty of an event (e.g., space weather, air quality, water and weather forecasts).
- Improved performance of NOAA's weather and water, air quality, and space weather prediction suite.
- Increased number of favorable scores on public surveys of citizen knowledge about appropriate actions under hazardous weather and water related conditions.
- Increased percentage of the public reporting timely receipt of warnings as measured by public surveys.

- Increased number of communities with plans in place to act on weather warnings and to reduce the impacts of severe weather.
- Increased community knowledge of, use of, and satisfaction with NOAA information that supports local air quality monitoring and forecast programs.
- Increased assistance to international partners to improve response capabilities to weather and water predictions.

NWS places an increasing emphasis on weather-related events which significantly affect people, their livelihoods and the economy. NWS strives to promote the Nation's commerce by providing information supporting society's ability to take preventive actions so that people remain safe; less damage is done to communities, businesses, and the environment; and economic productivity is maximized. NWS services are critical to the safe and efficient transportation of people and goods by sea, air and over land. The transportation and public utility sectors are a vital component of the U.S. economy and are highly vulnerable to weather and climate events. NWS will work to provide aviation forecast improvements to help mitigate air traffic delays and reduce weather-related aviation accidents; improve precipitation and water resource forecasting, which affects surface transportation; and improve ocean and wind forecasting, which affects sea-borne transport from the high seas to our coasts and the Great Lakes. NWS is committed to working with our partners to continue improving weather information services in support of all modes of transportation and commerce.

NWS Activities in support of commerce

- Increased safety and productivity of transportation systems by providing relevant observations, warnings and forecasts of weather events impacting the transportation sector.
- Increased reliability, frequency, and use of marine, aviation, and surface transportation-related observations.
- Increased accuracy and use of weather and marine forecasts to increase efficiency of all land, water and air transportation systems.

NWS operates and maintains critical infrastructure which enables the provision of NOAA's services to the Nation. NWS manages a distributed network of offices that span the Nation, delivering essential NOAA services, especially those related to high-impact events, at the local level where critical, life-saving decisions are made. This includes the management of all major weather observing systems, from software engineering and communications to facilities and logistical planning. NWS also ensures worldwide acquisition and delivery of weather and water data through the Telecommunications Gateway and NOAAnet. In support of NOAA's operational forecasting mission, NWS develops, improves and monitors data assimilation systems and models of the atmosphere and oceans, using advanced methods developed internally as well as cooperatively with scientists from universities, NOAA laboratories, other government agencies, and the international scientific community.

NWS' enabling infrastructure

- Ensure the reliability and integrity of NOAA's operational weather and water observing and prediction systems and services.
- Determine the optimal mix of observations, in terms of spatial and temporal resolution and data type, to advance NOAA's numerical modeling capabilities.

Proposed Reorganization to establish a Climate Service line office:

The National Weather Service (NWS) proposes to transfer two climate-focused observing systems (the TAO array, and the Regional US Historical Climatology Network) and the Climate Prediction Center (CPC) to the Climate Service. The transfer of the observing systems will allow consolidation of NOAA's climate observing assets under the same management. The transfer of CPC will provide continuity between NOAA's short and long-term climate prediction capabilities. NWS will continue to work with CS and CPC to ensure continuity between long-range weather forecasts and short-term climate predictions.

Research and Development Investments:

The NOAA FY 2012 Budget estimates for its activities, including research and development programs, are the result of an integrated requirements based strategic planning process. This process provides the structure to link NOAA's strategic vision with programmatic detail and budget development, with the goal of maximizing resources while optimizing capabilities. NWS requests $34,086,000 for investments in R&D and infrastructure to support R&D in the FY 2012 Budget.

NOAA's strategic planning process makes specific reference to the objectives and milestones outlined in the NOAA 5-Year Research Plan for 2008-2012. The strict management of planning against these investment criteria, objectives, and milestones leads to NOAA budget proposals that reflect the research and development needs of the organization. The NOAA Research Council - an internal body composed of senior scientific personnel from every line office in the agency - is tasked with developing the 5-Year Research Plan, and provides corporate oversight to ensure that NOAA's research activities are of the highest quality, meet long-range societal needs, take advantage of emerging scientific and technological opportunities, and shape a forward-looking research agenda.

Significant Adjustments-to-Base (ATBs):

NOAA requests a net increase of $16,764,000 and 1 FTE to fund adjustments to current programs for NWS. The increase will provide inflationary increases for non-labor activities, including service contracts, utilities, field office lease payments, and rent charges from the General Service Administration (GSA).

NWS also requests the following transfers for a net change to NOAA of $0 and 0 FTEs.

From Office	Line	To Office	Line	Amount ($000)/ FTEs
NWS	Local Warnings & Forecasts	CS	Observations & Monitoring - Ocean Observations	$4,300/ 0 FTE
NWS	Cooperative Observer Network Modernization (NERON)	CS	Observations & Monitoring - Historical Climatology Network Modernization (PAC)	$3,734/ 0 FTE
NWS	Climate Prediction Center (CPC)	CS	Observations, Monitoring, and Prediction	$6,930/ 47 FTE
Total NWS				**$14,964/ 47 FTE**

NWS requests a technical adjustment to move $14,964,000 and 47 FTEs from NWS to the Climate Service (CS). These funds will be used to support the formation of the new CS line office.

From Office	Line	To Office	Line	FTEs
NWS	Cooperative Observer Network Modernization (NERON)	NWS	Local Warnings & Forecasts	2
Total NWS				**2**

In addition, NWS requests a technical adjustment to move 2 FTEs from the Cooperative Observer Network Modernization (NERON) PAC PPA to the Local Warnings & Forecasts ORF PPA. These FTEs will continue to support the Regional US Historical Climatology Network (formerly the Cooperative Observer Network Modernization (NERON) program) of the Climate Service.

From Office	Line	To Office	Line	Amount ($000)
NWS	Weather Forecast Office Construction	NWS	Local Warnings & Forecasts	$3,504

NWS requests technical adjustments to transfer $3,504,000 from the Procurement, Acquisition, and Construction (PAC) Weather Forecast Office Construction line to the Operations, Research, and Facilities (ORF) Local Warnings and Forecasts line. This realignment will facilitate NWS managing all Weather Forecast Offices leases out of Operations, Research, and Facilities funds.

Other Adjustments:

The NOAA FY 2012 Budget for NWS also requests other adjustments in the amount of $9,426,000 to restore funds related the Promote and Develop (P&D) account as provided in the FY 2011 annualized Continuing Resolution. The P&D transfer represents funds derived from

duties on imported fisheries products and are transferred to NOAA from the Department of Agriculture. The annualized FY 2011 Continuing Resolution provided $36,056,800, including carryover, less than requested in the budget due to a downturn in the international fisheries markets. To address a difference between estimated and actual transfer amounts, NOAA has spread the reduction to each of its seven line offices, taking a 1.06 percent reduction to each PPA. With this adjustment, NOAA seeks to restore ORF amounts for NMFS back to the requested amount.

From Office	Line	To Office	Line	Amount
NWS	All	NWS	All	$9,426,000

Administrative Cost Savings:

The Administration is pursuing an aggressive government-wide effort to curb non-essential administrative spending called the Administrative Efficiency Initiative (AEI). In order to be good stewards of taxpayer money the Federal Government should continue to seek ways to improve the efficiency of programs without reducing their effectiveness. As such, the President directed each agency to analyze its administrative costs and identify savings where possible. After reviewing its administrative costs, the National Weather Service (NWS) has identified $13,285,000 in administrative savings. NWS has targeted a number of areas to achieve these savings, at both the Line Office Headquarters level and throughout the program offices. Using NOAALink, the National Weather Service anticipates saving money through more strategic sourcing of products and services. Consolidation of products will enable buying in bulk to reduce prices. Consolidation of services will also result in dollar savings by reducing the number of contracts to be managed. In the area of human capital, NWS expects to reduce its costs by canceling some planned hires, downgrading some positions, and working to reduce its workers compensation costs. Administrative savings in the area of logistics plans and in general administrative support have been identified by limiting of the use of overnight mail services as well as consolidating services through a single provider. NWS has also identified savings tied to IT related items, primarily through delaying the refresh of computer equipment and eliminating redundant software licenses. In addition, NWS expects to reduce costs through business process reengineering. The $13,285,000 in administrative savings identified above reduces NWS' funding requirement in FY 2012. These saving are reflected in the request.

Headquarters Administrative Costs:

In FY 2012, NWS headquarters will use $20,903,700 after instituting planned savings as a result of the AEI mentioned above to support general management activities, financial and budgeting, and IT related expenses, as well as supporting facilities and other general operating costs. These funds also include support for service contracts, utilities, and rent charges from the General Services Administration. As part of the AEI, NWS has reviewed its Line Office Headquarters costs and will be able to reduce previously planned costs by $1,850,000. Specifically, NWS will use headquarters administrative funds to support the following:

Headquarters Program Support Type	Description	FY 2012 Amount	FY 2012 FTE associated with NWS Line Office HQ
General Management & Direction	Includes Assistant Administrator's office, public affairs, information services	$7,467,050	30.0
CFO Operations	Includes Budget, Finance and Accounting	$6,230,250	25.0
CIO Operations	Includes IT-related expenses and other CIO related activities	$2,423,400	17.0
CAO Operations	Includes Facilities and Security costs, as well as other CAO related activities	$4,232,700	10.0
Human Resources	All HR services, including EEO	$2,400,300	14.0
Total Before AEI Savings		**$22,753,700**	**96.0**
AEI Savings		*($1,850,000)*	-
TOTAL post AEI Savings		**$20,903,700**	**96.0**

NOAA recognizes the need to improve the transparency of the policies and procedures used by its line office headquarters to bill component programs for management and administrative services. NOAA is currently re-evaluating, standardizing, and documenting these policies and procedures for each line office. Prior to the beginning of FY 2012, NOAA will publish its policies and procedures for assessing headquarters and administrative costs within the line offices on the NOAA CFO public website along with other budget and finance documents. NOAA looks forward to working with the Congress and other interested parties to increase the transparency and confidence in NOAA's financial management.

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APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES

SUBACTIVITY: OPERATIONS AND RESEARCH

NOAA's NWS serves the people of the United States 24 hours each day. NWS is the sole official and authoritative United States voice for issuing warnings during life-threatening weather situations. NWS forecasters issue climate, public, aviation, marine, fire weather, air quality, space weather, river and flood forecasts and warnings every day for the U.S., its territories, adjacent waters and ocean areas, to protect life and property and enhance the national economy.

NWS has over 4,600 employees in 122 WFOs, 13 RFCs, 8 National Centers for Environmental Prediction (NCEP), and other support offices around the country, including 21 units collocated with the Federal Aviation Administration's (FAA) air route traffic control centers. In addition, NWS supports a national infrastructure to gather and process data worldwide from the land, sea, and air. This infrastructure collects data from technology such as Doppler weather radars, satellites operated by NOAA's National Environmental Satellite Service (NESS), data buoys for marine observations, surface observing systems, and instruments for monitoring space weather and air quality. This data feeds sophisticated models running on high-speed supercomputers. A highly trained and skilled workforce uses powerful workstations to analyze all of these data and issue forecasts and warnings. High-speed communications tie this entire information infrastructure together and disseminate forecasts and warnings to the public.

NWS staff also use trained community volunteers to enhance weather service operations. Cooperative observers collect weather data that become part of the Nation's climate records and citizen storm spotters provide NWS with visual confirmation of severe weather events. As environmental information becomes more sophisticated, complete, and available to all, the environmental literacy of the public becomes more important. NWS outreach and education activities are aimed at making sure the public understands the information we provide and can use it effectively in the decisions they make.

LOCAL WARNINGS AND FORECASTS BASE

Local Warnings and Forecasts Base includes the following activities:

Weather Warnings and Forecasts: Each year, NWS forecasters issue over 1,000 tornado warnings, 2,500 flash flood warnings, 5,000 winter storm warnings, 900,000 airport forecasts, 200,000 coastal and lakeshore marine forecasts, 50,000 fire weather forecasts and warnings, and 700 tropical cyclone/hurricane forecast and warning packages. In addition to these high-impact services, Weather Forecast Offices (WFO) deliver a comprehensive and continuous suite of forecasts and information to support a variety of users, including the general public.

Although text forecasts have been the primary means of product dissemination, NWS has been converting its forecast products to a digital, gridded format. Each WFO sends detailed, high resolution graphical forecasts for their local area to a national server to be compiled in the National Digital Forecast Database (NDFD) (http://www.weather.gov/ndfd/). This is a collection of sensible weather elements such as maximum and minimum temperature, humidity, cloud cover, probability of precipitation, amount of precipitation and wintry precipitation, weather type, and wind direction and speed. In addition to viewing gridded weather data via the Internet, more advanced users can decode the individual grids into a number of different output types for additional uses and automated exchanges. These capabilities have greatly increased the

audience of NDFD data, and many private weather firms quickly realized its potential benefits and have flourished by using the NDFD as a tool for composing their products.

Upper Air (UA) Observations Program (http://www.ua.nws.noaa.gov) provides meteorological data to support NWS forecast operations. NWS operates 92 radiosonde stations in the United States and supports 10 additional stations in the Caribbean and launches over 78,000 radiosondes from these sites each year. A radiosonde is a small, expendable instrument package that is launched by a large hydrogen or helium gas filled balloon. During its flight, the radiosonde measures and transmits profiles of pressure, temperature, and relative humidity. This data is the primary source for NWS weather prediction models used to support severe storm, aviation and marine forecasts, and also support climate and other research uses. Radiosondes serve as the benchmark for deriving estimates of temperature and moisture from satellite and ground-based thermodynamic profiler measurements.

Marine and Coastal Weather Services (http://www.nws.noaa.gov/om/marine/marine.shtml) encompass a vast area from inter-coastal waterways to near-shore bays and inlets to the open oceans that span much of the Northern and Western Hemispheres. The program aims to promote safe and efficient transportation in support of both commercial and recreational interests. Forecasts, analyses, watches, warnings and advisories of maritime conditions, as well as coastal and tropical hazards are provided by forty-seven coastal WFOs and three components of the National Centers for Environmental Prediction (NCEP) (http://www.ncep.noaa.gov). These services are provided for the coastal waters, offshore, high seas waters, and Great Lakes nearshore and open lake waters.

Using observational data sources such as buoy observations and satellite imagery, numerical model forecast guidance provided by various sources such as NCEP and the NOAA Office of Oceanic and Atmospheric Research (OAR) Great Lakes Environmental Research Laboratory, as well as analyses of ice from the National Ice Center (NIC) (http://www.natice.noaa.gov/), the forecasters at tropical and marine centers and coastal and Great Lakes offices maintain a continuous monitoring of weather conditions over marine zones. Routine forecast products and analyses, watches, warnings and advisories are disseminated in alphanumeric, gridded, and graphical formats to describe maritime conditions and tropical and coastal hazards. Marine and coastal products describe wind, waves, visibility, icing, coastal flooding, severe weather, high surf, and rip currents. Tropical products describe hazards associated with tropical cyclones such as storm surge, wind, waves, and inland impacts.

NWS is focused on enhanced forecaster training, increased customer outreach, and implementation of new products. One area of focus will be to educate emergency managers and all users on the strengths, limitations, and application of new tropical cyclone probabilistic wind speed products. Enhanced customer outreach and training will be provided for coastal hazards such as rip currents and high surf.

Over the next several years NWS plans to expand the NDFD to support new marine and tropical gridded products in the coastal, offshore and high seas zones. Ocean and marine gridded products in the NDFD include 6 separate Probabilistic Tropical Cyclone Surface Wind Speed grids, and Wind speed and Significant Wave Height grids in the coastal zone. In FY 2012, NWS plans to make operational the Tropical Analysis and Forecast Branch (TAFB) five day forecasts of gridded Mean Sea Level Pressure, Surface (10-m) winds and significant wave heights.

National Data Buoy Center **(NDBC)** (http://www.ndbc.noaa.gov) provides hourly observations from a network of 101 moored weather observation buoys and 48 Coastal Marine Automated

Network (C-MAN) stations. This network provides forecasters with frequent, high-quality marine observations for forecast preparation and to verify forecasts after they are produced. Other users rely on the observations and forecasts for commercial and recreational activities.

All stations measure wind speed, direction, and gusts; barometric pressure; and air temperature. In addition, all buoy stations, and some C-MAN stations, measure sea surface temperature and wave height and period. Conductivity and water current are measured at some stations as well.

To support the buoy network, NDBC's Industrial Operations and Engineering Complex has specialized equipment and provides NDBC with the environment needed to support the assembly and service of buoys and C-MAN stations. Buoy hulls are refurbished in the onsite sandblast and painting facility. Equipment integration and testing aboard the buoys are accomplished in high bays. Sensors are calibrated in wind tunnels or environmental chambers, and later tested with the onboard station microprocessors, called payloads, on test stands at the outside sensor test facility. Final calibration and testing of the completed buoy systems are accomplished in the onsite canal.

Fire Weather Services (http://weather.gov/fire) support national, regional and local land management agencies such as the Bureau of Land Management (BLM) and the U.S. Forest Service (USFS). NWS issues a complete Fire Weather Forecast twice daily, with updates as needed. The forecast contains weather information relevant to fire control and smoke management for the next 36-48 hours. The appropriate dispatch zones and crews use this information to plan staffing levels, equipment placement, prescribed burns conditions, and assess the daily fire danger. Once per day, NWS meteorologists issue forecasts for specific wildland observation sites for input into the National Fire Danger Rating System (NFDRS). NFDRS determines land use restrictions and informs the public of the daily fire danger via the Smokey Bear awareness campaign. The WFOs also, under a prescribed set of criteria, will determine if a Fire Weather Watch or a Red Flag Warning needs to be issued. These products alert not only the public, but other agencies that conditions are creating the potential for extreme fire behavior.

On the national level, NWS Storm Prediction Center issues assessments for one, two, and 3-8 days in advance of the development of critical fire weather patterns. These include large-scale areas that may experience critical fire weather conditions including the occurrence of "dry thunderstorms." These thunderstorms, containing little precipitation, are responsible for thousands of fires annually.

During the height of the fire season, state and federal forestry officials often request a forecast for a specific location called a "spot forecast." Spot forecasts are used to determine whether it will be safe to ignite a prescribed burn and how to situate crews during the controlling phase. In the last two years, NWS has implemented regional digital weather files to complement currently-provided spot forecasts. The weather output enables Fire Behavior Analysts to directly input weather data into their fire gridded fire weather element forecasts to be used as input into more accurate fire danger assessments. These improvements are particularly important near zones where planned communities meet the wildland forests. Recent improvements also include an improved spot forecast program, allowing spot forecast for fires, hazardous spills, search and rescue and marine/coastal incidents. In addition, NWS will continue excellent interagency relations with the wildland fire community through implementation of a new Interagency Agreement for Meteorological Services.

Upon request, NWS also provides on-scene assistance at large wildfires or other disasters, including HAZMAT incidents. Incident Meteorologists (IMETs) are NWS forecasters specially trained to work with Incident Management Teams during severe wildfire outbreaks or other disasters requiring onsite weather support. IMETs travel quickly to the incident site and then assemble a mobile weather center capable of providing continuous meteorological support for the duration of the incident. The kit includes a cell phone, a laptop computer, and communications equipment, used for gathering and displaying weather data such as satellite imagery or numerical forecast model output. Remote weather stations are also used to gather specific data for the point of interest. IMETs can be deployed anywhere a disaster strikes. There are 87 IMETs nationally with IMET equipment.

*The **Climate Services*** Division (CSD) (http://www.nws.noaa.gov/om/csd/) at NWS headquarters provides the strategic vision for climate services within NWS and oversees the NWS regional and local climate services programs. The regional and local offices deliver short-term climate products, information, and services (which in many cases are based on products and guidance from the Climate Prediction Center, now part of the Climate Service) and provide outreach to their customers. At the NWS Headquarters level, the division also sets NWS regional and local policies and procedures for climate prediction products, defines service and mission needs, solicits user feedback to evaluate new products and services, and approves final product design. CSD provides internal training for NWS operational field personnel, and external user targeted training and outreach on climate variability and change. CSD coordinates across NOAA lines; with federal agencies; the university community; and the private sector, and encourages collaborative arrangements among various regional, state and local climate stakeholders.

Water Resource Forecast Services extend basic NWS hydrologic forecasting services to include a Community Hydrologic Prediction System (CHPS) and provide water resource managers with localized water and soil condition forecasts. CHPS, the backbone NOAA's national water information strategy, will allow NOAA's research and development enterprise and operational service delivery infrastructure to be integrated and leveraged with other federal water agency activities and the private sector. Through CHPS, NOAA will deliver a new suite of high-resolution forecasts (including estimates of uncertainty) for stream flow, soil moisture, soil temperature, and many other variables directly related to watershed conditions, via collaboration and sharing of data and algorithms with university and private sector research groups. Furthermore, these activities will enable NOAA to deliver a national database of hydrologic analyses and predictions, and generate user-friendly Geographic Information Systems (GIS) products for monitoring floods and drought. This activity contributes to the National Integrated Drought Information System (NIDIS).

River & Flood Forecast Services are provided in the form of daily river forecasts by the 13 NWS River Forecast Centers (RFC) (http://water.weather.gov/ahps/rfc/rfc.php) using hydrologic models based on rainfall, soil characteristics, precipitation forecasts, and several other variables. Some RFCs, especially those in mountainous regions, also provide seasonal snow pack and peak flow forecasts. These forecasts are used by a wide range of users, including those in agriculture, hydroelectric dam operation, and water supply resources. The information is also the basis for local flood and flash flood warnings, watches, and advisories issued by the WFOs that emphasize flooding impacts depending on geographic area, land use, time of the year, and other factors.

The Aviation Weather Center (AWC) (http://aviationweather.gov/), located in Kansas City, Missouri, is the mechanism by which the U.S. disseminates its weather forecasts to the aviation

community under an international agreement through the International Civil Aviation Organization. The AWC provides wind, temperature, and flight hazard (e.g., icing and turbulence) forecasts for flight planning and en route aircraft operations for the U.S., the North Atlantic and north Pacific routes, and some routes in the Southern Hemisphere. In addition to the en route weather support provided for the aviation industry, the AWC also produces guidance products for use by WFOs in support of the airport terminal forecast function. Thus, the AWC discharges large-scale, global aviation functions which can be sensibly centralized, while the WFOs discharge local aviation functions based on centralized guidance provided by the AWC. AWC, along with the Space Weather Center, is one of two centers funded through Local Warnings and Forecasts.

The Space Weather Prediction Center (SWPC) (http://www.swpc.noaa.gov/) in Boulder, CO, provides real-time monitoring and forecasting of solar and geophysical events, conducts research in solar-terrestrial physics, and develops techniques for forecasting solar and geophysical disturbances. SWPC provides services to a broad user community of government agencies, industries, public institutions, and private individuals. These users are involved in satellite operation, space exploration, radio navigation, high-altitude polar flights, high-frequency communications, remote intelligence gathering, long-line power and data transmissions, and geophysical exploration. SWPC serves many government, industry and private-sector clients, and such end-product users as the power industry, the airline industry, satellite operators, and the National Aeronautics and Space Administration (NASA).

SWPC research scientists study the sun's electromagnetic, particle, and plasma emissions and the processes by which they affect the near-Earth space environment. SWPC takes a leading role in advocating and specifying new space-environment sensors for operational use. The SWPC, with the U.S. Air Force, jointly operates the national civilian Space Weather Operations Center. Forecasts, alerts, and warnings are provided to customers on a 24 hour-per-day, seven day a week basis. SWPC products are synthesized from over 1,400 data streams providing observations of the solar terrestrial environment, including x-ray flux, charged particles, and magnetic field changes on the sun, in interplanetary space, and at Earth.

The AWC and the SWPC are managed by NCEP, which is described under Central Forecast Guidance (CFG).

The schedule, milestones, and deliverables for SWPC are provided with the program change requested for this activity.

Schedule & Milestones:

FY 2012

- Develop integrated fire weather/incident response training curriculum, and conduct annual IMET Type 1 and IMET Types II/III Workshops.
- Maintain FX-Net operations to assure remote data access for IMETs

FY 2013

- Benchmark of user needs for NOAA's fire weather products and services and identify needed improvements
- Refine performance metrics for fire weather forecasts elements and make this information available to land management partners

FY 2014

- Procure equipment for IMETs including a total of 29 electronic theodolites, 17 additional IMET kits, and 87 replacement satellite communication platforms

Deliverables:

- CHPS fully operational
- Augment NWS fire weather distance learning suite by at least one new course annually to fully train workforce on Incident Command System
- Provide a real-time verification database of fire-weather forecast elements to land management partners.
- Develop wildland fire observing system and strategy for improving observations and data management

Performance Goals and Measurement Data

Performance Measure	FY 11 Target	FY 12 Target	FY 13 Target	FY 14 Target	FY 15 Target	FY 16 Target
Tornado Warnings Lead Time, Measure 15a	12	13	13	13	14	14
Tornado Warnings Accuracy, Measure 15a	70	72	72	72	73	73
Tornado Warnings False Alarm Ratio, Measure 15a	72	71	71	71	70	70
Flash Flood Warnings Lead Time, Measure 15b	38	40	40	40	42	42
Flash Flood Warnings Lead Accuracy, Measure 15b	72	74	74	74	76	76
Marine Wind Speed Forecast Accuracy, Measure 15g	69	70	70	70	71	71
Marine Wave Height Forecast Accuracy, Measure 15g	74	75	75	75	76	76
Aviation Forecast IFR Accuracy, Measure 15h	65	66	68	69	69	70
Aviation Forecast IFR False Alarm Ratio, Measure 15h	41	41	39	39	38	38
Winter Storm Warnings Lead Time, Measure 15f	15	19	19	19	19	19
Winter Storm Warnings Accuracy, Measure 15f	90	90	91	91	91	92

AIR QUALITY FORCASTING

The NWS Air Quality Forecast Services (http://www.nws.noaa.gov/ost/air_quality/index.htm) capability is an integrated, end-to-end forecast system that provides timely, reliable forecast guidance to accurately predict the onset, severity and duration of poor air quality. Forecast guidance consists of next-day ground-level ozone and smoke predictions, at hourly intervals and 12 km grid resolution. Forecast products are available on the National Digital Guidance Database at weather.gov, on ftp-servers at the NWS Telecommunications Gateway, and via NOAA's partner agency, the Environmental Protection Agency (EPA), which develops health-based interpretations and posts state and local community forecasts. NOAA's products meet customer requirements from federal, state, local, and public sectors with state-of-the-science information, both to assist state and local air quality forecasters who issue health-based air quality alerts for participating cities, and to provide information for people at risk from poor air quality at any time of day or night, on any day of the week, in any month of the year, in cities, suburbs, and rural areas alike.

Base funding supports the phased development and testing activities that are in progress to extend the initial ozone-based regional capability. In FY 2005, ahead of schedule, coverage expanded to cover the entire eastern U.S. In FY 2007, NWS deployed an expanded ozone forecast capability over the contiguous United States, and implemented the smoke predictions for the same domain. In FY 2008 and 2009, expansions to the smoke prediction over AK and HI were provided as experimental products, and prototype ozone predictions over AK and HI were developed. Smoke predictions were operationally deployed over AK in FY 2009 and over HI in FY 2010. Operational coverage for ozone predictions has been fully deployed over all 50 states. Development and testing of additional components needed for particulate matter (PM) forecasts is also in progress. Predictions of dust for CONUS are in advanced testing and planned for implementation in FY2011. Assimilation of real-time air chemistry observations will be incorporated into forecast models as needed for extended forecasting improvements.

Schedule & Milestones:

FY 2012 - 13

- Develop and test PM forecast capability prototype

FY 2014

- Initiate experimental PM forecast capability for the northeast U.S.

FY 2015

- Integrate PM products for the northeast U.S.

ALASKA DATA BUOYS

This program was instituted to expand the Alaskan coastal buoy network. The buoys report hourly marine weather information including wind speed and direction, air and sea temperature, atmospheric pressure, and detailed wave information such as swell height, significant wave height, period, and steepness. These buoys provide data which result in more accurate weather forecasts and warnings by providing routine near real-time meteorological and oceanographic information that was not otherwise available. Weather information transmitted by the buoys is added to the computer models that help meteorologists with long range outlooks in addition to short term forecasts and warnings.

Schedule & Milestones:

FY 2012

- Maintain Alaska Data Buoy array

COOPERATIVE OBSERVER PROGRAM (COOP)

This continued investment maintains the nationwide network of volunteer-operated weather observing sites. The COOP network began with the Organic Act of 1890. The observational data obtained from the network is critical for snow forecasts for amount, liquid to water equivalence, snow depth, precipitation type forecasts, flood outlooks, flood forecast guidance modeling, monitoring of droughts, issuing local weather forecasts, and declaration of disasters by government officials. The data from the COOP program is the only data utilized in the NWS model forecasts guidance for snow, snow depth and precipitation type. The COOP network continues to be used by NOAA to prepare national, regional, and local climate forecasts and is critical in the development of climatological normals and averages. In FY 2002, NWS began network refurbishment with the replacement of rain gauges and temperature sensors. The network's instruments require continued refreshment to ensure sustainability and accuracy. The funding provides required sustainment and modernization activities, as recommended by the National Research Council in 1998. Rain gauge refurbishment is estimated to be complete by the end of 2012.

Schedule & Milestones:

FY 2012

- Finish testing of soil moisture sensors in conjunction with USDA and NASA
- Final Fischer & Porter Rain Gauge Replacements (FPR) purchased and installed

FY 2013

- Begin purchase of wireless thermometer systems for future deployment to field as next-generation systems to replace the Cotton Region Shelters first and electronic MMTS at USHCN sites
- Purchase replacement Cotton Region Shelters for field use

FY 2014

- Purchase and installation of 300 wireless thermometer systems

FY 2015

- Purchase and installation of 300 wireless thermometer systems

FY 2016

- Purchase and installation of 300 wireless thermometer systems

Deliverables:

- Replacement of Cotton Region Shelters
- FPR project completed in 2012 with spares in stock
- Complete deployment of soil moisture sensors
- Deployment of wireless thermometer systems nationwide
- Deactivation of MMTS temperature systems at all US HCN sites

NOAA PROFILER NETWORK (NPN)

NPN is a network of 35 operational and two non-operational support Wind Profilers that were installed starting in 1988. Wind Profilers, vertical looking radars, are used across the Nation to track upper air wind profiles that detect the potential development of severe convective weather. The Wind Profilers also provide information that leads to improved forecasts of other types of dangerous weather, such as tornadoes and winter storms, and provides useful information for issuing aviation advisories, volcanic ash plumes tracking and wildfire predictions. The base program provides the operational funding for the NPN. The NPN system is going through a multi-year technology refresh and frequency conversion that is funded in the Procurement, Acquisition, and Construction account.

PACIFIC ISLAND COMPACT

The U.S. maintains a Compact of Free Association (COFA) or agreement with the Republic of the Marshall Islands (RMI), the Federated States of Micronesia (FSM), and the Republic of Palau (ROP) to provide basic government and commerce services including weather services to these island nations. The Compact provides the necessary funding to support the NWS Weather Service Offices (WSO) and associated weather warning, forecast, and observation services for these islands including WSO Majuro, RMI; WSOs Pohnpei, Yap and Chuuk of the FSM; and WSO Koror of ROP. This continued investment will also preserve critical weather observation infrastructure and services in the Pacific necessary to support core NOAA mission responsibilities in the Pacific such as aviation, typhoon, and marine forecasts; climate monitoring; and support to U.S. Navy operations.

STRENGTHEN U.S. TSUNAMI WARNING NETWORK

Strengthen U.S. Tsunami Warning Network is supported by the Pacific Tsunami Warning Center (PTWC) (http://www.prh.noaa.gov/ptwc/) at Ewa Beach, Hawaii and the West Coast/Alaska Tsunami Warning Center (WC/ATWC) (http://wcatwc.arh.noaa.gov/) at Palmer, Alaska. These centers conduct tsunami watches and issue warnings for all U.S. communities at risk. NWS collects and analyzes observational data from an international network of seismological observatories and sea level observing stations that operate on a cooperative basis. Observational data is also collected from the NOAA Deep Ocean Assessment and Reporting of Tsunamis (DART) Buoy Network. The DART Buoy Network consists of 39 deep-water buoys located throughout the Pacific Ocean, Atlantic Ocean, and Caribbean. The centers use these data to prepare watches and warnings covering all U.S. territories and states bordering on the Pacific and Atlantic Ocean Basins and disseminate them to WFOs, federal and state disaster agencies, military organizations, private broadcast media, and other facilities that can furnish warning information to the public.

In FY 2004, NWS assumed operational responsibility for the National Tsunami Hazard Mitigation Program (NTHMP) (http://nthmp.tsunami.gov/). The goal of the NTHMP is to ensure adequate advance warning of tsunamis along all U.S. coastal areas and appropriate community emergency response to a tsunami event. In response to the destructive Indian Ocean Tsunami, the U.S. Tsunami Warning Program (including the NTHMP) was upgraded and expanded to enhance the monitoring, detection, warning, and communications designed to protect lives and property for all U.S. communities at risk. In FY 2008, the U.S. Tsunami Warning Program achieved full operating capability. In FY 2012, the base program will be augmented by approximately $12.7 million in additional reimbursable funding provided by the National Telecommunications and Information Administration (NTIA) from analog spectrum auction proceeds as specified by the Deficit Reduction Act of 2005.

ADVANCED HYDROLOGIC PREDICTION SERVICE

The Advanced Hydrologic Prediction Service (AHPS) is a web-based suite of river-forecast products providing new information on the magnitude and certainty of occurrence of floods or droughts, from hours to days and months before an event. Prior to AHPS, river forecasts were text products with 1, 2 and 3 day lead times and were delivered via the weather wire. Congressional funding for AHPS began in FY 2000. When implementation is complete, advanced river forecast information will be provided at 4,011 locations throughout the United States to assist emergency managers, water managers, and the general public in making decisions based on improved forecasts and the certainty of a hydrologic event.

AHPS Objectives:

- Produce more accurate forecast information incorporating advanced hydrologic science in NWS models
- Provide more specific and timely information on fast-rising floods with increased lead time
- Create new formats, including graphics, for products that are easier to understand and use
- Create more information to assess the risk to flooding, including forecast probability
- Provide products with forecast horizons two weeks or further into the future
- Increase the distribution of products using advanced information technologies (such as web-based geographic information system (GIS) formats and the internet) to provide broader and more timely access and delivery of information
- Implement partnered flood forecast inundation mapping
- Expand outreach and engage partners and customers in all aspects of hydrologic product improvement

The NWS has the primary responsibility among the federal agencies to provide advanced alerts via flood warnings and forecasts in the United States (in accordance with the Weather Service Organic Act,15 USC 313; Inland Flood Forecasting and Warning System Act of 2002, 15 USC 313c; and NOAA Reorganization Plan No. 4 of 1970 as amended, 5 USC 1557-61, 1994). Prior to AHPS, river forecasts were provided as text products via the weather wire, primarily to emergency managers and other federal water management agencies. Through AHPS, the NWS provides forecasts to all users of hydrologic predictions and meets AHPS Objectives (see above).

Schedule & Milestones:

FY 2012

- Implement additional 343 forecast point locations

FY 2013

- Implement additional 317 forecast point locations

FY 2014

- AHPS implementation complete

Deliverables:

- Incorporate advanced hydrologic science into NWS models
- Provide more specific and timely information on fast-rising floods with increased lead time
- Deliver graphic forecast products that are easier to use
- Provide probabilistic forecasts useful to assess river level and flood risk
- Provide products with forecast horizons two weeks or further into the future
- Increase the distribution of products using advanced information technologies (such as the internet and web-based GIS formats) to provide broader and more timely access to and delivery of information; and
- Provide partnered flood forecast inundation mapping at selected locations
- Expand outreach and engage partners and customers in all aspects of hydrologic product improvement.

Performance Goals and Measurement Data

Performance Measure	FY 2011 Target	FY 2012 Target	FY 2013 Target	FY 2014 Target	FY 2015 Target	FY 2016 Target
Total Forecast Locations with AHPS (#)	3070	3413	3739	4011	4011	4011
Description: Number of Forecast locations that will have AHPS capability to assist emergency managers, water managers, and the general public to make decisions based on the probability of a hydrologic event taking place.						

AVIATION WEATHER

The Aviation Weather Program is focused on improving the accuracy, timeliness and consistency of aviation weather products and services to improve the safe and efficient flow of air traffic in the National Airspace System (NAS). The program supports the Federal Aviation Administration (FAA), International Civil Aviation Organization (ICAO), and the World Meteorological Organization (WMO), as well as the aviation industry and stakeholders. In response to requirements of the international community and FAA, aviation weather products issued by NWS span the globe.

The Aviation Weather Program serves as the focal point for NOAA's role in the multi-agency Next Generation Air Transportation System (NextGen) and is the lead for NOAA's development of the NextGen 4-D Weather Data Cube Services. This virtual repository of weather information will integrate observed and forecast weather information into an automated, multi-agency, coordinated air traffic management system. Planned NextGen 4-D Weather Data Cube Services activities consist of development of the operational NextGen 4-D Weather Data Cube Services systems, establishing connectivity between legacy NWS datasets and the NextGen 4-D Weather Data Cube Services prototype, improvement of aviation forecasts, development of new forecast information and transition of these improved forecasts to operations, and enhancement of the NWS forecast process to meet NextGen Weather Initial Operational Capability (IOC) requirements.

Numerous programs contribute to NWS's aviation weather forecast and service capabilities. NWS maintains an extensive surface, upper air, and radar weather observing program and a nationwide aviation weather forecasting service capability. Aviation services are provided to FAA and other NWS customers in two general categories, which include Terminal Area Forecast (TAF) and en route area forecasts and advisories. GPRA targets for ceiling and visibility accuracy and false alarm ratio are derived from information in TAFs generated by 122 WFOs for 630 specific airports. Numerous area forecast products are provided for both domestic and international airspace, including text area forecasts, collaborative convective forecast products, AIRMETs (AIRman's METeorological Information), SIGMET (Significant Meteorological Information) weather advisories, and en route pilot guidance. These forecasts and advisories are produced by the National Center for Environmental Prediction (NCEP) Aviation Weather Center, other NCEP centers, the Alaska Aviation Weather Unit, WFO Honolulu, Hawaii, and 21 Central Weather Service Units. In addition, the AWC serves as an international World Area Forecast Center providing global aviation weather forecasts.

The acquisition and implementation of aircraft-based water vapor sensors and a variety of product enhancements and training activities are also managed from this program. All aviation weather projects support increasing and improving observation capabilities, improved forecast

products and techniques, outreach and training, operational adaptation of applied research, and verification of forecast products.

The multi-agency NextGen Joint Planning and Development Office (JPDO) developed a plan to achieve these required improvements and accommodate the expected growth in demand. A critical component of the NextGen plan is the integration of weather information into air traffic operations. To enable this integration, JPDO is calling for the creation of rapidly updated, high-resolution probabilistic weather information consistent across space and time and accessible to all NAS managers and users through a network-enabled infrastructure. This information will be produced by an enhanced forecast process, where meteorologists add value to guidance and rapidly updated gridded datasets produced by automation. This capability does not presently exist within the Federal government, and the JPDO partner agencies are depending on NOAA, as the Federal experts in the provision of weather information, to deliver it.

NOAA is legislatively mandated by Title 49 of the U.S. Code to provide weather information to the FAA. In addition, Public Law No 108-176 directs DOT, FAA, DOC, NASA and JPDO to conduct integrated planning for research to operations to support NextGen. This investment is critical to meet NOAA's obligations as laid out in the NextGen Integrated Work Plan, which calls for a NextGen Weather IOC in 2013 and full operational capability in 2022. This investment represents a coordinated effort spanning two line offices and three NOAA programs. It will require an extended investment over many years, resulting in a significant increase in weather prediction and dissemination capabilities with wide-ranging benefits across NOAA.

A significant portion of the NextGen investment will improve broader NOAA and NWS mission areas beyond aviation. Higher resolution forecast guidance driven by NextGen will enhance most NWS service areas, including fire weather, marine weather and public weather, especially the Warn on Forecast capability needed to increase NWS thunderstorm and tornado warning lead times. The IT and data services research will increase the efficiency of how NWS shares its environmental information with internal and external customers. NextGen capabilities support the Global Earth Observation System of Systems (GEOSS) requirements. More importantly, it will allow our public and private partners broader access to all NWS products and services and provide tools that will enable full exploitation of NWS data for decision support.

The schedule, milestones, and deliverables for NextGen are provided with the program change requested for this activity. Aviation Weather base schedule, milestones and deliverables are provided below.

Schedule & Milestones:

FY 2012

- Acquire additional water vapor data via aircraft observation
- Improve skill in aviation weather forecasting through training

FY 2013

- Acquire additional water vapor data via aircraft observation
- Meet WMO requirement for certification of aviation weather forecasters

FY 2014

- Acquire additional water vapor data via aircraft observation
- Improve skill in aviation weather forecasting through training

FY 2015

- Develop improved volcanic ash modeling to enhance aviation safety
- Acquire additional water vapor data via aircraft observation

FY 2016

- Acquire additional water vapor data via aircraft observation
- Improve skill in aviation weather forecasting through training

Deliverables:

- Meteorological Services to the Terminal Area capability
- Distance Learning Aviation Course (DLAC) modules 3 and 4
- Complete installation of 175 Water Vapor Sensing Systems (WVSS II) for increased granularity and greater accuracy in numerical models
- Provide daily WITI information
- Certify all aviation forecasters in compliance with WMO directives
- Improved volcanic ash model

WEATHER FORECAST OFFICE MAINTENANCE

This continued investment allows NWS to fund recurring maintenance contracts and address priority maintenance repairs. WFOs provide forecasters with modernized facilities, supporting the advanced technology systems and the provision of weather service to the public. As WFOs continue to age, the facilities require recurring and cyclic maintenance. This investment allows NWS to protect the $250 million capital investment in its previously modernized facilities in accordance with NWS operational standards along with GSA and private industry standards.

NOAA WEATHER RADIO TRANSMITTERS BASE

NWR is one of the most efficient, reliable and cost-effective methods of disseminating severe weather watches and warnings, flash flood warnings, and other NWS products and services to NWS' constituency, including the general public and all levels of government emergency managers. It is also the only NWS dissemination system capable of reaching individual citizens at nominal cost to citizens (i.e., individual purchase of NOAA weather radio) and is the only system the Federal Communications Commission mandates that broadcast media outlets monitor as a source of public safety announcements. The United States National Response Framework, Emergency Support Function Annex #2 – Communications tasks NOAA/NWS to provide public dissemination of critical pre- and post-event information on the All Hazards NOAA Weather Radio.

The existing infrastructure of NWR has tremendous potential for communicating warnings and information about non-weather related hazards and emergencies. NWS has collaborated extensively with the Department of Homeland Security to make NWR an all-hazard warning network. The NWR national warning network infrastructure consists of over 1000 existing broadcast stations, broadcast coverage reaching 98 percent of the Nation’s population, and the ability to deliver the broadcasted message to individuals monitoring their own NWR receivers. Since NWR signal enters the Emergency Alert System, monitored by television and radio license holders, NWR can reach millions of listeners and viewers.

Schedule & Milestones:

- FY 2012 National Maintenance Contract Award Option Year 1
- FY 2013 National Maintenance Contract Award Option Year 2
- FY 2014 National Maintenance Contract Award Option Year 3

- FY 2015 National Maintenance Contract Award Option Year 4
- FY 2016 National Maintenance Contract Award Option Year 5

Deliverables:

- Preventative maintenance and/or corrective action visits at 405 sites per year
- 841 Sites Logistics and Spare Parts Provisioning and LRU Repair Support

Performance Goals and Measurement Data

Performance Measure	FY 2011 Target	FY 2012 Target	FY 2013 Target	FY 2014 Target	FY 2015 Target	FY 2016 Target
NWR Transmitter Availability	96%	96%	96%	96%	96%	96%
Description: NWR transmitters broadcast 24 hours a day, 365 days a year. This measure reflects NWR transmitter broadcast time versus unscheduled off time and is calculated on a monthly basis.						

CENTRAL FORECAST GUIDANCE

The Central Forecast Guidance (CFG) Program provides an integrated suite of weather and environmental forecast guidance from the short-term through seasonal, inter-annual, decadal, and centennial time frames and specific tailored forecast products. CFG consists of six National Centers for Environmental Prediction (NCEP) (http://www.ncep.noaa.gov) and also funds NOAA's Hurricane Forecast Improvement Project (HFIP). NCEP provides the backbone of NOAA's Weather Ready Nation goal by providing expert analysis and prediction services to the local weather forecast office infrastructure. Forecasters use these services as the basis for local forecast products. The total forecast process depends critically on both NCEP products and local forecast efforts to enhance both accuracy and uniformity of service across the country. As part of the FY 2012 request, one center, Climate Prediction Center, is proposed to transfer to the new Climate Service line office.

NCEP also provides the principal means through which NOAA provides operational weather, ocean, coastal, and climate prediction services for large areas, up to and including the entire globe, to a vast assortment of domestic and international users. These services typically exceed the domain of a single WFO, and require a large supercomputer; efficiency demands that these forecasts be generated centrally. Users include numerous private weather providers, airlines, government research laboratories, media outlets, energy companies, the military, insurance and safety organizations, academic institutions, storm spotters and chasers, and various American Meteorological Society listservs.

NCEP's science-based, service-oriented complementary centers generate environmental prediction products and three central activities supporting those services. Each center depends on the observational infrastructure, data assimilation systems, numeric modeling function, and application of model output statistics to produce value-added forecast guidance products for NWS field offices and direct users. The four centers that are proposed to be funded through CFG in FY 2012 are described below. NCEP's two additional science-based centers, the Aviation Weather Center and the Space Weather Prediction Center, are funded through Local Warnings and Forecasts Base.

The *Storm Prediction Center* (SPC) (http://www.spc.noaa.gov/), located in Norman, Oklahoma, provides timely and accurate forecasts and watches for severe thunderstorms and tornadoes over the contiguous United States. The SPC also monitors heavy rain, heavy snow, and fire weather events across the U.S. and issues specific products for those hazards. The forecast products cover time scales ranging from a few hours out to eight days. Products issued from the SPC supply specific guidance to WFOs about the probability and intensity of hazardous weather occurrences.

The *Hydrometeorological Prediction Center* (HPC) (http://www.hpc.ncep.noaa.gov/), located in Camp Springs, Maryland, is responsible for preparing quantitative precipitation forecasts (QPF) that are used by WFOs to develop local rainfall, snow, and ice forecasts and by the Regional Forecast Centers (RFC) to develop local river and flood forecasts. The HPC provides special QPFs and coordinates with other federal agencies such as the Federal Emergency Management Agency (FEMA) during major flood events. The HPC also provides an array of analysis and forecasts of frontal systems, pressure patterns, temperature, and precipitation for use by WFOs and the private weather community.

The *Ocean Prediction Center* (OPC) (http://www.opc.ncep.noaa.gov/), located in Camp Springs, Maryland, discharges domestic and international meteorological products to marine interests under the International Convention for Safety of Life at Sea, to which the U.S. is a signatory. It is a central resource for marine interests operating outside the domain of coastal WFOs. The OPC provides weather and sea state warnings and forecasts for the offshore waters and high seas of the Northern Hemisphere for planning and operational purposes. Its warnings and products go directly to ships at sea via several dissemination methods, and are vital for the protection of life and property. The OPC also provides guidance for WFOs with coastal responsibilities, which extend out to nearly 100 nautical miles. Coastal WFOs have responsibility for forecasts and warnings out to that limit, while the centralized OPC has responsibility for offshore and high seas waters.

The NCEP experts in the area of tropical meteorology are concentrated at the *Tropical Prediction Center* (TPC)/*National Hurricane Center (*NHC) in Miami, Florida (http://www.nhc.noaa.gov/). Services provided by the TPC/NHC include advisories, watches, and warnings for tropical cyclones in the North Atlantic and eastern North Pacific oceans, the Caribbean Sea, and the Gulf of Mexico, including the portions of the U.S. coastline threatened by such storms. In addition, TPC forecasters provide aviation and marine analyses and forecast products for the same areas of responsibility. The TPC/NHC functions both to provide guidance, coordination, and tropical weather expertise to WFO forecasters and to serve users of centrally generated products.

NCEP also maintains two critical support organizations to facilitate the central forecast guidance process:

NCEP Central Operations (NCO) (http://www.nco.ncep.noaa.gov/) operates the NOAA Weather and Climate Operational Supercomputer, manages the model production suite upon which all NCEP services are based, the communications linking the several parts of NCEP, and NOAA's Climate Service provides operational quality assurance of incoming observations and outgoing products. NCO staff also provides central support for software development for data processing, display, interaction, and product generation. NCO is the technical transition point between the development of numerical weather and climate prediction models and their operational use by forecasters at NCEP and the WFOs. NCO staff also provides central support for software development for data processing, display, interaction, and product generation. NCO consists of

computing, communications, and software specialists, as well as meteorologists with special knowledge of numerical modeling operations. The NCO organization provides system support and maintenance, administration and other user support services on a 24-hour basis for NCEP operational computing and communications systems ensuring a secure and reliable "system of systems" infrastructure that comprises radar imaging, satellite imaging, model guidance, and sounding media used in the visualization and analysis of weather and climate information.

NCEP's Environmental Modeling Center (EMC) (http://www.emc.ncep.noaa.gov/) develops, enhances, and maintains complex data assimilation and numerical modeling software systems that span the globe. The computer models and other numerical forecast products developed by the EMC provide the basic guidance that meteorologists at NCEP and the WFOs use in making weather and climate predictions. EMC serves as the integrator of numerical modeling research and development performed from universities and research laboratories. EMC conducts model impact studies to validate data sets that lead to new data requirements from observing technologies (e.g., satellites, radar, etc.).

NOAA Center for Weather and Climate Prediction (NCWCP) in College Park, Maryland, is a new facility that will replace the current World Weather Building (WWB) with a new state-of-the-art facility to meet the operational requirements of NCEP, NOAA's National Environmental Satellite Service's (formerly National Environmental Satellite, Data, and Information Service) Center for Satellite Applications and Research and Satellite Services Division, and NOAA's OAR Air Resources Laboratory. NWS demonstrated positive results of co-locating its Forecast Offices with research laboratories and universities in the form of improved weather forecast performance scores; NWS hopes to see similar improvements by co-locating these NOAA offices. NOAA intends to use this model to accelerate the transfer of weather and climate research into operations, improve forecast models, and provide a focus for improving environmental satellite data assimilation. Further, co-locating the new facility in a scientific, academic setting will increase the recruitment and retention of top scientists as needed to advance NOAA's programs.

Another critical program activity within CFG is the **Hurricane Forecast Improvement Project** (HFIP). HFIP's goals include improving the accuracy and reliability of hurricane track and intensity forecasts; extending lead time for hurricane forecasts with increased certainty; and increasing confidence in hurricane and storm surge forecasts. The HFIP provides the basis for NOAA to engage and align the other agencies and larger scientific community efforts to work towards coordinated national hurricane research needed to significantly improve operational hurricane forecast guidance. HFIP is pursuing existing science and technology innovations to develop an advanced Hurricane Forecast System (HFS); initial technology demonstrations show significant promise. HFIP development efforts also include enhanced observational strategies and improved data assimilation. Output from HFS is expected to be high quality information with associated probabilities on high impact variables such as wind speed, precipitation, and storm surge. Once operationally implemented, this guidance will be used by the NHC in their development of hurricane forecasts and warnings resulting in significantly improved response to the tropical storm and hurricane threat to coasts, contingent upon the ability to apply high performance computing.

Schedule & Milestones:

NCEP Centers
FY 2012-16

- Update model access and display websites

- Conduct regular customer/partner outreach forums
- Update product suite based on customer requirements
- Engage in training activities with international partners
- Integrate testbeds at all centers and better engage academic community in testbed activities to accelerate research into operations

FY 2014-16
- Implement model upgrades routinely
- Update product suite based on customer requirements
- Provide support to NOAA's Climate Service
- Work with National Ocean Service to expand into ecological forecasting

HFIP
FY 2012
- Implement full-scale reliability testing of High resolution GEFS/HFS
- Demonstrate performance impact of Higher Resolution GEFS/HFS

FY 2013
- Demonstrate performance impact of accelerated research and development

FY 2014
- Demonstrate performance impact of accelerated research and development

FY 2015
- Demonstrate performance impact of accelerated research and development

FY 2016
- Demonstrate performance impact of accelerated research and development

Deliverables:
- Approximately 28 million model fields a day for every forecast hour; including temperature, winds, humidity as a function of pressure
- Approximately 200 products and services from each of NCEP's service centers per day
- Continuous improvement to NOAA's operational forecast suite
- High frequency aircraft observation data sets made available to research community
- Additional improved modeling techniques delivered for evaluation at Developmental Testbed Center

Performance Goals and Measurement Data

Performance Measure	FY 2011 Target	FY 2012 Target	FY 2013 Target	FY 2014 Target	FY 2015 Target	FY 2016 Target
Hurricane Forecast Track Error (48 hour), Measure 15c	87	87	87	87	84	81

Performance Measure	FY 2011 Target	FY 2012 Target	FY 2013 Target	FY 2014 Target	FY 2015 Target	FY 2016 Target
Hurricane Forecast Intensity Error (48 hour), Measure 15c	13	12	12	12	11	11

Performance Measure	FY 2011 Target	FY 2012 Target	FY 2013 Target	FY 2014 Target	FY 2015 Target	FY 2016 Target
Accuracy (%) (Threat score) of Day 1 precipitation forecasts, Measure 15e	30	31	32	32	33	33

Performance Measure	FY 2011 Target	FY 2012 Target	FY 2013 Target	FY 2014 Target	FY 2015 Target	FY 2016 Target
500 mb height anomaly for NCEP Global Forecast System	0.86	0.866	0.872	0.875	0.875	0.900
Description: The weather forecast skill is assessed using a scientifically accepted measure, called 500 millibarr anomaly correlation. This measure serves as a very sensitive proxy for overall forecast of lead times and accuracy of severe weather events. The Global Forecast System serves as the underpinning of NCEP's modeling suite and NCEP's services to the Nation.						

Performance Measure	FY 2011 Target	FY 2012 Target	FY 2013 Target	FY 2014 Target	FY 2015 Target	FY 2016 Target
Timeliness of Delivery for NCEP's model guidance	99.5%	99.5%	99.5%	99.5%	99.5%	99.5%
Description: NCEP EMC delivers over 28 million model output fields including temperature, winds, humidity as a function of pressure per day. This model guidance is disseminated to NWS Regions and WFOs and external users. Timeliness of delivery impacts WFOs' ability to develop the forecasts with sufficient lead times to warn the public of severe weather events.						

Performance Measure	FY 2011 Target	FY 2012 Target	FY 2013 Target	FY 2014 Target	FY 2015 Target	FY 2016 Target
Timeliness of Delivery for NCEP Centers' products and services	98%	98%	98%	98%	98%	98%
Description: NCEP Centers interpret model based guidance and observational information to develop a suite of forecasts and outlooks at a rate of approximately 100-200 products per day per center. Users rely on these services to inform decisions for protection of life and property and enhancement of the economy.						

PROGRAM CHANGES FOR FY 2012:

Local Warnings & Forecasts: National Data Buoy Center Sustainment (Base Funding: 40 FTE and $24,722,000; Program Change: +0 FTE and +$4,000,000): NOAA requests an increase of 0 FTE and $4,000,000 for a total of $28,722,000 to resolve sustainment gaps in the National Data Buoy Center's (NDBC) ocean observation capabilities, which include Coastal Weather Data Buoys (CWB) and Coastal-Marine Automated Network (C-MAN) stations.

Proposed Actions:

Requested funding will:

1. Provide necessary operations and maintenance (O&M) funding to repair or replace buoys that have exceeded their usable life or have been damaged or destroyed by severe weather, commercial boating accidents, or vandalism, replenish spares inventories, reduce the backlog of deferred maintenance, comply with international regulations, and return system performance to its required level.
2. Provide O&M support for 12 Congressional Earmarked buoys. Since 2002, the following 12 Congressional Earmarked buoys have been added to the network. This increase provides for the required recurring O&M funds necessary to maintain these buoys:
    a. Six (6) buoys deployed off New England
    b. One (1) buoy deployed off Alabama
    c. Two (2) buoys deployed off Southern California
    d. Three (3) buoys deployed near Hawaii
3. Redesign and procurement of new mooring and components. Funding would allow compliance with new international regulations prohibiting scuttling of plastic materials in the oceans.
4. Procure repair parts and ship time for backlogged buoy maintenance as funding permits. Remaining funding would be used to improve spares inventory and reduce the maintenance backlog.
5. Provide some funding for charter vessel contracts to supplement the diminishing availability of USCG ship time for servicing the weather buoy network.

Statement of Need and Economic Benefits:

NWS currently operates 101 moored weather observation buoys and 48 C-MAN stations. Over the last 8 years, system performance has trended downward to the current low (as of February 2011) of 66 percent data availability. This trend will continue downward to 65 percent data availability in 2011. The requested increase will provide O&M funding to support earmarked, damaged and destroyed buoys, and to comply with new international regulations. Remaining funding, if any, will be used to begin reducing the backlog of deferred maintenance.

Decreased data availability has caused large maritime data voids where no meteorological or oceanographic data is routinely sampled. This makes it difficult for NWS forecasters to make accurate and timely marine warnings and forecasts, and to measure the accuracy of their forecasts.

NDBC has witnessed an increase in buoy and C-MAN station replacements as a result of damage from severe weather, commercial boating accidents, and vandalism. New international regulations prohibiting scuttling of plastic materials in the oceans have resulted in increased operational costs. In addition, O&M funding was not provided for the 12 operational buoy and C-MAN station replacements deployed over the past 8 years.

Base Resources Assessment:

The base resource assessment is provided in the Program Summary for Local Warnings & Forecasts.

Schedule & Milestones:

FY 2012

- Conduct backlogged maintenance
- Perform preventative maintenance on earmark buoys
- Initiate procurement actions and prepare to contract for new moorings and components
- Acquire and Schedule commercial vessel service

FY 2013

- Conduct backlogged maintenance
- Perform preventative maintenance on earmark buoys
- Initiate procurement actions and prepare to contract for new moorings and components
- Acquire and Schedule commercial vessel service

FY 2014

- Conduct backlogged maintenance
- Perform preventative maintenance on earmark buoys
- Initiate procurement actions and prepare to contract for new moorings and components
- Acquire and Schedule commercial vessel service

FY 2015

- Conduct backlogged maintenance
- Perform preventative maintenance on earmark buoys
- Initiate procurement actions and prepare to contract for new moorings and components

Acquire and Schedule commercial vessel service FY 2016

- Conduct backlogged maintenance
- Perform preventative maintenance on earmark buoys
- Initiate procurement actions and prepare to contract for new moorings and components
- Acquire and Schedule commercial vessel service

Deliverables:

- Stabilized performance of the NWS/NDBC Ocean Observation System at FY 2011 level
- Reach and maintain data availability level of 80 percent
- Complete deployment of new moorings

Performance Goals and Measurement Data

Performance Measure: Data availability of C-MAN and weather buoys	**FY 2011 Target**	**FY 2012 Target**	**FY 2013 Target**	**FY 2014 Target**	**FY 2015 Target**	**FY 2016 Target**
With increase	65%	65%	70%	75%	80%	80%
Without increase	65%	60%	55%	50%	45%	40%
Description: Perform deferred maintenance in order to prevent additional performance degradation and to maintain the network performance to its required operating capacity.						

Performance Measure: Number of quality controlled marine observations (millions)	**FY 2011 Target**	**FY 2012 Target**	**FY 2013 Target**	**FY 2014 Target**	**FY 2015 Target**	**FY 2016 Target**
With increase	1.60	1.60	1.70	1.82	1.94	1.94
Without increase	1.60	1.42	1.30	1.18	1.06	0.95
Description: Observations from all weather buoys and C-MAN Stations.						

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Activity: Operations, Research, and Facilities
Subactivity: Operations & Research

	Object Class	2012 Increase
11	Personnel compensation	
11.1	Full-time permanent	$0
11.3	Other than full-time permanent	0
11.5	Other personnel compensation	0
11.8	Special personnel services payments	0
11.9	Total personnel compensation	0
12	Civilian personnel benefits	0
13	Benefits for former personnel	0
21	Travel and transportation of persons	0
22	Transportation of things	0
23.1	Rental payments to GSA	0
23.2	Rental Payments to others	0
23.3	Communications, utilities and miscellaneous charges	0
24	Printing and reproduction	0
25.1	Advisory and assistance services	340
25.2	Other services	1,600
25.3	Purchases of goods & services from Gov't accounts	0
25.4	Operation and maintenance of facilities	0
25.5	Research and development contracts	0
25.6	Medical care	0
25.7	Operation and maintenance of equipment	0
25.8	Subsistence and support of persons	0
26	Supplies and materials	2,060
31	Equipment	0
32	Lands and structures	0
33	Investments and loans	0
41	Grants, subsidies and contributions	0
42	Insurance claims and indemnities	0
43	Interest and dividends	0
44	Refunds	0
99	Total obligations	4,000

Local Warnings & Forecasts: Global Positioning System (GPS) Radiosondes (Base Funding: 0 FTE and $4,000,000; Program Change: +0 FTE and +$5,042,000): NOAA requests an increase of 0 FTE and $5,042,000 for a total of $9,042,000 to fully fund the acquisition cost of the global positioning system (GPS) radiosondes for all 102 NOAA/NWS Upper Air (UA) observing stations utilizing GPS tracking capability and GPS radiosondes.

Proposed Actions:

Complete the acquisition of GPS radiosondes to launch at all 102 UA observing sites. The Nation's UA network provides approximately 78,000 atmospheric profiles (wind, humidity, temperature, pressure and altitude) per year from ground level to up to 60,000 feet from 92 NWS-operated sites plus 10 additional UA sites in the Caribbean Hurricane Upper Air System (CHUAS). Using the new GPS radiosondes provides a 50 percent improvement in wind measurement accuracy and a 6-fold improvement in vertical resolution. This enables unmatched ability to detect dangerous wind shear, which is hazardous to aviation and critical to hurricane formation; and enables much improved ability to define the jet stream core.

The radiosonde replacement program was initiated as a result of the 1993 Omnibus Budget Reconciliation Act (OBRA), in which the Government reallocated 5 MHz (1670-1675 MHz) to the private sector effective January 1, 1999, requiring the NWS to vacate this part of the spectrum. The GPS radiosonde meets this requirement with a new transmitter design operating in the 1675-1700MHz frequency range.

Statement of Need and Economic Benefits:

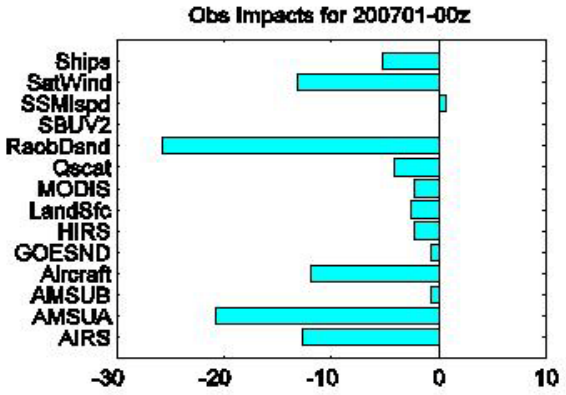
The current NWS UA operations concept, driven by National Centers for Environmental Prediction (NCEP) modeling requirements, requires an annual quantity of over 78,000 radiosondes per year to be launched at 102 sites. The cost of GPS radiosondes is significantly higher ($160 per unit) than the legacy radio-direction finding (RDF) radiosondes ($110 per unit).

The transition to GPS technology has resulted in significantly more, and more accurate, data from each flight. The RDF radiosondes transmit a complete observation (wind, humidity, temperature, pressure and altitude) every 6 seconds, resulting in approximately 1,100 observations per flight. GPS radiosondes transmit a complete observation every second, providing approximately 6,700 observations per flight. This is a 6-fold increase in the vertical profile data. Today's powerful computers and higher resolution models are capable of processing the increased number of observations, therefore producing more accurate forecasts.

The UA profile data received from GPS radiosondes serve as one of the principal data sources for NWS weather prediction models supporting days 2, 7, and 14 severe storm, aviation and marine forecasts and warnings. Radiosonde data are also used by the Department of Homeland Security and the Environmental Protection Agency in modeling the dispersion and mixing of hazardous materials and pollutants that are released into the atmosphere. This information is also used by policy-makers to set regulations for industrial emissions and to protect the public from hazardous levels of pollution. The Federal Aviation Administration uses radiosonde data to analyze the effects of freezing precipitation on aircraft, potentially informing aircraft design and improved safety measures for air transportation.

NOAA's upper-air network (radiosondes, wind profilers, NEXRAD, and in-flight data sensors from commercial aircraft) provides the foundation for all short-term weather predictions; the quality, timeliness, and availability of observations from this composite network directly affect NOAA's ability to meet its protection of life and property mission. Studies using NASA's GEOS-5

global numerical weather prediction model showed radiosonde observations have the most significant impact on the 24 hour weather forecast effort (see chart below) according to Rienecker, et al., 2008 in "The GEOS-5 Data Assimilation System - Documentation of Versions 5.0.1, 5.1.0, and 5.2.0," NASA *Technical Report Series on Global Modeling and Data Assimilation*, 27. The 24 hour forecast effort has a significant impact on Winter Storm Warning Accuracy GPRA measures. UA (radiosonde) observations taken twice daily from 102 sites are the only UA observations capable of providing the independent measurement of winds, moisture and temperature at the same place and time, with a vertical resolution unmatched by any other set of observations. UA radiosonde profiles are a key element to the calibration of remote sensing systems, including all NOAA weather observation satellites. Due to their multiple measurement capability and their importance for satellite calibration, the UA observations provided by the NOAA's modernized UA radiosonde network are critical to Numerical Weather Prediction (NWP) modeling and remain the backbone of the Nation's global observing system.



An analysis of forecast error reduction shows radiosonde usage yields the greatest error reduction, followed by satellites (AMSUA, SatWind & AIRS) and aircraft (MDCRS).

Base Resources Assessment:

The base resource assessment is provided in the Program Summary for Local Warnings & Forecasts.

Schedule & Milestones:

FY 2010

- Begin launching GPS radiosondes at 12 additional sites for a total of 78 GPS sites

FY 2012

- Award second source contract for GPS radiosondes
- Begin launching GPS radiosondes at 8 additional sites for a total of 86 GPS sites

FY 2013

- Begin launching GPS radiosondes at 6 additional sites for a total of 92 GPS sites

FY 2014

- Begin launching GPS radiosondes at 10 CHUAS sites for a total of 102 GPS sites

Deliverables:

- Full compliance with National Telecommunications and Information Association (NTIA) frequency usage mandates at all sites
- Improved forecasts for severe storms, aviation and marine, and climate applications
- Expanded ability to inter-compare observations and model analysis products, resulting in improved data quality; improved ability to monitor rapidly changing moisture patterns

- Increased wind accuracy by an order of magnitude (10.0 m/s to 1.0 m/s at 200km downwind) at commissioned GPS radiosonde stations
- Increase vertical resolution by 6x (from 30m to 5m vertical resolution) at commissioned GPS radiosonde stations
- Improve observation vertical height accuracy from +/-1000m to +/-10m (two orders of magnitude)

Performance Goals and Measurement Data

Performance Measure: Number of UA observing sites launching GPS radiosondes	**FY 2011 Target**	**FY 2012 Target**	**FY 2013 Target**	**FY 2014 Target**	**FY 2015 Target**	**FY 2016 Target**
With increase	78	86	92	102	102	102
Without increase	78	78	78	78	78	78
Description: The radiosonde replacement program was initiated as a result of the 1993 Omnibus Budget Reconciliation Act (OBRA), in which the Government reallocated 5 MHz (1670-1675 MHz) to the private sector effective January 1, 1999, requiring the NWS to vacate this part of the spectrum. The GPS radiosonde complies with this requirement, and this output measure demonstrates full compliance with the OBRA.						

Performance Measure: 5-day 500 mb height anomaly for NWS Global Forecast System	**FY 2011 Target**	**FY 2012 Target**	**FY 2013 Target**	**FY 2014 Target**	**FY 2015 Target**	**FY 2016 Target**
With increase	0.860	0.866	0.872	0.875	0.875	0.900
Without increase	0.819	0.825	0.831	0.834	0.837	0.854
Description: The weather forecast skill is assessed using a scientifically accepted measure, called 500 millibarr anomaly correlations. This measure serves as a very sensitive proxy for overall forecast of lead times and accuracy of severe weather events. The Global Forecast System serves as the underpinning of NCEP's modeling suite and NCEP's services to the Nation. Regional scale forecasts would experience significant further degradation than experienced at the global scale, especially for severe weather events.						

Performance Measure: NWP Error Reduction (joules per kilogram)	**FY 2011 Target**	**FY 2012 Target**	**FY 2013 Target**	**FY 2014 Target**	**FY 2015 Target**	**FY 2016 Target**
With increase	-19 j/kg	-21.3 j/kg	-23 j/kg	-26 j/kg	-26 j/kg	-26 j/kg
Without increase	-19 j/kg	-19 j/kg	-19 j/kg	-19 j/kg	-19 j/kg	-19 j/kg

Description: This measure is based on NASA's GEOS-5 NWP model and their 2008 analysis of the impacts of various observation systems on the 24-hour forecast error. The metric is joules per kilogram, which is a measure of the amount of energy available for convection. The analysis assumes the full 102 NWS network launching two GPS radiosondes per site per day. A loss of 22 percent of the network observations results in a similar impact on error reduction, assuming a linear relationship.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Activity: Operations, Research, and Facilities
Subactivity: Operations & Research

	Object Class	2012 Increase
11	Personnel compensation	
11.1	Full-time permanent	$0
11.3	Other than full-time permanent	0
11.5	Other personnel compensation	0
11.8	Special personnel services payments	0
11.9	Total personnel compensation	0
12	Civilian personnel benefits	0
13	Benefits for former personnel	0
21	Travel and transportation of persons	0
22	Transportation of things	0
23.1	Rental payments to GSA	0
23.2	Rental Payments to others	0
23.3	Communications, utilities and miscellaneous charges	0
24	Printing and reproduction	0
25.1	Advisory and assistance services	0
25.2	Other services	0
25.3	Purchases of goods & services from Gov't accounts	0
25.4	Operation and maintenance of facilities	0
25.5	Research and development contracts	0
25.6	Medical care	0
25.7	Operation and maintenance of equipment	0
25.8	Subsistence and support of persons	0
26	Supplies and materials	5,042
31	Equipment	0
32	Lands and structures	0
33	Investments and loans	0
41	Grants, subsidies and contributions	0
42	Insurance claims and indemnities	0
43	Interest and dividends	0
44	Refunds	0
99	Total obligations	5,042

Aviation Weather/ Next Generation Air Transportation System (Base Funding: 5 FTE and $11,649,000; Program Change: +4 FTE and +$26,944,000): NOAA requests a increase of 4 FTE and $26,944,000 for a total of 9 FTE and $38,593,000 to fund planned third year of Next Generation Air Transportation System (NextGen) development activities. This requested increase will support initial operational deployment of a 4-Dimensional (4-D) Weather Data Cube for aviation users and lay the foundation for the development of follow-on capabilities as required by the NextGen Integrated Work Plan. The NextGen 4-D Weather Data Cube will improve access and availability of observed and forecast weather information and enable its integration into an automated, multi-agency air traffic management system.

The NextGen weather capability will be implemented in three phases: The Initial Operational Capability (IOC) is due in 2014, Mid Operational Capability (MOC) in 2017 and Full Operational Capability (FOC) in 2022 which supports the broader NextGen FOC in 2025. Funding uncertainty in FY2011 has delayed the IOC date by one year and MOC date by two years, but FOC is still scheduled for completion in 2022. IOC will deliver a significantly enhanced weather infrastructure enabling improved dissemination of weather information to National Airspace System users. Between 2014 and 2017, as NextGen implements automated decision assistance tools and algorithms for managing air space, NOAA will invest resources to improve environmental modeling and human forecast tools for greater resolution, accuracy, consistency and timeliness. By FOC in 2022, NextGen weather must meet all meteorological and engineering performance requirements to support the envisioned NextGen traffic management systems. The R&D investments needed to meet these requirements will be significant, but will yield benefits across most National Weather Service (NWS) service areas, and throughout the NOAA information management enterprise.

Proposed Actions:
This planned increase to the Aviation Weather/NextGen funding line will be used to support the following activities:

1. NextGen 4-D Weather Data Cube Services and Infrastructure ($9.0M): Software and systems prototyped in prior years will be made ready to transition from the research environment to operations. This activity will begin in FY 2012 to ensure readiness to complete Operational Testing and Evaluation and deployment of this Initial Operational Capability (IOC) as scheduled in FY 2014.
2. Integration of diverse forecasts into a consistent weather picture ($2.3M): Develop techniques and processes to evaluate disparate forecasts of individual weather parameters and examine methods to consolidate these forecasts into a Single Authoritative Source (SAS) of weather aviation information.
3. Tools and techniques for the generation of legacy aviation products from digital sources ($3.1M): Legacy aviation forecast products are largely text based and have been generated in essentially the same manner for the past 50 years. Tools and techniques must be developed to allow these products to be derived from digital weather information generated at NWS facilities. This capability is an essential element in the reduction of inconsistencies currently found in aviation products.
4. Expanded R&D capabilities to meet NextGen MOC requirements ($12.7M): Initiate research and development (R&D) in advanced weather observation and prediction to meet critical NextGen MOC requirements. The focus of FY 2012 activities will be on advanced numerical weather prediction models, enhanced forecast processes and the development of tools enabling forecasters to add value to automatically generated weather information sets.

Statement of Need and Economic Benefits:
The air transportation industry is an important element of the U.S. economy and weather impacts to the National Airspace System result in significant economic losses. The industry generates 5.4 percent of America's Gross Domestic Product, $640 billion in revenue and over 11 million jobs. The Congressional Joint Economic Committee estimates that air traffic delays cost the U.S. economy over $41 billion in 2007, of which 70 percent are related to adverse weather. The FAA has determined that two-thirds of these weather delays are avoidable with more accurate and better integrated weather information into decision-making, potentially reducing the number of delays by 46 percent and saving $19 billion annually (see FAA's Research, Engineering and Development Advisory Committee (REDAC) in its "*Report of the Weather-ATM Integration Working Group"* (3 Oct, 2007)). As air traffic increases, delays and the associated economic toll will only increase.

The multi-agency NextGen Joint Planning and Development Office (JPDO) has developed a plan to accommodate the expected growth in demand, which will allow for the reduction of air traffic delays. A critical component of the NextGen plan is the integration of weather information into air traffic operations. To enable this integration, the plan requires the creation of rapidly updated, high-resolution probabilistic weather information consistent across space and time and accessible to all NAS managers and users through a network-enabled infrastructure. Meteorologists will utilize and produce this information, using enhanced forecast processes to add value to forecast guidance and rapidly updated gridded datasets produced by automation. This capability does not presently exist within the federal government, and the JPDO partner agencies are depending on NOAA, as the federal experts in the provision of weather information, to deliver it.

NOAA is legislatively mandated by Title 49 of the U.S. Code to provide weather information to the FAA. In addition, Public Law No 108-176 directs the Department of Transportation (DOT), FAA, Department of Commerce, the National Aeronautics and Space Administration (NASA) and the JPDO to conduct integrated planning for research to operations to support NextGen. This investment represents a coordinated effort spanning two line offices with linkages to numerous NOAA IT, observation and service improvement projects. NOAA NextGen investments will result in a significant increase in weather prediction and dissemination capabilities with wide-ranging benefits across NOAA. The weather information in the NextGen 4-D Weather Data Cube will enhance decision-support systems by offering consistent information at high spatial and temporal resolutions. While the NextGen 4-D Weather Data Cube will be applied initially in the aviation industry, it has the potential to yield benefits to all commercial sectors that require environmental information. NOAA, other governmental agencies, private industry, and the public will have more effective and efficient access to accurate, consistent, and timely weather information to drive their decision-making systems and processes.

Base Resources Assessment:
The base resource assessment is provided in the Program Summary for Aviation Weather.

Schedule & Milestones:
FY 2012

- Critical Design Review of contractor's solution for the IOC NextGen 4-D Weather Data Cube
- 4-D Weather Data Cube contractor solution validation
- Plan for enhanced aviation forecast processes to meet emerging NextGen forecast performance requirements

- Incorporate experimental ceiling and visibility grids into NextGen Environment for Testing (NET)

FY 2013
- Contractor demonstration of 4-D Weather Data Cube solution
- NextGen registry/repository capability available
- Execute multiyear plan to enhance aviation forecast processes
- Implement the WAFC gridded forecast products for icing

FY 2014
- OT&E and deployment of NextGen 4-D Weather Data Cube IOC
- Deploy Network Enabled Verification Service (NEVS) Phase 1
- Implement high resolution models with advanced data assimilation techniques in NWS operations pending availability of High Performance Computing resources
- Enhance ensemble and probabilistic modeling techniques for aviation parameters
- Develop prototype of dynamic SAS generation

FY 2015
- Implement digital aviation services to provide consistent operational advisory and forecast products
- Extend NEVS technology for access to real-time verification information
- Develop enhanced NextGen data services infrastructure

FY 2016
- OT&E and deployment of NextGen 4-D Weather Data Cube MOC
- Implement dynamic SAS generation capabilities

Deliverables:
- NextGen Weather Capability IOC
- Network Enabled Verification System Phase 1 for NWS products
- Impact-based performance measures for weather forecast impact on air traffic
- Operational aviation advisory and forecast product generation from grids to improve forecast consistency for aviation products
- Operational WAFC icing gridded forecast product

Performance Goals and Measurement Data

Performance Measure: Weather Products Net-Enabled	**FY 2011 Target**	**FY 2012 Target**	**FY 2013 Target**	**FY 2014 Target**	**FY 2015 Target**	**FY 2016 Target**
With increase	0	0	0	120	130	140
Without increase	0	0	0	0	0	0

Description: The emergence of pervasive digital networks, including the public Internet and internal NOAA and governmental broadcast networks has created opportunities in all sectors of society. Net-enabled products and technologies allow for new channels for access by customers, a real-time integration capability, and new efficiencies in internal operations, and offer new digital products or services. The previous and current requests contribute to the effort to net-enable all aviation weather products in order to allow ready access to information and support automation of forecast products and improvement of National Air Space NAS management. Metric indicates number of distinct products which are available operationally from the NextGen 4-D Weather Data Cube.

PROGRAM CHANGE PERESONNEL DETAIL
(Dollar amount in thousands)

Activity: National Weather Service
Subactivity: Operations & Research

Title:	Location	Grade	Number of Positions	Annual Salary	Total Salaries
Project Engineer	Silver Spring, MD	GS-14	1	105,211	105,211
Project Planner	Silver Spring, MD	GS-13	1	89,033	89,033
Outreach Coordinator	Silver Spring, MD	GS-13	1	89,033	89,033
Logistics Coordinator	Silver Spring, MD	GS-12	1	74,872	74,872
Contract Manager	Silver Spring, MD	GS-12	1	74,872	74,872
Total			5		433,021
less Lapse		25%	1		108,255
Total full-time permanent (FTE)			4		324,766
TOTAL					324,766

Personnel Data	Number
Full-Time Equivalent Employment	
Full-time permanent	4
Other than full-time permanent	0
Total	4
Authorized Positions:	
Full-time permanent	5
Other than full-time permanent	0
Total	5

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Activity: Operations, Research, and Facilities
Subactivity: Operations & Research

	Object Class	2012 Increase
11	Personnel compensation	0
11.1	Full-time permanent	$325
11.3	Other than full-time permanent	0
11.5	Other personnel compensation	0
11.8	Special personnel services payments	0
11.9	Total personnel compensation	325
12	Civilian personnel benefits	99
13	Benefits for former personnel	0
21	Travel and transportation of persons	28
22	Transportation of things	0
23.1	Rental payments to GSA	0
23.2	Rental Payments to others	0
23.3	Communications, utilities and miscellaneous charges	20
24	Printing and reproduction	0
25.1	Advisory and assistance services	14,394
25.2	Other services	220
25.3	Purchases of goods & services from Gov't accounts	2,949
25.4	Operation and maintenance of facilities	0
25.5	Research and development contracts	8,509
25.6	Medical care	0
25.7	Operation and maintenance of equipment	0
25.8	Subsistence and support of persons	0
26	Supplies and materials	0
31	Equipment	0
32	Lands and structures	0
33	Investments and loans	0
41	Grants, subsidies and contributions	400
42	Insurance claims and indemnities	0
43	Interest and dividends	0
44	Refunds	0
99	Total obligations	26,944

Local Warnings & Forecasts: Complete Certification and Accreditation (C&A) of the National Critical Space Weather System (Base Funding: 45 FTE and $9,585,000; Program Change: +0 FTE and +$2,000,000): NOAA requests an increase of $2,000,000 and 0 FTE for a total of 45 FTE and $11,585,000 for the National Space Weather Prediction Center. Along with a redirection of base resources, a total of $4,700,000 will be used to make required IT security improvements to the Nation's National Critical Space Weather System in order to prevent the loss of authority to operate, which would result in the shutdown of NOAA's space weather predictions and forecast program. With a solar max expected in 2013, this is a critical time period when NOAA must continue to provide alerts, watches, warnings, and forecasts to customers to ensure the Nation's infrastructure is protected from severe space weather storms.

Proposed Actions:
In FY 2012, the additional funding of $2,000,000, combined with a redirection of resources provided in the base to enhance Space Weather modeling, will be used to address IT security deficiencies that jeopardize the SWPC authority to operate and provide the Nation with space weather forecasts and warnings. The requested funding will be used to:

Acquire hardware and software for Space Weather Forecast Center backup ($1,000,000): Currently the National Weather Service has a single forecast office to issue the Nation's space weather alerts, watches, and warnings. This investment will provide the hardware and software to establish an alternate backup site for the system.

Modernize hardware and software to support satellite data ingest ($2,300,000): Space weather satellite ingest is currently done only in Boulder and is considered a single point of failure. This funding will purchase new hardware and software to support a secondary location for space weather data ingest.

Update unsupportable legacy software ($1,400,000): Software for space weather product generation systems was developed 25 years ago and cannot be supported by modern technology. The hardware to support this technology is no longer available and the software is not patchable to meet modern security requirements. A labor contract will be established to support the re-development and installation of the space weather product generation software to a modern, supportable, and secure platform.

Impact of Authorization to Operate
NOAA's Space Weather Program depends on the National Critical Space Weather System to: monitor, measure, and specify the space environment and provide timely and accurate operational space weather forecasts, warnings, alerts, and data to critical customers in the US and around the world. The Program is the sole civilian entity that (1) operates and maintains the US National Critical Space Weather System, (2) ingests and processes NOAA data as well as data from other sources, (3) supports research to understand the processes that cause severe space weather, (4) transitions research into operations to improve services, and (4) archives data from NOAA and the Department of Defense (DoD) and makes it accessible to customers. Without the Authorization to Operate, all of the above activities will cease and the space weather products and services critical to our Nation's infrastructure and defense will be lost. The Assistant Administrator for the National Weather Service has responsibility for granting the Authority to Operate (ATO) for the National Critical Space Weather System based on requirements for certification, accreditation, and ATO in the following: The Federal Information Security Management Act (FISMA), OMB Circular A130, and NIST Special Publication 800-37.

Statement of Need and Economic Benefits:

In 2005, the Space Weather Prediction Center (SWPC), then called Space Environment Center, was transferred into the NWS in recognition of its operational importance. Up to this time, SWPC was functioning within a research environment that was not designed to stand the rigors and requirements of NWS operations. This weakness became clear when in October 2007, NOAA's 3210 (National Critical Space Weather System) failed the certification and accreditation required by the Office of Management and Budget (OMB). The SWPC currently is operating under an interim authority to operate. Without substantial improvements, NOAA will be forced to shut down this critical national asset. This investment is requested to: (1) maintain the operational viability of the Nation's National Critical System Space Weather System, (2) to meet the Certification and Accreditation (C&A) requirements mandated for Federal information systems by the Federal Information Security Management Act of 2002 (FISMA), P.L. 107-347, and (3) to ensure the Nation's Authority to Operate this critical national resource.

Without timely and accurate alerts and warnings, space weather has the demonstrated potential to disrupt virtually every major public infrastructure system, including transportation systems, power grids, telecommunications, and global positioning systems (GPS). NOAA will provide these critical services by modernizing its aging space weather infrastructure, securing critical data to enable predictions and warnings, and integrating space weather and terrestrial weather products to support key industries such as commercial airline, electric power, and the GPS industry. Our national security and economic well-being that are now dependent on our advanced technologies are in danger without accurate 1-4 day advanced warnings of impending geomagnetic storms. According to a recent report by the National Academies, storm-disabled electric power grids and collateral impacts could result in projected economic and societal costs of approximately $1 to $2 trillion, and full recovery could take 4-10 years. Precision GPS-enhanced agriculture is an $8 billion per year enterprise, and the Next Generation Air Transportation System is based entirely on GPS-enabled positioning, navigation and timing. Aircraft flying polar routes now include space weather as an integral part of the weather pre-brief, providing the pilot a big-picture view of the flight environment, including potential impacts to critical communication and navigation systems, and the potential for hazardous solar radiation exposure. Strong storms with the potential to impact critical elements of our Nation's infrastructure can occur over 100 times during a solar cycle. The Nation's advanced technology service providers will be looking to NOAA for alerts, watches and warnings needed to protect lives and livelihood and ensure continuity of critical operations. This funding ensures that NOAA will be prepared to meet their needs with actionable information.

Schedule & Milestones

FY 2012

- Begin migration of critical satellite data ingest and processing for the SWPC National Critical System to supportable environments
- Begin development of an alternate processing facility to overcome the many single points of failures that exist within the current infrastructure

FY 2013

- Complete migration of critical satellite data ingest and processing for the SWPC National Critical System to supportable environments
- Complete testing of disaster recovery systems
- Complete the build out of the alternate processing facility at a geographically separate site and begin limited operations

FY 2014

- Complete remaining actions necessary to satisfy C&A and receive full authorization to operate
- Establish refresh cycles to ensure systems remain current
- Full operations at both the primary and alternate processing environments including the introduction of annual fail-over exercises (COOP)

Deliverables

- All components of the National Critical Space Weather System migrated to supportable platforms
- NWS C&A and Authorization to Operate for NOAA 3210 National Critical Space Weather System
- Operate under two fully accredited space weather systems: National Critical (3210) and Business essential (3200) Space Weather System
- Fully functional primary and alternate processing facilities
- Space Weather IT Systems refreshed regularly as directed per industry standard best practices

Performance Goals and Measurement Data

Performance Measure: Achieve Authorization to Operate (ATO) for NOAA 3210 National Critical Space Weather System	**FY 2011 Target**	**FY 2012 Target**	**FY 2013 Target**	**FY 2014 Target**	**FY 2015 Target**	**FY 2016 Target**
With increase	No	No	No	Yes	Yes	Yes
Without increase	No	No	No	No	No	No
Description: This measure shows when the National Critical Space Weather System will achieve full Authority to Operate.						

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Activity: Operations, Research, and Facilities
Subactivity: Operations & Research

	Object Class	2012 Increase
11	Personnel compensation	
11.1	Full-time permanent	$0
11.3	Other than full-time permanent	0
11.5	Other personnel compensation	0
11.8	Special personnel services payments	0
11.9	Total personnel compensation	0
12	Civilian personnel benefits	0
13	Benefits for former personnel	0
21	Travel and transportation of persons	0
22	Transportation of things	0
23.1	Rental payments to GSA	0
23.2	Rental Payments to others	0
23.3	Communications, utilities and miscellaneous charges	0
24	Printing and reproduction	0
25.1	Advisory and assistance services	0
25.2	Other services	2,000
25.3	Purchases of goods & services from Gov't accounts	0
25.4	Operation and maintenance of facilities	0
25.5	Research and development contracts	0
25.6	Medical care	0
25.7	Operation and maintenance of equipment	0
25.8	Subsistence and support of persons	0
26	Supplies and materials	0
31	Equipment	0
32	Lands and structures	0
33	Investments and loans	0
41	Grants, subsidies and contributions	0
42	Insurance claims and indemnities	0
43	Interest and dividends	0
44	Refunds	0
99	Total obligations	2,000

Local Warnings & Forecasts: Cooperative Observer Program (Base Funding: 1 FTE and $10,975,000; Program Change: -0 FTE and -$1,200,000): NOAA requests a decrease of 0 FTE and $1,200,000 for a total of $9,775,000 to the NWS Cooperative Observer Program (COOP) by phasing out approximately 1,000 COOP observing sites.

Proposed Actions:
NWS is reviewing and prioritizing the existing 11,000 COOP sites as part of the planning for phasing out of approximately 1,000 sites. Since the new Climate Service is implementing a network to replace the U.S. Historical Climate Network (USHCN), existing COOP sites that are also designated as USHCN sites will be phased out.

Statement of Need and Economic Benefits:
The NWS Legacy COOP Network consists of approximately 11,000 surface observing systems located throughout the United States. These stations are operated by volunteer COOP observers. Station equipment, station inspection, COOP training, and COOP site data acquisition and quality control is provided by the servicing WFO. COOP observational data supports the NWS field operations and climate program by providing data that is used in statistical and numerical model weather and river forecast guidance; to verify our forecasts, watches, and warnings; and to compute climatic trends.

Of the 11,000 COOP sites, 1,200 sites are designated as USHCN sites. Current USHCN stations' temperature and rain gauge sensors lack accuracy, precision, and resolution to monitor climate trends. The USHCN sites are not located in an optimal configuration, resulting in observing gaps, too many stations in some areas, and too few in other areas. The installation of the Regional U.S. Historical Climatology Network (RUSHCN) sites by the Climate Service will allow NWS to prioritize which 1,000 COOP sites to phase out. The NWS reviewed the current ~1,200 COOP Historical Climatology Network sites for the appropriateness for climate purposes and determined that only 70 of the 1,200 sites meet the Climate Observing Classification Scheme Criteria for rating a station's adequacy for monitoring climate. New stations will be deployed at specific (mostly new) locations that are equipped to support monitoring and assessing climate trends (variation and change) at the regional scale. The result will be improved confidence in U. S. regional climate monitoring not possible by upgrading existing USHCN sites largely due to development around existing sites.

NWS will conduct a prioritization of its COOP sites and phase out approximately 1,000 of the lowest priority legacy sites, for example, sites being replaced by RUSHCN deployments or where similar observations are collected by other available observing systems. The prioritization will minimize any impact on the quality of weather forecasts in areas where these observations are no longer collected.

Base Resources Assessment:
The base resource assessment is provided in the Program Summary for Local Warnings & Forecasts.

Schedule & Milestones:

FY 2012

- Reduce approximately 750 COOP legacy sites

FY 2013

- Reduce approximately 250 COOP legacy sites

Deliverables:

- Reduction of 1,000 COOP legacy sites

Performance Goals and Measurement Data

Performance Measure: # of observations from COOP sites per year	**FY 2011 Target**	**FY 2012 Target**	**FY 2013 Target**	**FY 2014 Target**	**FY 2015 Target**	**FY 2016 Target**
With decrease	4,000,000	3,700,000	3,600,000	3,600,000	3,600,000	3,600,000
Without decrease	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000
Description: Legacy COOP observations of temperature and precipitation (and other parameters) per year						

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Activity: Operations, Research, and Facilities
Subactivity: Operations & Research

	Object Class	2012 Increase
11	Personnel compensation	
11.1	Full-time permanent	$0
11.3	Other than full-time permanent	0
11.5	Other personnel compensation	0
11.8	Special personnel services payments	0
11.9	Total personnel compensation	0
12	Civilian personnel benefits	0
13	Benefits for former personnel	0
21	Travel and transportation of persons	-38
22	Transportation of things	0
23.1	Rental payments to GSA	0
23.2	Rental Payments to others	0
23.3	Communications, utilities and miscellaneous charges	0
24	Printing and reproduction	-1
25.1	Advisory and assistance services	0
25.2	Other services	-1,129
25.3	Purchases of goods & services from Gov't accounts	0
25.4	Operation and maintenance of facilities	0
25.5	Research and development contracts	0
25.6	Medical care	0
25.7	Operation and maintenance of equipment	0
25.8	Subsistence and support of persons	0
26	Supplies and materials	-32
31	Equipment	0
32	Lands and structures	0
33	Investments and loans	0
41	Grants, subsidies and contributions	0
42	Insurance claims and indemnities	0
43	Interest and dividends	0
44	Refunds	0
99	Total obligations	-1,200

Local Warnings & Forecasts: Telecommunications (Base Funding: 0 FTE and $19,356,000; Program Change: 0 FTE and -$3,203,000): NOAA requests a decrease of 0 FTE and $3,203,000 for a total reduction of $3,203,000. NWS believes it can achieve a target reduction in its telecommunications costs across all its programs and will take the reduction from its largest one, the Local Warnings and Forecasts base. This reduction can be achieved by the utilization of the new GSA Networx contract.

Proposed Actions:
NWS is in the process of transitioning between GSA's FTS2001 and Networx contracts.

In addition, NWS has ongoing initiatives that may reduce the need for added bandwidth. While these initiatives could conceivably result in lower existing costs, the likely result is in future cost avoidance. These initiatives include:

- Implement data compression (also called network acceleration) – This involves the installation of devices that compress the data on the network thereby effectively increasing the amount of data that can be carried on the network by some multiple without increasing physical bandwidth.
- Implement Quality of Service (QoS) – Using this technique, data traffic on the network is prioritized such that critical traffic, or traffic which is delay sensitive, always traverses the network without delay, while less critical traffic is subject to possible delays. This permits the network to be optimized in terms of bandwidth utilization, usually resulting in lower bandwidth and lower cost. Any delays are generally unnoticed by users.
- Implement dynamic bandwidth allocation – This technique allocates a guaranteed portion of the network (committed information rate or CIR) to various users but allows the bandwidth to be shared by all users when not in use by the users covered by the CIRs. This allows a much more flexible use of the total network bandwidth. This may reduce the need for more physical bandwidth and thus result in cost avoidance.

Schedule & Milestones:

- Award new GSA Networx contract in 2011

Deliverables:

- New cost-saving GSA Networx contract in place in 2011

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Activity: Operations, Research, and Facilities
Subactivity: Operations & Research

	Object Class	2012 Decrease
11	Personnel compensation	
11.1	Full-time permanent	$0
11.3	Other than full-time permanent	0
11.5	Other personnel compensation	0
11.8	Special personnel services payments	0
11.9	Total personnel compensation	0
12	Civilian personnel benefits	0
13	Benefits for former personnel	0
21	Travel and transportation of persons	0
22	Transportation of things	0
23.1	Rental payments to GSA	0
23.2	Rental Payments to others	0
23.3	Communications, utilities and miscellaneous charges	-3,203
24	Printing and reproduction	0
25.1	Advisory and assistance services	0
25.2	Other services	0
25.3	Purchases of goods & services from Gov't accounts	0
25.4	Operation and maintenance of facilities	0
25.5	Research and development contracts	0
25.6	Medical care	0
25.7	Operation and maintenance of equipment	0
25.8	Subsistence and support of persons	0
26	Supplies and materials	0
31	Equipment	0
32	Lands and structures	0
33	Investments and loans	0
41	Grants, subsidies and contributions	0
42	Insurance claims and indemnities	0
43	Interest and dividends	0
44	Refunds	0
99	Total obligations	-3,203

Local Warnings & Forecasts: National Mesonet Network (Base Funding: 0 FTE and $0; Program Change: -0 FTE and -$19,000,000): NOAA requests a decrease of 0 FTE and $19,000,000 for a total of 0 FTE and $0 for the congressionally directed use of funds for the National Mesonet Network. NWS used congressionally directed FY 2010 funding to procure data from in situ mesonet observations, to further develop the Meteorological Data Ingest System (MADIS) for validation and quality control of mesonet data, and to develop a platform (MoPED) to ingest data from mobile observational systems. NWS can continue to achieve its operational GPRA targets using data collected from its existing observational systems. NWS will also continue to obtain observational data from many networks free of charge and will work towards integrating these data into operational models.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Activity: Operations, Research, and Facilities
Subactivity: Operations & Research

	Object Class	2012 Decrease
11	Personnel compensation	
11.1	Full-time permanent	$0
11.3	Other than full-time permanent	0
11.5	Other personnel compensation	0
11.8	Special personnel services payments	0
11.9	Total personnel compensation	0
12	Civilian personnel benefits	0
13	Benefits for former personnel	0
21	Travel and transportation of persons	0
22	Transportation of things	0
23.1	Rental payments to GSA	0
23.2	Rental Payments to others	0
23.3	Communications, utilities and miscellaneous charges	0
24	Printing and reproduction	0
25.1	Advisory and assistance services	0
25.2	Other services	-19,000
25.3	Purchases of goods & services from Gov't accounts	0
25.4	Operation and maintenance of facilities	0
25.5	Research and development contracts	0
25.6	Medical care	0
25.7	Operation and maintenance of equipment	0
25.8	Subsistence and support of persons	0
26	Supplies and materials	0
31	Equipment	0
32	Lands and structures	0
33	Investments and loans	0
41	Grants, subsidies and contributions	0
42	Insurance claims and indemnities	0
43	Interest and dividends	0
44	Refunds	0
99	Total obligations	-19,000

APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH AND FACILITIES

SUBACTIVITY: SYSTEMS OPERATIONS AND MAINTENANCE

This subactivity reflects the costs of on-going operations and maintenance of major NWS observing and processing systems.

NEXT GENERATION WEATHER RADAR (NEXRAD)

NEXRAD (http://www.roc.noaa.gov/) is the joint NWS/FAA/DOD weather radar system consisting of 160 operational radars. NEXRAD utilizes Doppler technology and hydrometeorological processing to provide significant improvements over the previous generation of weather radars for tornado and thunderstorm warnings, air safety, flash flood warnings, and water resources management. The system is modular in design, upgradeable, has long lifecycle expectancy, and provides its principal users with a wide array of automated weather information that will increase their capability to meet their respective operational requirements. In FY 2012, NWS will continue to operate and maintain its network of 122 operational NEXRAD systems and 12 non-operational support radars. These non-operational support radars are used for training and maintenance.

THE AUTOMATED SURFACE OBSERVING SYSTEM (ASOS)

ASOS (http://www.weather.gov/asos/) is the Nation's primary surface weather observing network supporting aviation operations and weather forecasting. It was designed to replace manual observations in support of weather forecast activities, aviation operations, and the needs of the meteorological, hydrological, and climatological research communities. ASOS operates 24x7, significantly increasing the amount of information available to forecasters and the aviation community. ASOS is a joint National Weather Service (NWS)/Federal Aviation Administration (FAA)/Department of Defense (DOD) automated surface observation system consisting of 1,001 operational systems. ASOS provides reliable, continuous surface weather observations. Implementation of ASOS into NWS field operations provides continuous weather watch and yields improved staff productivity. NWS operates and maintains 315 NWS ASOS units. NWS also maintains 572 FAA ASOS units under a reimbursable funding arrangement. In FY 2012 NWS will continue operations and maintenance of its 315 ASOS systems, continue work on Phase 1 of ASOS Sustainment, and continue deployment of interim IT security improvements to bring the system into compliance with Federal, Department of Commerce, NOAA, and NWS Information Technology (IT) security policies and procedures.

ADVANCED WEATHER INTERACTIVE PROCESSING SYSTEM (AWIPS)

AWIPS (http://www.crh.noaa.gov/lmk/?n=awipsoverview) is the cornerstone of the modernized NWS. This system is required to integrate and display all hydrometeorological data at NWS field offices. AWIPS acquires and processes data from modernized sensors and local sources, provides computational and display functions at operational sites, provides an interactive communications system to interconnect NWS operational sites, and disseminates weather and flood warnings and forecasts in a rapid and highly reliable manner. This system integrates satellite and NEXRAD Doppler weather radar data and provides to the local field forecaster capabilities to significantly improve forecasts and warnings. AWIPS provides the only display for the NEXRAD Doppler weather radar at NWS Weather Forecast Offices (WFOs) and River Forecast Centers (RFCs). The AWIPS satellite broadcast offers the communications capability to provide internal and external users with open access to much of NOAA's real-time environmental data.

NATIONAL WEATHER SERVICE TELECOMMUNICATION GATEWAY (NWSTG) BACKUP

NWSTG (http://www.weather.gov/tg/) is the Nation's hub for the collection and distribution of weather data and products. NWSTG provides national and global real-time exchange services using automated communication resources to collect and distribute a wide variety of environmental data such as observations, analysis, and forecast products. These time-perishable products are distributed as received to ensure the fastest availability of the information. NWSTG ensures that the delivery of critical meteorological data necessary for the protection of life and property and the economic well-being of the Nation continues uninterrupted, providing increased operational availability and reducing risk vulnerability in the event of lost access to NWSTG for whatever reason.

The NWSTG Backup eliminates the NWSTG as a single point of failure by providing backup operations for the primary systems within 12 hours of a failure. This capability reduces the vulnerability of the NWSTG to extended outages and the risks to NWS operations. Thousands of customers worldwide use data distributed by NWSTG, and these data affect a wide range of economic and emergency management decisions. Without this backup capability, NWSTG is a single point of failure, vulnerable to natural disasters, human error, computer viruses, hacker attacks, and terrorism.

In conjunction with NWSTG Backup, the Legacy Replacement Project replaced the legacy NWSTG core mainframe-based message switching system with server-based technology, and upgraded the facility support infrastructure. Full operational capability of the Legacy Replacement was achieved in 2006 and full operational capability of NWSTG Backup was achieved in 2007. With the utility of the current hardware now waning and expected increased demand for processing capacity due to the demand for higher resolution weather products, planning for the next generation NWSTG architecture is underway.

Statement of Need for the Program

This subactivity reflects the costs of on-going operations and maintenance of major NWS observing and processing systems. NEXRAD is the NWS' prime observation system for acquiring information about tornados and severe storms (storms containing damaging winds, hail, turbulence, and lightning). NEXRAD provides information on precipitation that enables development of flash flood and heavy snow warnings, and is a key element in the forecasting of aviation related weather events. NEXRAD is the most important sensor contributing to meeting tornado and flash flood-related GRPA goals.

Since the first ASOS was fielded in 1992, the national needs for these data has resolved from hourly and special reports to higher temporal resolution data to feed models serving weather and aviation weather forecasts. Private sector and the hydrometeorological and climatological research communities are requesting higher resolution ASOS data as well.

NWSTG Backup was established to provide backup operations for the primary NWSTG within 12 hours of a failure.

Schedule & Milestones:

NEXRAD

FY 2013

- RDA LAN Switch and Remote Access Server – complete engineering tests and begin procuring modification kits

FY 2014

- RPG CPU and Peripheral I/O Devices – complete engineering tests and begin procuring modification kits

FY 2015

- RPG LAN Switch and Console Servers – complete engineering tests and begin procuring modification kits

FY 2016

- RDA Signal Processors and RPG Routers – complete engineering tests and begin procuring modification kits

ASOS

FY2012

- Complete deployment of interim IT security improvements
- Continue work on Phase 1 of ASOS Sustainment

FY2013

- Continue work on Phase 1 of ASOS Sustainment.
- Demonstrate ASOS functionality with a modern operating system

FY2014

- Complete Phase 1 of ASOS Sustainment
- Initial Operating Capability (IOC)

FY2015

- Commence work on Phase 2 of ASOS Sustainment

FY2016

- Commence work on Phase 2 of ASOS Sustainment

AWIPS

- Steady state

NWSTG Backup

- Steady state

Deliverables:

ASOS:

- Deployment of interim ASOS IT security improvements
- Improved auditing, incident reporting (through the system log), password management, and account management

NEXRAD:

- RPG Software Build 12B deployed in support of Dual Polarization modification at radars with redundant RDAs
- RPG and RDA Software Build 13 deployed to provide new signal processing science and Dual Polarization enhancements
- Begin deploying Pedestal Servo Power Amplifier modification kits to replace obsolete components to maintain 96 percent availability and control sustainment/maintenance costs
- Begin deploying Master System Control Function Processors and RDA Routers to replace obsolete components and maintain IT Security compliance

AWIPS

- Continued High Level of customer satisfaction with 24/7 support of operational system
- Continued High end-to-end Availability of Satellite Broadcast Network (SBN)
- Continued on-time software releases and hardware refreshes

- Continued Low Latency of Operational Wide Area Network (fast product dissemination)

NWSTG Backup

- Continue 24/7 support

Performance Goals and Measurement Data

NEXRAD Performance Measure	FY 2011 Target	FY 2012 Target	FY 2013 Target	FY 2014 Target	FY 2015 Target	FY 2016 Target
Mission & Business Results: Network availability of 96%	96%	96%	96%	96%	96%	96%
Customer Results: Archived data available to customers in 24 hours 96% of the time	96%	96%	96%	96%	96%	96%
Description: Network availability measure tracks the uptime of the radars. This measure excludes planned preventive maintenance. Archived data availability metric tracks availability of radar data directed from the sites to NCDC to archive. NCDC has 24 hours to make radar data available to customers.						

AWIPS Performance Measure	FY 2011 Target	FY 2012 Target	FY 2013 Target	FY 2014 Target	FY 2015 Target	FY 2016 Target
Workstation Performance Ratings (seconds)	86	78	71	65	59	53
Message Latency (seconds)	40	38	36	35	33	31
SBN end-to-end availability (%)	99.5	99.5	99.5	99.5	99.5	99.5
Site Hardware Availability (%)	99	99	99	99	99	99
Description: The above measures contribute to a high performance IT system in support of high level of forecaster skill and decision making ability, leading to faster, more accurate and more precise weather watches, warnings and advisories that will save more lives and property as improvements are realized.						

PROGRAM CHANGES FOR FY 2012:

NEXRAD O&M (Base Funding: 103 FTE and $46,621,000; Program Change: +0 FTE and +$127,000): NOAA requests an increase of 0 FTE and $127,000 for a total of $46,748,000 for NEXRAD O&M. This increase is requested to increase the base level of funding to that recommended in the FY 2010 President's Budget but not provided for in the Consolidated Appropriations Act, 2010. Funding will be used to support the operations and maintenance of the new Washington State radar. The Washington State radar will become operational in September of 2011 and is an addition to the existing network of operational radars.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Activity: Operations, Research, and Facilities
Subactivity: Systems Operation & Maintenance

	Object Class	2012 Increase
11	Personnel compensation	
11.1	Full-time permanent	$0
11.3	Other than full-time permanent	0
11.5	Other personnel compensation	0
11.8	Special personnel services payments	0
11.9	Total personnel compensation	0
12	Civilian personnel benefits	0
13	Benefits for former personnel	0
21	Travel and transportation of persons	0
22	Transportation of things	0
23.1	Rental payments to GSA	0
23.2	Rental Payments to others	0
23.3	Communications, utilities and miscellaneous charges	0
24	Printing and reproduction	0
25.1	Advisory and assistance services	0
25.2	Other services	127
25.3	Purchases of goods & services from Gov't accounts	0
25.4	Operation and maintenance of facilities	0
25.5	Research and development contracts	0
25.6	Medical care	0
25.7	Operation and maintenance of equipment	0
25.8	Subsistence and support of persons	0
26	Supplies and materials	0
31	Equipment	0
32	Lands and structures	0
33	Investments and loans	0
41	Grants, subsidies and contributions	0
42	Insurance claims and indemnities	0
43	Interest and dividends	0
44	Refunds	0
99	Total obligations	127

ASOS O&M (Base Funding: 44 FTE and $11,100,000; Program Change: +0 and +$202,000): NOAA requests an increase of 0 FTE and $202,000 for a total of $11,302,000 for ASOS O&M. This increase is requested to increase the base level of funding to that recommended in the FY 2010 President's Budget but not provided for in the Consolidated Appropriations Act, 2010. Since 1992, the ASOS program has experienced a significant number of operational anomalies associated with software components. During subsequent years the number of anomalies and the severity of their impact has steadily increased. Funding is needed to continue the technology refresh of the ASOS IT subsystems to correct these operational anomalies. The IT subsystems are the Acquisition Control Unit (ACU) and the Data Collection Platform (DCP).

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Activity: Operations, Research, and Facilities
Subactivity: Systems Operation & Maintenance

	Object Class	2012 Increase
11	Personnel compensation	
11.1	Full-time permanent	$0
11.3	Other than full-time permanent	0
11.5	Other personnel compensation	0
11.8	Special personnel services payments	0
11.9	Total personnel compensation	0
12	Civilian personnel benefits	0
13	Benefits for former personnel	0
21	Travel and transportation of persons	0
22	Transportation of things	0
23.1	Rental payments to GSA	0
23.2	Rental Payments to others	0
23.3	Communications, utilities and miscellaneous charges	0
24	Printing and reproduction	0
25.1	Advisory and assistance services	0
25.2	Other services	202
25.3	Purchases of goods & services from Gov't accounts	0
25.4	Operation and maintenance of facilities	0
25.5	Research and development contracts	0
25.6	Medical care	0
25.7	Operation and maintenance of equipment	0
25.8	Subsistence and support of persons	0
26	Supplies and materials	0
31	Equipment	0
32	Lands and structures	0
33	Investments and loans	0
41	Grants, subsidies and contributions	0
42	Insurance claims and indemnities	0
43	Interest and dividends	0
44	Refunds	0
99	Total obligations	202

Congressionally Directed Projects (Base Funding: 0 FTE and $6,225,000; Program Change: -0 FTE and -$6,255,000): NOAA requests a decrease of $6,225,000 to terminate the funding level that would continue under an annualized FY 2011 continuing resolution associated with the Congressionally directed projects identified in the Conference Report that accompanied the Consolidated Appropriations Act, 2010.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Activity: National Weather Service
Account: Operations, Research, and Facilities

	Object Class	2012 Decrease
11	Personnel compensation	
11.1	Full-time permanent	$0
11.3	Other than full-time permanent	0
11.5	Other personnel compensation	0
11.8	Special personnel services payments	0
11.9	Total personnel compensation	0
12	Civilian personnel benefits	0
13	Benefits for former personnel	0
21	Travel and transportation of persons	0
22	Transportation of things	0
23.1	Rental payments to GSA	0
23.2	Rental Payments to others	0
23.3	Communications, utilities and miscellaneous charges	0
24	Printing and reproduction	0
25.1	Advisory and assistance services	0
25.2	Other services	-2,400
25.3	Purchases of goods & services from Gov't accounts	0
25.4	Operation and maintenance of facilities	0
25.5	Research and development contracts	0
25.6	Medical care	0
25.7	Operation and maintenance of equipment	0
25.8	Subsistence and support of persons	0
26	Supplies and materials	0
31	Equipment	0
32	Lands and structures	0
33	Investments and loans	0
41	Grants, subsidies and contributions	-3,825
42	Insurance claims and indemnities	0
43	Interest and dividends	0
44	Refunds	0
99	Total obligations	-6,225

APPROPRIATION ACCOUNT: PROCUREMENT, ACQUISITION, AND CONSTRUCTION

SUBACTIVITY: SYSTEMS ACQUISITION

AUTOMATED SURFACE OBSERVING SYSTEM (ASOS)

ASOS serves as the Nation's primary surface weather observing network. ASOS provides reliable, 24-hour, continuous surface weather observations which are vital to aviation safety and are important data points for numerical models and weather forecasting and warning services. The product improvement portion of this acquisition program is developing new ASOS sensor capabilities to meet changing user requirements and decrease maintenance costs for NOAA, DOD, and FAA in this tri-agency program.

The ASOS Product Improvement Sensors are crucial for aviation safety and continued support to numerical modeling and weather forecasting and warnings services. While ASOS is designed to support weather forecast and warning activities and aviation operations, at the same time it supports the needs of the meteorological, hydrological, and climatological research communities. ASOS works non-stop, continuously updating observations minute-by-minute, every day of the year, ensuring that critical surface observations are available to forecasters, air traffic controllers, and the aviation community.

Continual forecast improvement requires increasing accuracy of atmospheric data, and this data be collected more frequently and from more locations. ASOS information helps NWS increase the accuracy and timeliness of its forecasts and warnings. The ASOS Product Improvement Program will implement new beneficial technologies, replace sensors no longer in production, and reduce maintenance costs. Improved performance in detecting solid and liquid/solid mixes of precipitation and in icing conditions will promote increased aviation safety, better weather forecasting, and better climatology. Higher reliability designs will decrease maintenance and logistics costs, and improve availability of critical surface observations and weather information.

By FY 2012, NWS will have completed its replacement of ASOS legacy ceilometers. The legacy sensor had a maximum reporting height of 12,000 feet. The replacement ceilometer accurately reports cloud conditions to a maximum height of 25,000 feet, meeting NWS reporting requirements.

NWS is developing and deploying a Enhanced Precipitation Identifier (EPI) which will replace the current ASOS Present Weather reporting capability and detect, identify, and report rain, snow, drizzle, hail and ice pellets. The current Present Weather sensor is only capable of detecting and identifying snow and rain Present Weather elements. EPI will provide precipitation type verification for NWS forecasters. In addition, EPI will enhance decision support for general aviation flights and commercial aircraft de-icing operations.

Schedule & Milestones:

FY 2012
- Production and deployment of 6 EPI sensors

FY 2013
- Production and deployment of 6 EPI sensors

FY 2014
- Production and deployment of 6 EPI sensors

Deliverables:

- Deployment of EPI sensors

Performance Goals and Measurement Data

Performance Measure	FY 2011 Target	FY 2012 Target	FY 2013 Target	FY 2014 Target	FY 2015 Target	FY 2016 Target
ASOS sites with enhanced precipitation sensing capability	0	6	12	18	24	30
Description: Measure tracks the deployment of EPI to NWS ASOS sites.						

Multi-Year Budget Information (BA in thousands)

Major Cost Categories	FY 2011 & Prior	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	CTC	Total
ASOS Product Improvement	46,571	1,635						
Total Request	46,571	1,635	TBD	TBD	TBD	TBD	TBD	TBD

ADVANCED WEATHER INTERACTIVE PROCESSING SYSTEM (AWIPS) TECHNOLOGY INFUSION

The Advanced Weather Interactive Processing System (AWIPS) is the cornerstone of a modernized National Weather Service (NWS). AWIPS hardware and software was originally deployed to Weather Forecast Offices (WFOs), River Forecast Centers (RFCs), and other NWS sites throughout the United States from 1996 to 1999. The system has been in its Operations and Maintenance phase of its lifecycle since 1999, and is critical to the National Weather Service's mission to the preserve life and property from severe weather and flooding events and to enhance the national economy.

Sustained investments in the AWIPS hardware, communications, and software infrastructure are necessary for realizing return on NOAA investments in many other programs such as NEXRAD, weather satellites, other weather radars, sensors, and instruments. NWS GPRA goals are based on the effective use of investments in AWIPS, as are NWS' advanced decision assistance tools, forecast preparation and advanced database capabilities. Improvements in NWS Tornado Warning Lead Time, Flash Flood Warning Lead Time and Winter Storm Warning Lead Time goals can only be realized with continued support of, and improvements to AWIPS using new and improved science, and exploiting more accurate and higher resolution data and weather forecast model information.

To measure current and projected AWIPS system performance, NWS uses the Workstation Performance Rating (WPR). WPR shows the latency or inherent processing delay in seconds within the AWIPS system. A higher WPR means more latency, and therefore more delay, in processing and in getting forecasters the products they need in a timely manner. WPR benchmark analysis shows that without planned hardware improvements, AWIPS performance will decrease, resulting in degradation in Tornado Lead Time and other warning products.

To enable these critical performance increases, software re-architecture (AWIPS II) and IT security enhancements were initiated in 2006. AWIPS II will continue through 2011 with an anticipated completion date of FY 2012.

AWIPS has been designated an NWS National Critical IT system. As such, it was required to be certified and accredited using the National Information Assurance Certification and Accreditation Process (NIACAP) in FY 2008. System acquisition funds provided in this PAC program are critical to providing adequate security for this National Critical system. When the AWIPS II migration is complete with new LINUX equipment and SOA software architecture, the National Critical IT system designation will require a new NIACAP certification. It is anticipated that the C&A will be performed prior to the new software being released for operational use.

AWIPS II Extended is a multi-phase program to add significant improvements to AWIPS II after its initial deployment. As AWIPS II alone adds no new functionality at initial deployment, the AWIPS Extended effort delivers new and improved functionalities and capabilities to NWS field forecasters, NOAA partners and the public. AWIPS II Extended capabilities include the National Centers AWIPS (NAWIPS) integration with AWIPS, remote access capabilities to support Incident Meteorologists mission requirements, and training capabilities. In addition, AWIPS II Extended will add new capabilities to more effectively access data providers (data delivery), improve collaboration capabilities among NWS operational units and NOAA trusted partners, improve means to generate information to support decision makers, and enhance forecasters' ability to access and visualize meteorological information. These extended capabilities will also enable forecasters to better access and utilize increasingly complex and high-volume datasets from GOES-R satellite output and high-resolution models. In addition, improved collaboration will streamline product consistency across the NWS enterprise and allow for more effective decision support to NOAA partners, customers, and ultimately, the public.

Schedule & Milestones:

FY 2012

- NCEP AWIPS (N-AWIPS) migrated to AWIPS II
- WES and Archive Server migrated to AWIPS II
- Integrated NWS Enterprise Collaboration IOC

FY 2013

- Improved Data Delivery Initial Operating Capability (IOC)

FY 2014

- Improved Data Delivery Full Operating Capability (FOC)
- Integrated NWS Enterprise Collaboration FOC
- Information Generation Re-Architecture FOC
- 3 Dimensional (3D) Data Visualization IOC

FY 2015

- Extend NWS Enterprise Collaboration to NOAA Partners IOC

Deliverables:

- Successful completion of the NCEP-AWIPS (N-AWIPS) software migration into the new architecture
- Successful completion of an enterprise wide capability to support the fire weather mission, Weather Service Offices and Center Weather Service Units
- Successful completion of the integration of WES and Archive Server into the AWIPS II architecture

- Continue development of an integrated collaborative capability within the new architecture
- Continue development of the improved data delivery method

Performance Goals and Measurement Data

Performance Measure	FY 2011 Target	FY 2012 Target	FY 2013 Target	FY 2014 Target	FY 2015 Target	FY 2016 Target
Storm-based lead time for Tornado Warnings, Measure 15a	12 minutes	13 minutes	13 minutes	13 minutes	14 minutes	14 minutes

Performance Measure	FY 2011 Target	FY 2012 Target	FY 2013 Target	FY 2014 Target	FY 2015 Target	FY 2016 Target
Workstation Performance Ratings	86 seconds	78 seconds	71 seconds	65 seconds	59 seconds	53 seconds
Description: Workstation Performance Rating shows the latency or inherent processing delay in seconds within the AWIPS system. A higher WPR means more latency, and therefore more delay, in processing and in getting forecasters the products they need when they need them. WPR benchmark analysis shows that without planned hardware improvements, AWIPS performance will decrease, resulting in degradation in Tornado Lead Time and other warning products.						

The outyear funding estimates are provided with the program change requested for this activity.

NEXT GENERATION WEATHER RADAR (NEXRAD)

The NEXRAD Doppler weather system is the single most important element in NOAA's capability to warn for severe weather such as tornados, hail, and damaging thunderstorm-induced high winds. NEXRAD is a Doppler weather radar system that provides automated signal processing, computerized data processing by sophisticated meteorological software algorithms, and a high-capacity, processor-driven communications capability. The system is modular in design, upgradeable, has long life-cycle expectancy, and provides both governmental and commercial sector weather users with a wide array of automated weather information that will increase their capability to meet their respective operational requirements. For NWS, the system uses Doppler technology and hydrometeorological processing to provide significant improvements compared to previous radars, both in functional capability and in performance, including improved tornado and thunderstorm warnings, increased air safety, improved flash flood warnings, and improved water resources management.

NEXRAD, initially developed as a tri-agency Program (NWS, FAA, and the United States Air Force Weather Agency) has evolved into NEXRAD Product Improvement (NPI) Program, focusing on shared agency requirements to effect synergistic solutions. For example, external FAA radar data are provided to NWS forecast offices to address coverage issues and provide backup data sources. Near-term plans include the continued execution of the Dual Polarization project, currently in the test phase of a five-year development/implementation contract.

Recent NPI achievements include:

- Coordination and funding of the implementation of Super-Resolution, a signal-processing technique which supports the capability of NEXRAD to detect smaller tornadoes at greater distances (June 2008).
- Deployment of 45 systems which connect to FAA Terminal Doppler Weather Radars and provide the weather data from those radars to NWS weather forecast offices to supplement data provide by NEXRAD. (September 2008)
- Implemented a system to connect to an FAA air traffic radar in NW Washington state to address local weather radar coverage issues (December 2008)

NPI science improvements have made significant improvements in NEXRAD performance, products, and data leading to increased warning lead time for tornados, lower false alarm rate for severe weather warnings, and more accurate hail and precipitation amount forecasts. Because of problems in the Dual Polarization acquisition effort which jeopardize the deployment schedule, base resources for lower priority non-dual polarization activities within the program have been redirected to the Dual Polarization effort beginning in FY 2010.

As stated above, NPI is managing the Dual Polarization modification to NEXRAD. Dual Polarization transmits and receives signals in two dimensions, resulting in a significant improvement in precipitation estimation; improved ability to discriminate rain, snow, and hail; and a general improvement in data quality. Precipitation estimates, currently within 30% of ground-truth estimates, will improve to 12.5 percent as demonstrated in a study conducted by the National Severe Storms Laboratory in 2003. The improved precipitation estimates from the national network of radars will be used as input to weather models with a concomitant improvement in model outputs. The Dual Polarization capability will allow other improvements in severe weather detection, including improvements in snow storm detection and warnings, icing conditions for air and ground transportation, and continued support for improved modeling data input. NWS plans to upgrade all 122 NWS NEXRAD systems with the Dual Polarization capability, as well as 26 United States Air Force NEXRADs and 12 FAA systems under reimbursable agreements.

The Dual Polarization modification contract was awarded in September 2007. Initial deployment of the modification is scheduled for late FY 2011 and is scheduled for completion in FY 2013. The program was accelerated in FY 2009 using funds from the American Recovery and Reinvestment Act.

The schedule, milestones, deliverables, and outyear funding estimates are provided with the program change requested for this activity.

NWS TELECOMMUNICATIONS GATEWAY LEGACY REPLACEMENT

The NWSTG (http://www.weather.gov/tg/) is the NWS communications hub for collecting and distributing weather information to its field units and external users. Replacing the NWSTG system with up-to-date technology will reduce the current delays in collecting and disseminating data by reducing transit time through the NWSTG. The replacement will ensure reliable delivery of NWS products to users and will fully capitalize on better observation data and prediction models to improve services.

Timely, accessible, and accurate weather forecasts and warnings are critical to the health and well-being of citizens and businesses in the United States and around the world. The lack of weather forecasts and warnings undermine human health and sustainability of national security

and various federal systems. Weather and environmental disturbances have the potential to disrupt virtually every major public infrastructure system including transportation systems, power grids, telecommunications, and emergency response systems that protect the public. The NWSTG is the Nation's hub for the collection and distribution of weather data and products and provides national and global collection and distribution of environmental data and forecast products. As such, the NWSTG facilitates every NWS GPRA goal. In addition, commercial partners all depend on data collected and processed by the NWSTG.

Schedule & Milestones:
FY 2012

- Continue to procure data processing and communications hardware and software

Deliverables:

- Address component obsolescence on current architecture

Performance Goals and Measurement Data

Performance Measure	FY 2011 Target	FY 2012 Target	FY 2013 Target	FY 2014 Target	FY 2015 Target	FY 2016 Target
Availability	99.9%	99.8%	99.7%	99.6%	99.4%	99.2%
Message Latency (seconds)	0.6	0.6	0.7	1.2	2.5	4.0
Description: Availability is measure indicating time system is available to users. Message Latency is a measure of the system's efficiency at moving information through the system. It measures the time it takes the system to process and disseminate a message.						

Performance Measure	FY 2011 Target	FY 2012 Target	FY 2013 Target	FY 2014 Target	FY 2015 Target	FY 2016 Target
Processing Capacity (Terabits/day)	2.5	2.5	2.5	2.25	2.0	1.5
Description: Measures the number of terabits per day processed by the TG and tracks the progress towards achieving projected processing requirement.						

Multi-Year Budget Information (BA in thousands)

Major Cost Categories	FY 2011 & Prior	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	CTC	Total
NWSTG	11,054	1,195						
Total	11,054	1,195	TBD	TBD	TBD	TBD	TBD	TBD

RADIOSONDE REPLACEMENT SYSTEM

The NWS radiosonde network is the primary real-time upper air observation system for NOAA prediction models for severe weather, aviation, and marine prediction models and forecasts for day two and beyond. Observations of temperature, pressure, humidity, and wind speed/direction are taken twice a day at locations nationwide and in the Caribbean and Pacific using radiosondes. Radiosondes are balloon-borne instruments that transmit observational data to a ground receiving and processing station as they fly from the originating Upper Air (UA) Observing Site to up to 30km away. The network's observations are also used to benchmark

the satellite and ground-based thermodynamic profiler measurements of temperature and moisture. Additionally, accumulated radiosonde data fill portions of the climate record and is the foundation of other atmospheric research.

The legacy RDF (Radio Direction Finding) radiosonde network is currently being replaced by a Global Positioning System (GPS) radiosonde network. The replacement ground-receiving and GPS-based radiosonde system installed at 78 of 102 locations has already provided a six-fold increase in independent vertical observing. In addition, the replacement system has virtually eliminated data losses due to physical obstructions. Additionally, GPS radiosondes prevent the loss of both wind speed and direction readings due to low antenna angle observations caused by the jet stream carrying RDF radiosondes slightly beyond the radio horizon.

The transition to GPS technology has resulted in significantly more-accurate data from each flight. The RDF radiosondes transmit a complete observation (wind, humidity, temperature, pressure and altitude) every 6 seconds or 90 feet or more resulting in approximately 1,100 observations per flight compared to GPS radiosondes which transmit a complete observation every second or 15 feet providing approximately 6,700 observations per flight, a 6-fold increase. Today's powerful computers and higher resolution models are capable of processing the increased number of observations producing more accurate forecasts.

In addition, the replacement network meets NOAA's legislative mandate under the Omnibus Budget Reconciliation Act to vacate radio frequency spectra for auction and telecommunication utilization and to reduce bandwidth and interference on the frequencies used to transmit data from the radiosonde to the ground receiving station.

Schedule & Milestones:

FY2012

- Deploy 8 radiosonde replacement sites for a total of 86 GPS sites

FY2013

- Deploy 6 radiosonde replacement sites for a total of 92 GPS sites

FY2014

- Transition 10 CHUAS sites to GPS for a total of 102 GPS sites

Deliverables:

- 102 GPS site network

Performance Goals and Measurement Data

Performance Measure	FY 2011 Target	FY 2012 Target	FY 2013 Target	FY 2014 Target	FY 2015 Target	FY 2016 Target
Number of UA observing sites launching GPS radiosondes	78	86	92	102	102	102
Description: The radiosonde replacement program was initiated as a result of the 1993 Omnibus Budget Reconciliation Act (OBRA) in which the Government reallocated 5 MHz (1670-1675 MHz) to the private sector effective January 1, 1999 requiring the NWS to vacate this part of the spectrum. The GPS radiosonde complies with this requirement and this output measure demonstrates full compliance with the OBRA. This profile assumes full funding of FY 2012 LWF GPS Radiosonde request.						

Multi-Year Budget Information (BA in thousands)

Major Cost Categories	FY 2011 & Prior	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	CTC	Total
Radiosonde Replacement Program (RRS)	63,362	4,014						
Total	63,362	4,014	TBD	TBD	TBD	TBD	TBD	TBD

WEATHER AND CLIMATE SUPERCOMPUTING

The NWS National Centers for Environmental Prediction (NCEP) Weather and Climate Operational Supercomputing System (WCOSS) is composed of primary and backup operational supercomputing systems, development computing systems, and the wide area network, which collectively perform a wide range of computational tasks. These tasks include data analysis, data assimilation, the execution of complicated prediction models and post processing, and product generation. The WCOSS provides support resources for (a) weather and climate forecasting capabilities 24 hours a day, 7 days a week, (b) numerical environmental prediction model development and testing, and (c) dissemination of NCEP operational products using the wide area networks. NCEP's operational products include national and global weather, water, climate and space weather guidance, forecasts, warnings and analyses to a broad range of users and partners (within NOAA, with other government agencies, military and the general public).

NWS maintains a backup supercomputer system, which is a clone of the primary supercomputer system and is located in an offsite facility. This system is used to thoroughly test pre-production weather and climate forecasting applications when it is not being used to run the Production Suite during a backup system test or actual emergency. The backup supercomputer system is capable of handling 100 percent of the operational workload should the primary supercomputer system be disrupted. Implementation and maintenance of a redundant Weather and Climate Operational Supercomputer Systems architecture ensures uninterrupted flow of essential weather and climate data and products, continuity of storm watch and warning services to the public, and compliance with NOAA Critical Infrastructure Protection (CIP) plans.

The increased need for NWS products for air quality, ecosystem, coupled modeling, and short-range ensemble forecasts has increased demands on the infrastructure support required to deliver them. The cyclical upgrade of NWS WCOSS capability is intended to procure the computing and communications equipment needed to receive and process the increasing wealth of environmental data acquired by modernized observing systems, process improved and more sophisticated numerical weather prediction models, and stay current with the supercomputing technology the market has to offer. Execution of this program promotes public safety and the protection of property by providing NCEP with the computer systems that are capable of producing more accurate NWS climate and numerical weather prediction (NWP) guidance products for hurricanes, severe thunderstorms, floods, and winter storms. Additionally, the upgraded supercomputing system will more accurately forecast large-scale weather patterns in the medium (3 to 10 days) and extended range (30 days), as well as forecasts of major climate events such as El Niño and La Niña. In addition, the computer upgrades will improve the delivery of products to the field and provide system users with enhanced productivity. These products and services will lead to significant economic benefits for all users and sectors, including the agriculture, construction, and transportation industries.

The schedule, milestones, deliverables, and outyear funding estimates are provided with the program change requested for this activity.

COMPLETE AND SUSTAIN NOAA WEATHER RADIO

National Weather Service faces challenges in its efforts to sustain a high level of reliability and maintainability of NOAA Weather Radio, due to equipment obsolescence and degraded reliability. Four hundred (400) NWR station transmitters employ 1970's-installed vacuum tube technology from four different manufacturers. These older stations are less reliable than newer ones using solid-state transmitters. Older stations demonstrate mean time between failure (MTBF) rates of 6,000 hours, or one failure every 250 days. In comparison, newer solid-state transmitters demonstrate MTBF of over 10,000 hours, a 67 percent improvement. Furthermore, stations have single points of failure due to configurations that include single, instead of dual, transmitters and lack of backup power generators to ensure continued service in the event of primary electrical service failure. Combined, these factors significantly decrease reliability and availability and increase logistics and maintenance costs. Refurbishing these older stations and adequately funding operations and maintenance costs will allow NWR to meet expectations of availability as the Nation's weather and all hazard warning system.

NWS will continue deployment of the NWR Broadcast Management System (BMS) as a replacement for the Console Replacement System (CRS) at each of the 122 Weather Forecast Offices (WFOs). The CRS is a main component of NOAA Weather Radio that converts text warning messages into digital voice which gives the NWS the ability to quickly disseminate Severe and High Impact Weather Warnings, Watches and forecasts and Non-Weather Emergency Messages to the public.

Schedule & Milestones:

FY 2012

- BMS deployment to WFOs

FY 2013

- Complete transmitter refurbishment installation
- Begin WRIP O&M

FY 2014

- Transmitter O&M

- WRIP O&M

FY 2015
- Transmitter O&M
- WRIP O&M

FY 2016
- Transmitter O&M
- WRIP O&M

Deliverables:
- NWR Steady State
- WRIP Steady State

Performance Goals and Measurement Data

Performance Measure	FY 2011 Target	FY 2012 Target	FY 2013 Target	FY 2014 Target	FY 2015 Target	FY 2016 Target
Sustain NWR Service Availability	96%	96%	96%	96%	96%	96%
Description: This measure reflects NOAA's ability to maintain and operational readiness including necessary equipment modernization to ensure overall NWR system reliability and availability. This NWR system consists of console replacement systems at each WFO, dedicated leased commercial phone lines to NWR transmitters, and the distributed NWR transmitters.						

The outyear funding estimates are provided with the program change requested for this activity.

NOAA PROFILER CONVERSION

The current wind profiler network, referred to as NOAA Profiler Network (NPN) consists of 35 operational and two support vertical looking radars that observe wind direction and velocity at various altitudes. This observational data are used in weather models that predict clouds, precipitation, and temperature. Most critically, the data provides indicators of severe weather, such as tornadoes and winter storms, formation. The data is also used for issuing aviation advisories, tracking volcanic ash plumes and predicting the spread of wildfires. NPN data has improved probability of detection, decrease false alarm rate, and improve lead time for tornado warnings, severe thunderstorms, flash floods, and winter storms. Wind profiler data also improves warnings related to aviation and fire weather.

Thirty-two of the existing 37 wind profilers use an experimental transmitter frequency of 404 MHz issued by the National Telecommunications and Information Administration (NTIA) upon the profilers' deployment. These 32 profilers using the 404Mhz frequency must cease transmitting on this frequency by the end of the FY 2012 to avoid interference with the European Union's Search and Rescue Satellite Tracking (SARSAT) transponders aboard the (Galileo) GPS satellite constellation. Thirty of the 32 wind profilers operating at 404MHz are located in the central U.S. along Tornado Alley.

This SARSAT frequency interference issue, along with the age of the existing NPN, led to considerable interest in replacement of the NPN with a new network of wind profilers operating at the 449 MHz frequency. The Senate Appropriations Committee, as part of a Cost and

Operational Effectiveness Analysis (COEA), requested a comparison of the cost to upgrade the NPN over the next decade versus the short, medium, and long-term costs of ending the NPN program.

The results of the COEA demonstrate that high-frequency wind data benefit several important NWS missions, in particular severe weather warnings (for tornadoes, flash floods, and winter storms), watches, and short-term forecasts. The COEA also considered a range of alternatives for providing wind profile information. The performance and cost-effectiveness analysis showed that sustaining the NPN, including upgrading the frequency, is the most cost-efficient method of obtaining high-frequency wind profiles as no alternative would be able to provide equal or higher performance at lower cost.

Following the COEA analysis, NOAA initiated the Next Generation NOAA Profiler Network (NGNPN) with the goal of upgrading NPN wind profiler radars to operate at 449 MHz. In addition to the upgrade of the wind profiler radars, the NGNPN program includes technology refresh for the network's VAX system computers and re-hosting the software on a LINUX platform; improving the telecommunications network; replacing site modems, data collection modems and uninterruptible power systems; and providing a major overhaul of site shelters and facility electrical distribution. The wind profiler radars are being upgraded with PAC funds and ORF funds support the technology refresh of the IT and processing systems.

The technology refresh and frequency conversion of the wind profiler radars are supported through a commercial contract. The current production contract tasks the development, production, and installation of next generation wind profilers through FY 2013. However an extension of the current contract or a re-compete will be required to meet the revised NPN schedule through FY 2015. In addition, future funding will be required to complete the technology refresh and frequency conversion of the entire network.

The schedule, milestones, deliverables, and outyear funding estimates are provided with the program change requested for this activity.

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PROGRAM CHANGES FOR FY 2012

Weather and Climate Supercomputing: NOAA High Performance Computing (Base Funding: 0 FTE and $29,169,000; Program Change: +0 FTE and +$11,000,000): NOAA requests an increase of 0 FTE and $11,000,000 for a total of $40,169,000 to (1) transition NOAA's operational high performance computing (HPC) to a new HPC contract; (2) support on-going Hurricane Forecast Improvement Project (HFIP) modeling activities; and (3) to continue regular improvements to numerical weather prediction (NWP) modeling.

Proposed Actions:
The current operational HPC contract expires at the end of FY 2011. In FY 2012 and FY 2013, NOAA must transition operations to a newly competed contract utilizing more technologically advanced supercomputing systems. The first transition year enables preparation of data-center space and associated infrastructure and manufacturing, delivery, installation, and acceptance of systems. In the second transition year, NOAA will port, integrate, and validate its operational models onto the new systems. During this two year period, the production of operational NWP guidance on the current supercomputers will be maintained under a bridge contract while systems under the new contract are configured to support operations. The requested increase will fund the bridge contract.

NOAA will acquire a new, ten-year performance based contract for scalable operational HPC. This new contract will include technology refreshment every three (3) years, resulting in HPC capacity increases. This strategy ensures that NOAA's environmental modeling is processed on reliable, state of the art systems. This continual growth in capacity will enable NOAA to implement enhanced NWP modeling systems that lead to continuous, incremental improvements to many of NWS Government Performance and Reporting Act (GPRA) measures. These modeling systems allow NWS to improve Department of Commerce mission-essential weather services that enhance the economy and protect life and property. NOAA's weather forecasts are derived from a suite of global to local NWP, hydrological, land, coastal, and ocean models. These models provide the basis of all of NWS' prediction and related service areas, except for localized severe weather. Likewise, enhancements in model resolution and sophistication made possible by increased HPC capacity have directly resulted in proportionate improvements in GPRA scores. Historically, NWS forecast skills and GPRA scores have steadily improved by 1-3 percent per year, to which HPC contributes significantly.

Without the requested funding for the bridge contract, existing funds within HPC would be divided between the new contract and the bridge contract. Under this scenario, the new contract would be awarded with the same operational supercomputing capacity that exists today, which would plateau GPRA score improvements through FY 2014. In order to sustain historical improvements in forecast skills and GPRA scores, the standard HPC capacity increases achieved through level funding and technological advancements must be realized at the start of the new contract.

$1.0 million of the requested resources will be used to augment the current HFIP development HPC system enabling the provision of real-time experimental products to the National Hurricane Center (NHC). NHC forecasters can get a head-start on initial operational testing and evaluation enabling acceleration of the optimization of the Hurricane Forecast System (HFS). This will enable NHC to determine transition requirements to the end-state operational products sooner.

Statement of Need and Economic Benefits:

The High Performance Computing and Communications Act of 1991 Section 204(a)(2) (P.L. 102-994, 15 U.S.C. 5501-5528) states: "the National Oceanic and Atmospheric Administration shall conduct basic and applied research in weather prediction and ocean sciences, particularly in development of new forecast models, in computational fluid dynamics, and in the incorporation of evolving computer architectures and networks into the systems that carry out agency missions." NOAA Administrative Order 216-110 establishes a NOAA policy for managing high performance computing resources as a corporate asset in support of NOAA's mission. The WCOSS investment supports NOAA's objectives of (1) Serving society's needs for weather and water information; (2) Supporting the Nation's commerce with information for safe, efficient, and environmentally sound transportation; and by 3) Providing critical support for NOAA's mission. The WCOSS supports strategic use of information technology including integrated high performance computing resources and data archival/retrieval capabilities, as needed to support NOAA's observation systems, data management, and modeling needs for operational service delivery.

NOAA provides environmental monitoring, assessment, and prediction services in order to protect life and property by ensuring an uninterrupted flow of critical forecast products. This program ensures the continued generation of NWS/NCEP products from operational forecast models and provides support for operating the NOAA's R&D supercomputer which serves as the meteorological and climate testbeds. Moreover, it supports the climate development work and the Joint Center for Satellite Data Acquisition (JCSDA) efforts.

The current increase request impacts NOAA's ability to apply HPC resources to support NOAA's science-based modeling applications and thereby achieve certain model based GPRA measures. HPC capacity enables NWS to output approximately 28 million model fields a day for every forecast hour, including temperature, winds, and humidity as a function of pressure. The model-based guidance underpins the provision of most of NOAA's products and services to the Nation by providing models and model-based estimates of both current and future states of the Earth's environment. Decision makers at all levels rely on this credible information at finer scales to support strategies to protect the lives and livelihoods of American citizens and to support commerce.

This request acquires the critical operational HPC resources needed to transition NOAA's weather modeling research advancements. The implementation of improved NWP models will enable NOAA to provide emergency managers additional lead time for winter storm events with great accuracy and provide maritime vessel operators and commercial fishermen more accurate marine wind and wave forecasts to optimize operations, among other benefits. In addition, this effort will enable tsunami models to become part of the NOAA operational model production suite by using NOAA operational HPC as an enterprise IT platform. By consolidating tsunami models currently running on multiple platforms, NOAA will leverage HPC processing and storage capacities and contract management activities.

Base Resources Assessment:
The base resource assessment is provided in the Program Summary for Weather & Climate Supercomputing.

Schedule & Milestones:

- Award Operational HPC Bridge Contract in FY 2011 to ensure continuity of operations
- Award the new 10-year contract using full and open competitive process in FY 2012
- Delivery of new leased supercomputers and facilities at the end of FY 2012

- Augmentation of the development computer complete by the end of FY 2012
- Migrate and transition NWS modeling suite to new leased supercomputer capability in FY 2013
- Go live with operations on the new computers at the end of FY 2013

Deliverables:

- Approximately 28 million model fields a day for every forecast hour including temperature, winds, humidity as a function of pressure

Output	FY 2011 Target	FY 2012 Target	FY 2013 Target	FY 2014 Target	FY 2015 Target	FY 2016 Target
Timeliness of Delivery for NCEP's model guidance	99.5%	99.5%	99.5%	99.5%	99.5%	99.5%
Supercomputing systems availability	99.5%	99.5%	99.5%	99.5%	99.5%	99.5%

Performance Goals and Measurement Data:

Performance measures detailed in Central Forecast Guidance and Local Warnings and Forecast base are impacted by the availability of HPC. HPC capacity is rate limiting for NWS' ability to run higher resolution and more sophisticated models. Forecast performance improvements in turn result from these most advanced modeling systems. Performance measures, such as winter weather accuracy and lead time warnings GPRA, Wind/Wave Forecast Accuracy GPRA, and aviation forecast GPRA depend on the skill of the NWS Global Forecast System (GFS). Hurricane Track and Intensity GPRA depend on a combination of the high resolution hurricane forecast system, GFS, and ocean models. Without growth in HPC capacity these GPRA targets will stagnate.

Performance Measure: Winter Storm Warnings Lead Time (hours), Measure 15f	FY 2011 Target	FY 2012 Target	FY 2013 Target	FY 2014 Target	FY 2015 Target	FY 2016 Target
With Increase	15	19	19	19	20	20
Without Increase	15	19	19	19	19	19

Performance Measure: 500 mb height anomaly for NWS Global Forecast System	FY 2011 Target	FY 2012 Target	FY 2013 Target	FY 2014 Target	FY 2015 Target	FY 2016 Target
With Increase	0.860	0.866	0.872	0.875	0.875	0.900
Without Increase	0.860	0.860	0.860	0.860	0.866	0.872
Description: The weather forecast skill is assessed using a scientifically accepted measure, called 500 millibarr anomaly correlation. This measure serves as a very sensitive proxy for overall forecast of lead times and accuracy of severe weather events. The Global Forecast System serves as the underpinning of NCEP's modeling suite and NCEP's services to the Nation.						

Performance Measure: NWS Operational Computational Capacity (terraflops)	**FY 2011 Target**	**FY 2012 Target**	**FY 2013 Target**	**FY 2014 Target**	**FY 2015 Target**	**FY 2016 Target**
With Increase	70	70	200	200	500	500
Without Increase	70	70	70	70	500	500

Description: FLOPS is an acronym meaning Floating point Operations Per Second. The FLOPS is a measure of a computer's capacity, especially in fields of scientific calculations. The terraflops unit is equal to one trillion flops. This measure represents the HPC capacity available to generate the operational NWP guidance to NWS internal and external customers.

Outyear Funding Estimates (BA in thousands)

Weather & Climate Supercomputing	**FY 2011 & Prior***	**FY 2012**	**FY 2013**	**FY 2014**	**FY 2015**	**FY 2016**	**CTC**	**Total**
Change from FY 2012 Base		11,000						
Total Request	265,860	40,169	TBD	TBD	TBD	TBD	TBD	TBD

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Activity: Procurement, Acquisition, and Construction
Subactivity: Systems Acquisition

	Object Class	2012 Increase
11	Personnel compensation	
11.1	Full-time permanent	$0
11.3	Other than full-time permanent	0
11.5	Other personnel compensation	0
11.8	Special personnel services payments	0
11.9	Total personnel compensation	0
12	Civilian personnel benefits	0
13	Benefits for former personnel	0
21	Travel and transportation of persons	0
22	Transportation of things	0
23.1	Rental payments to GSA	0
23.2	Rental Payments to others	0
23.3	Communications, utilities and miscellaneous charges	0
24	Printing and reproduction	0
25.1	Advisory and assistance services	0
25.2	Other services	10,000
25.3	Purchases of goods & services from Gov't accounts	0
25.4	Operation and maintenance of facilities	0
25.5	Research and development contracts	0
25.6	Medical care	0
25.7	Operation and maintenance of equipment	0
25.8	Subsistence and support of persons	0
26	Supplies and materials	0
31	Equipment	1,000
32	Lands and structures	0
33	Investments and loans	0
41	Grants, subsidies and contributions	0
42	Insurance claims and indemnities	0
43	Interest and dividends	0
44	Refunds	0
99	Total obligations	11,000

AWIPS Tech Infusion (Base Funding: 15 FTE and $24,000,000; Program Change: +0 FTE and +$364,000): NOAA requests an increase of 0 FTE and $364,000 for a total of $24,364,000 for AWIPS Tech Infusion. This increase is requested to increase the base level of funding to that recommended in the FY 2010 President's Budget but not provided for in the Consolidated Appropriations Act, 2010. The potential loss of $364,000 in the AWIPS Tech Infusion budget on a recurring basis in FY 2012 and beyond would inhibit our ability to incorporate new and/or enhanced hydrometeorological data sets into AWIPS. New and/or enhanced data sets infuse new science into NWS operations that is critical to improving warning and decision support across NWS mission areas including severe weather, tropical and aviation services. A funding level of $364,000 supports the necessary software development to incorporate about 3 new or enhanced data sets into AWIPS on a yearly basis.

Outyear Funding Estimates (BA in thousands)

AWIPS Tech Infusion	FY 2011 & Prior*	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	CTC	Total
Change from FY 2011 Base		364						
Total Request	196,873	24,364	TBD	TBD	TBD	TBD	TBD	TBD

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Activity: Procurement, Acquisition & Construction
Subactivity: Systems Acquisition

	Object Class	2012 Increase
11	Personnel compensation	
11.1	Full-time permanent	$0
11.3	Other than full-time permanent	0
11.5	Other personnel compensation	0
11.8	Special personnel services payments	0
11.9	Total personnel compensation	0
12	Civilian personnel benefits	0
13	Benefits for former personnel	0
21	Travel and transportation of persons	0
22	Transportation of things	0
23.1	Rental payments to GSA	0
23.2	Rental Payments to others	0
23.3	Communications, utilities and miscellaneous charges	0
24	Printing and reproduction	0
25.1	Advisory and assistance services	0
25.2	Other services	364
25.3	Purchases of goods & services from Gov't accounts	0
25.4	Operation and maintenance of facilities	0
25.5	Research and development contracts	0
25.6	Medical care	0
25.7	Operation and maintenance of equipment	0
25.8	Subsistence and support of persons	0
26	Supplies and materials	0
31	Equipment	0
32	Lands and structures	0
33	Investments and loans	0
41	Grants, subsidies and contributions	0
42	Insurance claims and indemnities	0
43	Interest and dividends	0
44	Refunds	0
99	Total obligations	364

NEXRAD Product Improvement (NPI) (Base Funding: 5 FTE and $7,976,000; Program Change: -0 FTE and -$2,157,000): NOAA requests a planned decrease of $2,157,000 and 0 FTE for a total of $5,819,000 and 5 FTE to reflect the nearing completion of the NEXRAD Product Improvement project.

Outyear Funding Estimates (BA in thousands)

NEXRAD Product Improvement	FY 2011 & Prior*	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	CTC	Total
Change from FY 2012 Base		(2,157)						
Total Request	105,244	5,819	TBD	TBD	TBD	TBD	TBD	TBD

.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Activity: Procurement, Acquisition, and Construction
Subactivity: Systems Acquisition

	Object Class	2012 Decrease
11	Personnel compensation	
11.1	Full-time permanent	$0
11.3	Other than full-time permanent	0
11.5	Other personnel compensation	0
11.8	Special personnel services payments	0
11.9	Total personnel compensation	0
12	Civilian personnel benefits	0
13	Benefits for former personnel	0
21	Travel and transportation of persons	0
22	Transportation of things	0
23.1	Rental payments to GSA	0
23.2	Rental Payments to others	0
23.3	Communications, utilities and miscellaneous charges	0
24	Printing and reproduction	0
25.1	Advisory and assistance services	0
25.2	Other services	-1,486
25.3	Purchases of goods & services from Gov't accounts	0
25.4	Operation and maintenance of facilities	0
25.5	Research and development contracts	0
25.6	Medical care	0
25.7	Operation and maintenance of equipment	0
25.8	Subsistence and support of persons	0
26	Supplies and materials	0
31	Equipment	-671
32	Lands and structures	0
33	Investments and loans	0
41	Grants, subsidies and contributions	0
42	Insurance claims and indemnities	0
43	Interest and dividends	0
44	Refunds	0
99	Total obligations	-2,157

Complete and Sustain NOAA Weather Radio (NWR): Weather Radio Improvement Project (WRIP) (Base Funding: 0 FTE and $11,000,000; Program Change: -0 FTE and -$5,406,000):
NOAA requests a decrease of 0 FTE and $5,406,000 for a total of $5,594,000. This planned decrease reflects the completed funding for the deployment of the NWR Broadcast Management System (BMS) and associated hardware at all 122 Weather Forecast Offices (WFO).

Outyear Funding Estimates (BA in thousands)

Complete and Sustain NWR	FY 2011 & Prior	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	CTC	Total
Change from FY 2012 Base		(5,406)						
Total Request	47,284	5,594	TBD	TBD	TBD	TBD	TBD	TBD

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Activity: Procurement, Acquisition, and Construction
Subactivity: Systems Acquisition

	Object Class	2012 Decrease
11	Personnel compensation	
11.1	Full-time permanent	$0
11.3	Other than full-time permanent	0
11.5	Other personnel compensation	0
11.8	Special personnel services payments	0
11.9	Total personnel compensation	0
12	Civilian personnel benefits	0
13	Benefits for former personnel	0
21	Travel and transportation of persons	0
22	Transportation of things	0
23.1	Rental payments to GSA	0
23.2	Rental Payments to others	0
23.3	Communications, utilities and miscellaneous charges	0
24	Printing and reproduction	0
25.1	Advisory and assistance services	0
25.2	Other services	-5,406
25.3	Purchases of goods & services from Gov't accounts	0
25.4	Operation and maintenance of facilities	0
25.5	Research and development contracts	0
25.6	Medical care	0
25.7	Operation and maintenance of equipment	0
25.8	Subsistence and support of persons	0
26	Supplies and materials	0
31	Equipment	0
32	Lands and structures	0
33	Investments and loans	0
41	Grants, subsidies and contributions	0
42	Insurance claims and indemnities	0
43	Interest and dividends	0
44	Refunds	0
99	Total obligations	-5,406

NOAA Profiler Conversion (Base Funding: 0 FTE and $7,500,000; Program Change: -0 FTE and -$2,020,000): NOAA requests a decrease of 0 FTE and $2,020,000 for a total of $5,480,000 to extend the ongoing modernization of the 20-year old NOAA Profiler Network (NPN) to take advantage of the slip in the European Union's Search and Rescue Satellite Tracking (SARSAT) transponders aboard the (Galileo) GPS satellite constellation. NOAA is able to reduce its budget requirements as a result of this slip.

Proposed actions:
The revised outyear profile will enable NWS to convert eleven (11) profilers currently operating at 404 MHz to 449 MHz and provide technology refresh to the 20-year old system.

- FY 2012: Two (2) profilers will be modernized and their operating frequencies converted from 404 MHz to 449 MHz; one (1) support system (used to train maintenance technicians) will be modernized at the NWS Training Center (NWSTC).
- FY 2013: Three (3) profilers will be modernized and their operating frequencies converted from 404 MHz to 449 MHz.
- FY 2014: Three (3) profilers will be modernized and their operating frequencies converted from 404 MHz to 449 MHz.
- FY 2015: Three (3) profilers will be modernized and their operating frequencies converted from 404 MHz to 449 MHz.

Statement of Need and Economic Benefits:
The Next Generation NOAA Profiler Network (NGNPN) contributes to NOAA's ability to provide and substantially improve upon its high quality products and services, such as those focused on enhancing public safety, transportation, water resources, wildfire management, and air quality monitoring and prediction. These observations and their associated metadata will be utilized by field meteorologists within the Advanced Weather Interactive Processing System (AWIPS), assimilated into NOAA's numerical weather prediction models, made available to NOAA's partners in near real-time, and stored in the long-term archive for climate monitoring.

Implementing NGNPN will improve short-term warnings and forecasts by observing precursor conditions that are related to high-impact weather events, detect changes in regional atmospheric conditions impacting transportation, and provide climate-quality information for climate change monitoring.

The Senate Appropriations Committee requested, as part of a Cost and Operational Effective Analysis (COEA), "the cost to upgrade the NOAA Profiler Network (NPN) over the next decade versus the short, medium, and long-term costs of ending the NPN program." The results of the COEA demonstrated that high-frequency wind data benefit several important NWS missions: severe weather warnings (for tornadoes, flash floods, and winter storms), watches, and short-term forecasts. These products are important for public safety, aviation, and wildfire-suppression support.

Thirty-two of the existing 37 wind profilers use an experimental transmitter frequency of 404 MHz issued by the National Telecommunications and Information Administration (NTIA) upon the profilers' deployment. These 32 profilers using the 404Mhz frequency must cease transmitting on this frequency as the European Union's SARSAT transponders aboard the (Galileo) GPS satellite constellation, also operating at 404Mhz, come online. Thirty of the 32 wind profilers operating at 404MHz are located in the central U.S. along Tornado Alley. Whenever a SARSAT passes over a profiler, the profiler is turned off to prevent interference. Right now, this only occurs about 90 minutes per day. When fully deployed, the Galileo

satellites will be overhead for hours instead of minutes. Under these conditions, the 32 NPN profilers operating at 404MHz will have to shut down more than 23.5 hours per day, effectively rendering these profilers useless.

Additionally, in 2010, the NPN will have been installed for over 20 years without any technology refresh during its life cycle. Therefore, a second priority is tech refresh for the entire 37 wind profiler network. This tech refresh includes replacing the 5 existing 449 MHz profilers. By coupling the frequency replacement with the tech refresh, the government avoids risking significant problems with technology integration and achieves a more cost-efficient solution to supporting the life-cycle of these operationally critical systems.

Schedule & Milestones:

- FY 2012 - Production, delivery, and installation of 2 Next Generation NOAA Profiler Network (NGNPN) operational wind profilers and one support system at the National Weather Service Training Center
- FY 2013 - Production, delivery, and installation of 3 NGNPN operational wind profilers
- FY 2014 - Production, delivery, and installation of 3 NGNPN operational wind profilers
- FY 2015 - Production, delivery, and installation of 3 NGNPN operational wind profilers

Deliverables:

- A total of 24 operational next generation wind profilers operating at 449 MHz
- 2 support system next generation wind profilers

Performance Goals and Measurement Data

Performance Measure: Network Availability	FY 2011 Target	FY 2012 Target	FY 2013 Target	FY 2014 Target	FY 2015 Target	FY 2016 Target
With decrease	65%	56%	68%	79%	90%	90%
Without decrease	65%	59%	90%	90%	90%	90%
Description: The annual average percentage of wind profiler data available. As the EU SARSAT constellation increases, unconverted NPNs will require increased down time to avoid interference. Maximum percentage of network availability at 90 percent.						

Outyear Funding Estimates (BA in thousands)

NOAA Profiler Network	FY 2011 & Prior*	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	CTC	Total
Change from FY 2012 Base		(2,020)						
Total Request	30,743	5,480	TBD	TBD	TBD	TBD	TBD	TBD

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Activity: Procurement, Acquisition, and Construction
Subactivity: Systems Acquisition

	Object Class	2012 Decrease
11	Personnel compensation	
11.1	Full-time permanent	$0
11.3	Other than full-time permanent	0
11.5	Other personnel compensation	0
11.8	Special personnel services payments	0
11.9	Total personnel compensation	0
12	Civilian personnel benefits	0
13	Benefits for former personnel	0
21	Travel and transportation of persons	0
22	Transportation of things	0
23.1	Rental payments to GSA	0
23.2	Rental Payments to others	0
23.3	Communications, utilities and miscellaneous charges	0
24	Printing and reproduction	0
25.1	Advisory and assistance services	0
25.2	Other services	-2,020
25.3	Purchases of goods & services from Gov't accounts	0
25.4	Operation and maintenance of facilities	0
25.5	Research and development contracts	0
25.6	Medical care	0
25.7	Operation and maintenance of equipment	0
25.8	Subsistence and support of persons	0
26	Supplies and materials	0
31	Equipment	0
32	Lands and structures	0
33	Investments and loans	0
41	Grants, subsidies and contributions	0
42	Insurance claims and indemnities	0
43	Interest and dividends	0
44	Refunds	0
99	Total obligations	-2,020

APPROPRIATION ACCOUNT: PROCUREMENT, ACQUISITION, AND CONSTRUCTION

SUBACTIVITY: CONSTRUCTION

WEATHER FORECAST OFFICE CONSTRUCTION

To support its mission, the NWS operates and maintains 122 Weather Forecast Offices (WFO); 18 Weather Service Offices (WSO); 8 National Centers; 2 Data Collection Offices; and 2 Tsunami Warning Centers. Of the WFOs, 35 are leased.

The WFO Construction program started in the late 1980s as part of the NWS modernization and restructuring program. The original scope of the project, completed in FY 1999, included the construction or lease of 117 WFOs (13 of which were co-located with River Forecast Centers) and cost approximately $250 million. Since then, NWS added five WFOs to address service coverage requirements in Guam; Northern Indiana; Caribou, ME; Huntsville, AL; and Key West, FL. The original modernization scope did not include the upgrade and modernization of Alaska and Pacific Region Weather Service Offices and associated employee housing units. The original facilities are reaching twenty years in age and require the typical capital improvements necessary to maintain their structural integrity, e.g., heating, ventilating, and air conditioning systems, roof and uninterruptible power supply replacements. In addition, this effort is essential to maintaining compliance with federal law and national and local building codes.

The schedule, milestones, deliverables, and outyear funding estimates are provided with the program change requested for this activity.

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PROGRAM CHANGES FOR FY 2012:

Weather Forecast Office (WFO) Construction (Base Funding: 0 FTE and $0; Program Change: +0 FTE and +$3,150,000): National Weather Service (NWS) requests an increase of $3,150,000 and 0 FTE for a total of $3,150,000 for a construction project in the Pacific Region and replacement of the heating, ventilating, and air conditioning (HVAC) systems at WFOs with modern, high efficiency units.

Proposed Actions:
The increase of $3,150,000 will complete on-going construction modernization projects in the Alaska and Pacific Regions and replacement of two (2) HVAC projects. In FY 2012, the total funding increase of $3,150,000 will be used for:

Alaska Facility Projects
St. Paul Island, AK Upper Air Inflation Shelter (UAIS): $1,500,000

Pacific Facility Projects
Weather Service Office (WSO) Koror Relocation: $1,000,000

HVAC Replacements
HVAC Units (2): $650,000

Statement of Need and Economic Benefits:
The WFO Construction program started in the late 1980s as part of the National Weather Service (NWS) modernization to meet facility requirements. Completed in FY 1999, the original project scope included the construction or lease of 117 WFOs (13 of which were co-located with River Forecast Centers). Since then, NWS added five WFOs to address service coverage requirements in Guam; Northern Indiana; Caribou, ME; Huntsville, AL; and Key West, FL. The original modernization scope did not include the upgrade and modernization of Alaska and Pacific Region Weather Service Offices (WSOs) and associated employee housing units. The original facilities are reaching twenty years in age. In order to maintain the vitality of these facilities, capital improvements are required such as HVAC, roof and uninterruptible power supply (UPS) replacements. In addition, this effort is essential to maintaining compliance with Federal law and national and local building codes.

Schedule & Milestones:
FY 2012

- Award St. Paul Island, AK Upper Air Inflation Shelter (UAIS)
- Award Koror renovation contract
- Award 2 HVAC replacement contracts

FY 2013

- Award WSO in Chuuk, Federated States of Micronesia renovation contract
- Award 2 HVAC replacement contracts

FY 2014

- Award Bethel, AK UAIS building contract
- Award King Salmon, AK UAIS building contract

FY 2015

- Award Kodiak, AK UAIS building contract
- Award Kotzebue, AK UAIS building contract

FY 2016

- Award McGrath, AK UAIS building contract
- Award Cold Bay, AK UAIS building contract

Deliverables

- Alaska Facility Modernization
- Pacific Facility Modernization

Outyear Funding Estimates (BA in thousands)

WFO Construction	FY 2011 & Prior*	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	CTC	Total
Change from FY 2012 Base		3,150						
Total Request	121,326	3,150	TBD	TBD	TBD	TBD	TBD	TBD

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Activity: Procurement, Acquisition, and Construction
Subactivity: Construction

	Object Class	2012 Increase
11	Personnel compensation	
11.1	Full-time permanent	$0
11.3	Other than full-time permanent	0
11.5	Other personnel compensation	0
11.8	Special personnel services payments	0
11.9	Total personnel compensation	0
12	Civilian personnel benefits	0
13	Benefits for former personnel	0
21	Travel and transportation of persons	0
22	Transportation of things	0
23.1	Rental payments to GSA	0
23.2	Rental Payments to others	0
23.3	Communications, utilities and miscellaneous charges	0
24	Printing and reproduction	0
25.1	Advisory and assistance services	500
25.2	Other services	2,650
25.3	Purchases of goods & services from Gov't accounts	0
25.4	Operation and maintenance of facilities	0
25.5	Research and development contracts	0
25.6	Medical care	0
25.7	Operation and maintenance of equipment	0
25.8	Subsistence and support of persons	0
26	Supplies and materials	0
31	Equipment	0
32	Lands and structures	0
33	Investments and loans	0
41	Grants, subsidies and contributions	0
42	Insurance claims and indemnities	0
43	Interest and dividends	0
44	Refunds	0
99	Total obligations	3,150

Congressionally Directed Projects (Base Funding: 0 FTE and $14,000,000; Program Change: -0 FTE and -$14,000,000): NOAA requests a decrease of $14,000,000 to terminate the funding level that would continue under an annualized FY 2011 continuing resolution associated with the Congressionally directed projects identified in the Conference Report that accompanied the Consolidated Appropriations Act, 2010.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Activity: National Weather Service
Account: Procurement, Acquisition, and Construction

	Object Class	2012 Decrease
11	Personnel compensation	
11.1	Full-time permanent	$0
11.3	Other than full-time permanent	0
11.5	Other personnel compensation	0
11.8	Special personnel services payments	0
11.9	Total personnel compensation	0
12	Civilian personnel benefits	0
13	Benefits for former personnel	0
21	Travel and transportation of persons	0
22	Transportation of things	0
23.1	Rental payments to GSA	0
23.2	Rental Payments to others	0
23.3	Communications, utilities and miscellaneous charges	0
24	Printing and reproduction	0
25.1	Advisory and assistance services	-601
25.2	Other services	0
25.3	Purchases of goods & services from Gov't accounts	0
25.4	Operation and maintenance of facilities	0
25.5	Research and development contracts	0
25.6	Medical care	0
25.7	Operation and maintenance of equipment	0
25.8	Subsistence and support of persons	0
26	Supplies and materials	0
31	Equipment	0
32	Lands and structures	-13,399
33	Investments and loans	0
41	Grants, subsidies and contributions	0
42	Insurance claims and indemnities	0
43	Interest and dividends	0
44	Refunds	0
99	Total obligations	-14,000

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