

## **BUDGET ACTIVITY: NATIONAL WEATHER SERVICE**

For FY 2013, NOAA requests a net decrease of \$29,776,000 and 101 FTE below the FY 2013 base program for a total of \$972,193,000 and 4,548 FTE for the National Weather Service (NWS). The requested funding includes \$10,095,000 and 0 FTE in inflationary adjustments.

### **BASE JUSTIFICATION FOR FY 2013**

The NWS Operations, Facilities, and Research base (\$910,859,000 and 4,623 FTE) includes the following subactivities:

- Operations and Research (\$808,807,000 and 4,435 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, warnings, and outlooks to the Nation.
- Systems Operation and Maintenance (\$102,052,000 and 188 FTE) includes the operation of systems such as the Advanced Weather interactive Processing System (AWIPS), the Next Generation Radar (NEXRAD), the Automated Surface Observing System (ASOS) and others that collect and process the observations necessary to provide weather forecasts, warnings, and outlooks.

Procurement, Acquisition, and Construction (PAC) activities (\$91,110,000 and 26 FTE) include the following subactivities:

- Systems Acquisition (\$87,960,000 and 26 FTE) includes the AWIPS II Extended which will add new capabilities and improve ways for forecasters to access and visualize meteorological information and NWS' operational High Performance Computing (HPC) capability, which is used to run all of NOAA's operational weather models.
- Construction (\$3,150,000 and 0 FTE) includes upgrades and improvements to NOAA's WFO's and Weather Service Offices (WSO).

The 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.

NWS is committed to enhancing observation capabilities by: (1) improving data assimilation that effectively uses all the relevant data NWS and others collect; (2) improving collaboration with the research community through creative approaches such as community modeling; by rapidly transforming scientific advances in modeling into improved operational products; (3) improving the techniques used by our expert forecasters; (4) making NWS information available quickly, efficiently, and in a useful form (e.g., the National Digital Forecast Database); (5) including information on forecast uncertainty to help customers make better-informed decisions; (6) taking advantage of emerging technologies to disseminate this information; and (6) 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 severe 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 the Office of Operational Systems Network (OPSnet). 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.

#### **Research and Development Investments:**

The NOAA FY 2013 Budget estimates for its activities, including research and development programs, are the result of an integrated requirements based strategic planning process and subject to on-going budget constraints. 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 \$21,637, 000 for investments in R&D and infrastructure to support R&D in the FY 2013 budget.

NOAA's R&D planning is tied to the goals, enterprises, and associated objectives outlined in NOAA's Next Generation Strategic Plan. Specifically, NOAA's Science and Technology Enterprise and underlying objectives of holistic understanding of the Earth system through research; accurate and reliable data from observing systems; and an integrated environmental modeling system, provide the basis for a set of internal implementation plans covering a 7-year period which guide NOAA's research and development activities. The NOAA Research Council - an internal body composed of senior scientific personnel from every line office in the agency - informs the annual updates to these implementation plans, and is developing the next 5-Year Research and Development Plan for NOAA (FY2013- 2018), which will be publicly available when completed. This new plan will reflect NOAA's strategic objectives, provide a single guiding document for our scientists, the public, and our partners, and inform future internal planning efforts.

**Significant Adjustments-to-Base (ATBs):**

NOAA requests a net increase of \$10,095,000 and 0 FTE to fund adjustments to current programs for NWS. The increase will fund the estimated 2013 Federal pay raise of 0.5 percent. 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         | NEXRAD Product Improvement (PAC) | NWS       | Local Warnings & Forecasts (ORF) | \$0/<br>5 FTE        |

NWS requests a technical adjustment to move 5 FTE from the NEXRAD Product Improvement program in PAC to the Local Warnings & Forecasts program in ORF. This adjustment refocuses the FTE working on the NEXRAD Product Improvement (PI) program to other LWF activities, following the planned termination of that program.

**Administrative Cost Savings:**

The Administration is continuing its pursuit of an aggressive government-wide effort to curb non-essential administrative spending. As a result, the Department of Commerce continues to seek ways to improve the efficiency of programs without reducing their effectiveness. The Department's total savings target for FY 2013 is \$176 million, which includes \$142.8 million in savings initiated in FY 2012 and an additional \$33.2 million planned for FY 2013. Building on NWS' administrative savings planned for FY 2012 (\$13.3 million), an additional \$9.7 million in savings is targeted for FY 2013 for a total savings in FY 2013 of \$23.1 million.

**Headquarters Administrative Costs:**

In FY 2013, NWS Line Office headquarters will use \$21,653,700 in funds 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. Specifically, NWS will use headquarters administrative funds to support the following:

| <b>Headquarters Program Support Type</b>            | <b>Description</b>  | <b>FY 2013 Amount</b> | <b>FY 2013 FTE associated with NWS HQ</b> |
|---|---|-----------------------|---|
| General Management & Direction/Executive Management | Includes Assistant Administrator's office, public affairs, information services | \$8,248,400           | 37.0                                      |
| Budget & Finance                                    | Includes Budget, Finance and Accounting   | \$5,165,700           | 22.0                                      |
| Information Technology                              | Includes IT-related expenses and other CIO related activities                   | \$2,867,000           | 17.0                                      |
| Facilities/Other Administrative (CAO Functions)     | Includes Facilities and Security costs, as well as other CAO related activities | \$3,673,400           | 6.0                                       |
| Human Resources                                     | All HR services, including EEO  | \$1,699,200           | 14.0                                      |
| <b>TOTAL</b>  |   | <b>\$21,653,700</b>   | <b>96.0</b>                               |

**Narrative Information:**

Following this section are base justification materials and program change narratives by subactivity for this line office. Please note that no program change narrative is provided for program changes of less than \$100,000, however, a summary exhibit is provided at the end of each subactivity showing the object class detail for the small program changes. Please contact the NOAA budget office if details for any of these changes are required.

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## **APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES**

### **SUBACTIVITY: OPERATIONS AND RESEARCH**

The objectives of the Operations and Research subactivity are to:

- Provide up-to-date and accurate weather forecasts, warnings, and outlooks to the Nation
- Support the emergency management community
- Engage in outreach and education activities to support public decisions

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 public, aviation, marine, fire weather, climate, 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 Weather Forecast Offices (WFO), 13 River Forecast Centers (RFC), 9 National Centers for Environmental Prediction (NCEP), and other support offices around the country. 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, Data, and Information Service (NESDIS), data buoys for marine observations, surface observing systems, and instruments for monitoring space weather. 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:

***Cooperative Observer Program (COOP):*** The National Weather Service (NWS) Cooperative Observer Program (COOP) is truly the Nation's weather and climate observing network of, by and for the people. More than 11,000 volunteers take observations on farms, in urban and suburban areas, National Parks, seashores, and mountaintops. The data are truly representative of where people live, work and play. The COOP was formally created in 1890 under the Organic Act. 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 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. Operations costs for the COOP network, such as labor, travel, and expendable materials, are funded within the Local Warnings and Forecasts Base. Sustainment and modernization activities for the COOP, such as

precipitation gauge and temperature sensor improvements, are funded within the Sustain Cooperative Observer Network PPA.

**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. Winds are measured by the instrument drift over the flight path. Pressure, temperature, wind and humidity data are significant sources for NWS weather prediction models and NWS forecaster operations, which are used to support severe storm, aviation and marine forecasts, and climate and other research uses. Radiosondes also serve to correct biases in satellite sounding data and as verification data for operational forecasts .

**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 and commercial and recreational fishing industry. 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 NCEP, including the Ocean Prediction Center, the Hydrological Prediction Center, and the National Hurricane Center (<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's (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 is 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 is provided for coastal hazards such as rip currents and high surf.

Over the next several years NWS plans to expand the National Digital Forecast Database (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.

**National Data Buoy Center (NDBC)** (<http://www.ndbc.noaa.gov>) operates a global network of over 200 observing platforms to provide marine meteorological, oceanographic and geophysical observations accurately and in real-time to assist warning centers, marine forecasters, the U.S. Coast Guard, ocean platform operators and the public in making sound decisions to safely operate in the marine environment.

NDBC's Weather and Ocean Platform network includes 101 moored buoys and 48 land-based coastal marine stations. They are deployed in the coastal and offshore waters from the western Atlantic to the Pacific Ocean around Hawaii, and from the Bering Sea to the South Pacific. 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 Coastal Marine Automated Networks (C-MAN) stations, measure sea surface temperature and wave height and wave period. Conductivity and water current are measured at some stations as well.

NDBC operates and maintains the Tropical Atmosphere Ocean (TAO) array, designed for the study of year-to-year climatic variations related to El Niño and the Southern Oscillation (ENSO). The array consists of 55 moored ocean buoys and 4 Acoustic Doppler Current Profilers (ADCP) in the equatorial Pacific. The buoys collect real-time air temperature; relative humidity; wind speed and direction; ocean temperature and pressure; however some buoys collect shortwave radiation; rainfall amounts; and ocean currents.

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 Weather and TAO 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. 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 issue Fire Weather Watches or a Red Flag Warnings based upon a prescribed set of criteria. These products alert not only the public, but other agencies that conditions are creating the potential for extreme fire behavior.

On the national level, the 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.

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. IMETs can be deployed anywhere a disaster strikes. There are 87 IMETs nationally with IMET equipment.

**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. 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.

**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 and develops techniques for forecasting solar and geophysical disturbances. The SWPC 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. The center serves many industries and private-sector clients, such as: the power industry, the airline industry, and satellite operators. SWPC also provides services to numerous government agencies including: the Federal Emergency Management Agency (FEMA), the Department of Defense (DoD), the Federal Aviation Agency (FAA), the Department of Energy (DOE), the Department of Homeland Security (DHS), and the National Aeronautics and Space Administration (NASA).

With a rapidly growing customer base and expanding interest in critical areas (airline safety, dependability and accuracy of GPS, reliability of electric power, and emerging commercialization of space), new demands for space weather information and services are emerging, modeling capabilities are critical to the meet these increasing demands. This investment will support the scientific development necessary to improve data assimilation, enhanced prediction tools, and model development capabilities for key components of the coupled earth-system modeling effort that will ultimately link weather phenomena, both space weather and terrestrial weather, into one unified modeling framework.

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

#### **Schedule & Milestones:**

##### **FY 2013**

- 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 2014**

- Space Weather products transitioned and operational on NWS AWIPS II
- 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 2015**

- Geospace model fully operational
- Cyclical replacement of IMET equipment

##### **FY2016**

- Steady state

##### **FY 2017**

- Whole Atmosphere Model (WAM) transitioned into operations
- Steady state

**Deliverables:**

- All NWS space weather products and data displays available through AWIPS II
- Improved geomagnetic disturbance forecasts available for the management of the Nation's electric power grid
- Improved forecasts of space weather conditions leading to communication and GPS outages
- 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:**

| <b>Performance Measure<sup>1</sup></b>               | <b>FY 11 Actual</b> | <b>FY 12 Target</b> | <b>FY 13 Target</b> | <b>FY 14 Target</b> | <b>FY 15 Target</b> | <b>FY 16 Target</b> | <b>FY 17 Target</b> |
|--|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Tornado Warnings Lead Time, Measure 15a              | 15                  | 13                  | 13                  | 13                  | 13                  | 13                  | 13                  |
| Tornado Warnings Accuracy, Measure 15a               | 75                  | 72                  | 72                  | 72                  | 72                  | 72                  | 72                  |
| Tornado Warnings False Alarm Ratio, Measure 15a      | 74                  | 72                  | 72                  | 72                  | 71                  | 71                  | 71                  |
| Flash Flood Warnings Lead Time, Measure 15b          | 73                  | 42                  | 45                  | 46                  | 47                  | 48                  | 48                  |
| Flash Flood Warnings Lead Accuracy, Measure 15b      | 79                  | 74                  | 74                  | 74                  | 76                  | 76                  | 76                  |
| Winter Storm Warnings Lead Time, Measure 15f         | 20                  | 19                  | 20                  | 20                  | 20                  | 20                  | 20                  |
| Winter Storm Warnings Accuracy, Measure 15f          | 88                  | 90                  | 90                  | 90                  | 90                  | 90                  | 90                  |
| Marine Wind Speed Forecast Accuracy, Measure 15g     | 75                  | 71                  | 72                  | 72                  | 72                  | 72                  | 72                  |
| Marine Wave Height Forecast Accuracy, Measure 15g    | 77                  | 75                  | 75                  | 75                  | 76                  | 76                  | 76                  |
| Aviation Forecast IFR Accuracy, Measure 15h          | 63                  | 65                  | 65                  | 65                  | 65                  | 65                  | 65                  |
| Aviation Forecast IFR False Alarm Ratio, Measure 15h | 39                  | 40                  | 38                  | 38                  | 38                  | 38                  | 38                  |
| Geomagnetic Storm Forecast Accuracy, Measure 15i     | -                   | -                   | 40                  | 40                  | 40                  | 40                  | 40                  |

<sup>1</sup> Descriptions of these GPRA measures are provided on pages 60-62.

### **AIR QUALITY FORECASTING**

In FY 2013, NOAA proposes to discontinue the development of the National Air Quality Forecasting Capability. Remaining funding will sustain on-demand dispersion forecasts of volcanic ash, transport of smoke, and forecast of emergency releases, supporting aviation affected by volcanic activity.

**The schedule, milestones, and deliverables for Air Quality Forecasting are provided with the program change requested for this activity.**

### **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:**

- Maintain Alaska Data Buoy array (FY 2013 – 2017)

#### **Deliverables:**

- Hourly marine weather wind speed and direction, air and sea temperature, atmospheric pressure, and detailed wave information

### **SUSTAIN COOPERATIVE OBSERVER NETWORK**

This continued investment maintains and modernizes the nationwide network of volunteer-operated weather observing sites, funding activities such as precipitation gauge and temperature sensor improvements. Operational costs, such as labor, travel, and expendable materials, for the COOP network are funded under the Local Warnings and Forecasts Base. 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 primary data utilized in the NWS model forecasts guidance for snowfall predictions. 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. The network's instruments require continued refreshment to ensure sustainability and accuracy. Base funding provides for maintenance activities, sustaining and modernizing equipment, as recommended by the National Research Council in 1998. In FY 2002, NWS began network refurbishment with the replacement of rain gauges and temperature sensors. Rain gauge refurbishment is estimated to be complete by the end of 2013.

**The schedule, milestones, and deliverables for Sustain Cooperative Observer Network are provided with the program change requested for this activity.**

### **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. Due to frequency interference that will occur when the European Galileo satellites become operational and the cost to refresh and convert the frequency of the NPN, by FY 2013 NOAA will only sustain three NPN sites located in Alaska that are operating outside of the interfered frequency band.

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

### **STRENGTHEN U.S. TSUNAMI WARNING PROGRAM**

Strengthen U.S. Tsunami Warning Program (SUSTWP) 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 issue tsunami watches and 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.

**The schedule, milestones, and deliverables for Strengthen U.S. Tsunami Warning Program are provided with the program change requested for this activity.**

### **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.

**Schedule & Milestones:**

FY 2013 - 2017:

- Provide weather warning, forecast, and observation services

**Deliverables:**

N/A

**ADVANCED HYDROLOGIC PREDICTION SERVICE (AHPS)**

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 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). Through AHPS, the NWS provides forecasts to all users of hydrologic predictions and meets AHPS Objectives (see above).

**Schedule & Milestones:**

- See Program Performance Measures and Deliverables below

**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:**

| <b>Performance Measure</b>  | <b>FY 2011</b> | <b>FY 2012</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|   | <b>Actual</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  |
| Total Forecast Locations with AHPS (#)  | 3,003          | 3,413          | 3,739          | 4,011          | 4,011          | 4,011          | 4,011          |
| <b>Description:</b> 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 the 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, 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 more than 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.

The acquisition of data from 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.

Economic activity attributed to civil aviation-related goods and services totaled \$1.3 trillion in 2009, generating 10.2 million jobs with \$394.4 billion in earnings. Aviation accounted for 5.2 percent of America's Gross Domestic Product. (See FAA's The Economic Impact of Civil Aviation on the U.S. Economy, August 2011). The Congressional Joint Economic Committee estimates that air traffic delays cost the U.S. Economy over \$41 Billion in 2007, of which 70% are related to adverse weather. The FAA has determined that two thirds of these weather delays are avoidable with better, more integrated weather information, reducing the number of delays by 46% 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 the demand for air traffic grows, air traffic delays and the associated economic toll will only increase.

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 use automated, rapidly updated gridded datasets to add value to guidance. 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 represents a coordinated effort spanning two line offices and three NOAA programs. It will result in a significant increase in weather prediction and dissemination capabilities with wide-ranging benefits across NOAA.

#### **Schedule & Milestones:**

FY 2013

- Award contract for NextGen 4-D Weather Data Cube development and implementation contractor
- Plan for enhanced aviation forecast processes to meet emerging NextGen forecast performance requirements
- Implement the World Area Forecast Centers gridded forecast products for icing
- Acquire additional water vapor data via aircraft observation
- Meet WMO requirement for certification of aviation weather forecasters
- Develop automated and gridded aviation weather elements including ceiling, visibility, and convection

#### FY 2014

- NextGen 4-D Weather Data Cube Critical Design Review
- Acquire additional water vapor data via aircraft observation
- Improve skill in aviation weather forecasting through training
- Implement gridded aviation weather elements

#### FY 2015

- OT&E and deployment of NextGen 4-D Weather Data Cube
- Implement high resolution models in NWS operations with available High Performance Computing resources
- Implement digital aviation services to provide consistent operational forecast products from gridded weather elements
- Develop improved volcanic ash modeling to enhance aviation safety
- Acquire additional water vapor data via aircraft observation

#### FY 2016

- Deploy Network Enabled Verification Service (NEVS) Phase 1
- Enhance ensemble and probabilistic modeling techniques for aviation parameters
- Develop prototype of dynamic Single Authoritative Source generation
- Complete implementation of Traffic Flow Management weather support solutions
- Acquire additional water vapor data via aircraft observation
- Improve skill in aviation weather forecasting through training

#### FY 2017

- Extend NEVS technology for access to real-time verification information
- Optimize 4-D Weather Data Cube to accommodate additional data providers, users and increase data throughput

#### **Deliverables/Outputs:**

- 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
- Distance Learning Aviation Course (DLAC) modules 3 and 4
- Acquire water vapor data from aircraft for increased granularity and greater accuracy in numerical models

#### **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.

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

### **NOAA WEATHER RADIO TRANSMITTERS BASE**

NOAA Weather Radio (NWR) was designed to be used as a reliable, inexpensive means of communicating weather related warnings directly to the public. The existing infrastructure of NWR has tremendous potential for use communicating warnings and information about non-weather related hazards and emergencies. NOAA has had extensive meetings with the Department of Homeland Security, discussing the use of NWR as an all hazards warning system. NWS received an appropriation of \$5.4 million in FY 2004 to make NWR an all hazard warning network. NWR infrastructure as a national warning network consists of over 1000 existing broadcast stations; broadcast coverage that reaches 98 percent of the nation's population; and the ability to deliver the broadcasted message to individuals monitoring their own NWR receivers as well as the ability to reach millions of listeners and viewers since NWR signal enters the Emergency Alert System, which is monitored by television and radio license holders.

Program resources are used to fund management and contract costs for the NWR sites maintained under the National Maintenance Contract. No FTEs are associated with this program.

NWR is the only NWS dissemination system capable of reaching individuals at nominal cost (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 Federal 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 NWR.

### **Schedule & Milestones:**

**FY 2013 – FY 2017:** Maintain NWR services

### **Deliverables:**

- 405 Sites x 3/year Preventative Maintenance and/or Corrective Action Visits
- 841 Sites Logistics and Spare Parts Provisioning and Line Replaceable Unit Repair Support

### **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 seven 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.

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 seven centers that are proposed to be funded through CFG in FY 2013 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.

**Climate Prediction Center (CPC)** (<http://www.cpc.noaa.gov/index.php>), located in Camp Springs, Maryland, includes a broad range of climate products and services related to climate monitoring, short-term climate fluctuation forecasts, and information on the impacts of climate patterns on the nation. Their product suite spans time scales from a week to seasons, extending into the future as far as technically feasible, and covers the land, the ocean, and the atmosphere, extending into the stratosphere. These climate services are available for users in government, the public and private industry. Applications include the mitigation of weather-related natural disasters and uses for social and economic good in agriculture, energy, transportation, water resources, and health. Continual product improvements are supported through diagnostic research, increasing use of models, and interactions with user groups.

Additionally, WFOs issue daily and monthly climate reports for their areas, providing localized information about temperature and precipitation records and extreme events such as droughts. WFOs serve as the local NOAA user interface for climate services, including outreach and education in this area. They are also the stewards for the integrity and continuity of the historical climate record in their area of responsibility.

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 **National Hurricane Center** (NHC) in Miami, Florida (<http://www.nhc.noaa.gov/>). Services provided by the 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, forecasters provide aviation and marine analyses and forecast products for the same areas of responsibility. The 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 NESDIS 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.

#### **Schedule & Milestones:**

##### NCEP Centers

FY 2013-2017

- Implement model upgrades routinely
- 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
- Energize testbeds at all centers to accelerate research into operations
- Integrate NextGen aviation weather program into NCEP operations, including contributions to the weather cube
- Expand availability of climate products through the climate portal
- Work with National Ocean Service to expand into ecological forecasting

##### HFIP

FY 2013 – FY 2017

- 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
- 100 to 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
- Issue over a thousand extended and long-range climate outlooks yearly

**Performance Goals and Measurement Data:**

| <b>Performance Measure</b>  | <b>FY 2011</b> | <b>FY 2012</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Accuracy (%) (Threat score) of Day 1 precipitation forecasts, Measure 15e | <b>Actual</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  |
|   | 34             | 31             | 31             | 32             | 32             | 33             | 33             |

**Description:** This performance measure tracks the ability of the weather forecasters of NOAA's Hydrometeorological Prediction Center (HPC) to predict accurately the occurrence of one inch or more of precipitation (rain or the water equivalent of melted snow or ice pellets) twenty-four hours in advance across the contiguous U.S. Through this measure, the HPC focuses on relatively heavy amounts of precipitation, usually a half inch or more in a 24-hour period (short-term flood and flash flood warnings), because of the major safety and economic impacts such heavy precipitation can have in producing flooding, alleviating drought, and affecting river navigation.

| <b>Performance Measure</b>                    | <b>FY 2011</b> | <b>FY 2012</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| US Seasonal Temp. Forecast Skill, Measure 16a | <b>Actual</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  |
|   | 22             | 21             | 22             | 23             | 24             | 25             | 26             |

**Description:** This is a measure of skill of NOAA's operational seasonal temperature forecasts where a higher numerical value for the measure implies an ability to better predict surface temperature variability over the U.S. Continued improvements in NOAA's ability to predict climate variability are reflected in an increasing positive value for this measure. For each three month period, seasonal outlooks for U.S. surface temperature are produced by NWS' Climate Prediction Center (CPC) and reported as either above normal, near normal, below normal or, where no definite seasonal guidance can be provided, equal chances. These forecasts are verified using a 48-month running mean of Heidke Skill scores computed for seasonal outlooks for each 3-month seasonal mean (e.g., January-February-March mean; February-March-April mean; March-April-May mean; and so on). It is calculated as follows: Heidke skill score:  $S = ((c-e)/(t-e)) \times 100$ , where c = number of grid points where forecast was correct and e = number of grid points expected to be correct by chance alone and t = total number of grid points where the forecast was made. The GPRA score is computed via an automated grid-based verification procedure. This technique verifies a gridded objective analysis of the forecast field against a gridded analysis of the observed verification field. This process treats the entire area of the lower 48 states objectively. The skill score varies from -50 to +100, representing perfect forecast skill.

| <b>Performance Measure</b>                            | <b>FY 2011</b> | <b>FY 2012</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 500 mb height anomaly for NCEP Global Forecast System | <b>Actual</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  |
|   | 0.869          | 0.866          | 0.872          | 0.875          | 0.875          | 0.900          | 0.900          |

**Description:** The weather forecast skill is assessed using a scientifically accepted measure, called 500 millibar (mb) anomaly correlation at 5 days. 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.

| <b>Performance Measure</b>                       | <b>FY 2011</b> | <b>FY 2012</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> |
|--|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Timeliness of Delivery for NCEP's model guidance | <b>Actual</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  |
|  | 99.5%          | 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.

| <b>Performance Measure</b>                                     | <b>FY 2011</b> | <b>FY 2012</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> |
|--|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Timeliness of Delivery for NCEP Centers' products and services | <b>Actual</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  |
|  | 98%            | 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.

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

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## **PROGRAM CHANGES FOR FY 2013:**

**Local Warnings and Forecasts Base: Tropical Atmosphere Ocean Array (Base Funding: \$4,291,000 and 0 FTE; Program Change: +\$2,400,000 and +0 FTE):** NOAA requests an increase of \$2,400,000 and 0 FTE for a total of \$6,691,000 and 0 FTE to increase the operations and maintenance of Tropical Atmosphere Ocean (TAO) buoys, to achieve an 80% data availability standard.

### **Proposed Actions:**

NOAA proposes to increase ongoing operations and maintenance (O&M) of the TAO array to meet full O&M needs. With this increase, NOAA will be able to maintain a data return rate of 80%. The current budget profile does not support the full O&M cost of the 55 NWS TAO buoys, including parts, labor, and services for replacement and spare equipment, sensor calibration, equipment preparation, data analysis and distribution, field service, and logistics.

Without this increase, NOAA will be at 50 percent data availability in FY 2013 for the TAO network with a continual decrease annually while optimal data availability is 80 percent annually. The inability to maintain the array and provide optimal observations will affect NOAA's ability to produce accurate forecasts and predictions related to El Niño and La Niña phenomena.

### **Statement of Need and Economic Benefits:**

Data provided via the TAO network directly contributes to the prediction of El Niño and La Niña. Accurate prediction of the onset of El Niño and La Niña allows mitigation actions to be taken in agriculture, fishing, and human health. Mitigating the economic and health impacts of these events and anticipating increases in other weather-related disasters associated with them, such as landslides, flooding, brush and forest fires, tornados, and hurricanes, can have consequences in terms of dollars and lives and are of vital concern to constituents. The societal and economic benefits of prediction of El Niño and La Niña include reduction in loss of life and property from disasters; improved understanding of the effects of environmental factors on human health and well being; improved understanding, assessment, prediction, mitigation and adaption to climate variability and change; improved protection and monitoring of ocean resources; improved monitoring and management of energy resources; further protection and monitoring of water resources; improved weather information, forecasting, and warning; further development of the capacity to make ecological (terrestrial, coastal, and marine) forecasts; and increased support for sustainable agriculture and tools to combat land degradation. Important operational decisions made within industries such as agriculture and utilities can be improved based on seasonal El Niño/Southern Oscillation (ENSO) forecasts (NOAA Economics). Research estimates that ENSO forecasting may benefit agriculture decision-making in the U.S., resulting in a net economic value between \$507-\$959 million/year (Chen et al. 2002). In addition, improved long-range weather forecasts of ENSO and the Pacific Decadal Oscillation (PDO) has been valued at \$161 million/year, as derived from more efficient reservoir operations and hydropower sales on spot markets of electric, gas, and sanitary services (Hamlet et al., 2002).

### **Base Resource Assessment:**

The base resources for this activity are described in the Local Warnings and Forecasts base narrative.

### **Schedule and Milestones:**

- Conduct routine buoy operations and maintenance.

| <b>Milestones</b>  | FY 2012 | FY 2013 | FY 2014 | FY 2015 | FY 2016 | FY 2017 |
|--|---------|---------|---------|---------|---------|---------|
| Operational Refreshed TAO stations deployed (Total #/yr) | 11      | 11      | 11      | 11      | 0       | 0       |
| Refreshed TAO stations deployed (Cum Total #)*           | 26      | 37      | 48      | 59      | 59      | 59      |

\*includes 4 moored Acoustic Doppler Current Profilers (ADCPs) refreshed at the end of FY 2011

**Deliverables:**

- Reach and maintain data availability level of 80 percent

**Performance Goals and Measurement Data:**

| <b>Performance Measure:</b>  | <b>FY 2011</b> | <b>FY 2012</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> |
|--|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Observational Data Availability of TAO Network (% Annually)  | <b>Actual</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  |
| <b>With Increase</b>   | -              | -              | 80%            | 80%            | 80%            | 80%            | 80%            |
| <b>Without Increase</b>  | 82%            | 62%            | 50%            | 45%            | 45%            | 45%            | 45%            |
| <b>Description:</b> This measure captures the data return from the TAO array expressed as percent available annually. This measure assumes the approximately 278 ship days needed for TAO servicing and maintenance. |                |                |                |                |                |                |                |

| <b>Performance Measure:</b>  | <b>FY 2011</b> | <b>FY 2012</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> |
|--|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| % Complete Refresh of TAO Stations (cum %)   | <b>Actual</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  |
| <b>With Increase</b>   | -              | -              | 54%            | 69%            | 100%           | 100%           | 100%           |
| <b>Without Increase</b>  | 20%            | 40%            | 40%            | 40%            | 40%            | 40%            | 40%            |
| <b>Description:</b> This measure captures the completion of the TAO buoy network refresh expressed as a cumulative percentage. This measure assumes approximately 278 ship days for TAO servicing and maintenance. |                |                |                |                |                |                |                |

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

Activity: National Weather Service  
Subactivity: Operations and Research

| <b>Object Class</b>                                      | <b>2013<br/>Increase</b> |
|--|--------------------------|
| 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                        | <u>0</u>                 |
| 12 Civilian personnel benefits                           | 0                        |
| 13 Benefits for former personnel                         | 0                        |
| 21 Travel and transportation of persons                  | 64                       |
| 22 Transportation of things                              | 250                      |
| 23.1 Rental payments to GSA                              | 0                        |
| 23.2 Rental Payments to others                           | 0                        |
| 23.3 Communications, utilities and miscellaneous charges | 65                       |
| 24 Printing and reproduction                             | 0                        |
| 25.1 Advisory and assistance services                    | 0                        |
| 25.2 Other services                                      | 1,071                    |
| 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                                | 450                      |
| 31 Equipment   | 500                      |
| 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                                     | <u>2,400</u>             |

**Local Warnings & Forecasts Base: Operational and Organizational Efficiencies in Information Technology (Base Funding: 4,093 FTE and \$639,905,000; Program Change: - 0 FTE and -\$2,000,000):** NOAA requests a decrease of 0 FTE and \$2,000,000 for a total of \$637,905,000 to reduce organizational costs through Information Technology (IT) consolidation and related efficiencies.

**Proposed Actions:**

NWS is implementing a consolidation and re-architecture initiative across its IT enterprise. NWS is in the midst of several significant IT efforts including: the re-architecture of its Telecommunications Gateway; ground system preparation for new satellite systems; the Next Generation Air Transportation System (NextGen); the Advanced Weather Interactive Processing System (AWIPS); and the re-compete of the Weather and Climate Operational Supercomputing System (WCOS) contract. With these major IT efforts, NWS has the unique opportunity to address and implement a more effective and cost conscious enterprise architecture which will lead to lower IT Operations & Maintenance (O&M) costs.

In FY 2013, NWS will implement various cost savings initiatives through streamlining requirements, elimination of redundant and duplicative requirements and use of proven, best practices from the IT community. NWS will execute these approaches with flexibility in order to meet the targeted reduction. NWS programs and activities will pay for enterprise IT solutions, rather than each organization independently purchasing to support their needs, resulting in savings for NOAA.

In the near term, these efficiencies will result in operations less dependent on contractor work and IT equipment requiring fewer replacements in the near-term and outyear service levels.

**Base Resources Assessment**

The base resource assessment is provided in the Operations & Research base narrative.

**Schedule & Milestones:**

FY 2012

- Assess best industry practices
- Finalize consolidation plans

FY 2013

- Initiate implementation of consolidation

**Deliverables:**

- Streamlined enterprise architecture
- Reduced replacement needs

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

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

| <b>Object Class</b>                                      | <b>2013<br/>Decrease</b> |
|--|--------------------------|
| 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                        | <u>0</u>                 |
| 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                                      | (500)                    |
| 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   | (1,500)                  |
| 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                                     | <u>(2,000)</u>           |

**Local Warnings & Forecasts Base: National Data Buoy Center (NDBC) Sustainment (Base**

**Funding: 40 FTE and \$28,272,000; Program Change: -0 FTE and -\$2,000,000):** NOAA

requests a decrease of 0 FTE and \$2,000,000 for a total of \$26,272,000 to reduce the Coastal Data Buoy sustainment program within the NDBC. The program includes Coastal Weather Data Buoys (CWB) and Coastal-Marine Automated Network (C-MAN) stations.

**Proposed Actions:**

NWS proposes to reduce funding for buoy sustainment to a level that will achieve and sustain 73 percent data availability by FY 2014 - a four percent increase in data availability compared to FY 2011. Reduced funding will delay routine operations and maintenance and failure response, and slow design and procurement of environmentally-safe moorings. At this level, NDBC will continue to provide marine meteorological, oceanographic and geophysical observations accurately and in real-time to assist warning centers, marine forecasters, the U.S. Coast Guard, ocean platform operators and the public in making sound decisions to safely operate in the marine environment.

**Base Resources Assessment:**

The base resources for this activity are described in the Operations & Research base narrative.

**Schedule & Milestones:**

FY 2013 - 2017

- Conduct buoy operations & maintenance
- Engineering and design activities for new moorings and components
- As funding permits, address backlogged buoy maintenance

**Deliverables:**

- Reach and maintain data availability level of 73 percent
- Procure new moorings and components

**Performance Goals and Measurement Data**

| <b>Performance Measure:</b>   | <b>FY 2011</b> | <b>FY 2012</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Data availability of C-MAN and weather buoys  | <b>Actual</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  |
| <b>With decrease</b>  | -              | 65%            | 70%            | 73%            | 73%            | 73%            | 73%            |
| <b>Without decrease</b>   | 69%            | 65%            | 70%            | 75%            | 80%            | 80%            | 80%            |
| <b>Description:</b> Perform deferred maintenance in order to prevent additional performance degradation and to maintain the network performance to its required operating capacity. |                |                |                |                |                |                |                |

| <b>Performance Measure:</b>   | <b>FY 2011</b> | <b>FY 2012</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Number of quality controlled marine observations (millions)                 | <b>Actual</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  |
| <b>With decrease</b>  | -              | 1.70           | 1.82           | 1.90           | 1.90           | 1.90           | 1.90           |
| <b>Without decrease</b>   | 1.80           | 1.70           | 1.82           | 1.95           | 2.10           | 2.10           | 2.10           |
| <b>Description:</b> 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

| <b>Object Class</b> |   | <b>2013<br/>Decrease</b> |
|---------------------|---|--------------------------|
| 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                        | <u>0</u>                 |
| 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                    | (200)                    |
| 25.2                | Other services                                      | (800)                    |
| 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                                   | <u>(2,000)</u>           |

**Local Warnings and Forecasts Base: Establishment of Regional Information Technology (IT) Collaboration Units (Base Funding: 122 FTE and \$12,126,550; Program Change: -98 FTE and -\$9,741,000):** NOAA requests a decrease of 98 FTE and \$9,741,000 for a total of \$2,385,550 and 24 FTE to reflect the transition to a new IT service delivery model to the NWS forecast offices.

**Proposed Actions:**

In FY 2013, the National Weather Service (NWS) will consolidate 122 Information Technology Officer (ITO) FTEs from each WFO into NWS's regional offices. With technological improvements, such as with Advanced Weather Interactive Processing System (AWIPS), NWS has gained the ability to fulfill much of the ITO responsibilities remotely, including systems analysis and software modifications and updates. These technology efficiencies enable NWS to reduce its workforce without impact to its mission to protect lives and property and enable the agency to provide a higher degree of consistency of service delivery.

Through this consolidated approach NWS will eliminate all ITO positions currently located at each WFO. In turn, 24 equivalent positions will be established across all NWS regions to form the IT collaboration units. NWS will make every effort to reduce ITO staffing through attrition across the entire organization. Many current ITOs can qualify for other NWS positions, such as meteorologists or electronics systems analysts. In addition, NWS will explore opportunities for early out and voluntary separation incentives for interested individuals.

The regional IT collaboration units will have responsibility in the three primary areas which the ITOs currently manage: enterprise compatible application development and integration; information technology management; and systems analysis. These units will ensure the working order of all computer applications and software, including regular maintenance and installation of new software. The IT collaboration units will be available to each WFO as a source of software and information technology expertise.

**Base Resources Assessment**

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

**Schedule & Milestones:**

FY 2012

- Finalize consolidation plans
- Begin ITO consolidation

FY 2013

- Complete ITO consolidation
- Staff IT collaboration units

**Deliverables:**

- 4 contiguous United States IT collaboration units
- 2 outside the contiguous United States IT focal points

**PROGRAM CHANGE PERSONNEL DETAIL**

Activity: National Weather Service

Subactivity: Operations & Research

| <b>Title:</b>                   | <b>Location</b> | <b>Grade</b> | <b>Number<br/>of Positions</b> | <b>Annual<br/>Salary</b> | <b>Total<br/>Salaries</b> |
|---------------------------------|-----------------|--------------|--------------------------------|--------------------------|---------------------------|
| Information Technology Officer  | Various*        | GS-13        | -98                            | -81,823                  | 8,018,654                 |
| <b>Total</b>                    |                 |              | <u>-98</u>                     |                          | <u>8,018,654</u>          |
| less Lapse                      |                 | 25%          | 0                              |                          | 0                         |
| Total full-time permanent (FTE) |                 |              | <u>-98</u>                     |                          | <u>8,018,654</u>          |
| FY 2012 Pay Adjustment (0%)     |                 |              |                                |                          | 0                         |
| FY2013 Pay Adjustment (0.5%)    |                 |              |                                |                          | 0                         |
| <b>TOTAL</b>                    |                 |              |                                |                          | <u>8,018,654</u>          |

**Personnel Data**

|                                 | <u>Number</u> |
|---------------------------------|---------------|
| Full-Time Equivalent Employment |               |
| Full-time permanent             | -98           |
| Other than full-time permanent  | 0             |
| <b>Total</b>                    | <u>-98</u>    |
| Authorized Positions:           |               |
| Full-time permanent             | -98           |
| Other than full-time permanent  | 0             |
| <b>Total</b>                    | <u>-98</u>    |

\*Based on "Rest of US" pay scale

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

Activity: National Weather Service  
Subactivity: Operations & Research

| <b>Object Class</b>                                      | <b>2013<br/>Decrease</b> |
|--|--------------------------|
| 11 Personnel compensation                                |                          |
| 11.1 Full-time permanent                                 | (\$8,019)                |
| 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                        | <u>(8019)</u>            |
| 12 Civilian personnel benefits                           | (1,722)                  |
| 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                                | 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                                     | <u>(9,741)</u>           |

**Air Quality Forecasting: Reduction to the National Air Quality Forecasting Capability (Base Funding: \$3,987,000 and 0 FTE; Program Change: -\$3,122,000 and 0 FTE):** NOAA requests a decrease of \$3,122,000 and 0 FTE for a total of \$865,000 and 0 FTE to discontinue the National Air Quality Forecasting Capability (NAQFC). Remaining funding will sustain on-demand dispersion forecasts of volcanic ash, transport of smoke, and forecast of emergency releases, supporting aviation affected by volcanic activity.

**Proposed Actions:**

NOAA proposes to terminate the NAQFC, which provides air quality forecasts of ozone and particulate matter, and redirect funding to other priorities in the National Weather Service that are more aligned to NOAA's core mission. The Environmental Protection Agency (EPA) and state and local agencies use the NOAA model guidance in conjunction with data and models generated at the local level to provide air quality health alerts to the public. Remaining funding will sustain the on-demand, operational dispersion forecasts of volcanic ash, transport of smoke, and forecast of emergency releases. Funding will support operational maintenance of a radiological and volcanic ash plume pollution dispersion model, called the Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT).

The EPA, through the Office of the Air Quality Planning and Standards and Office of Air Radiation, has the legislative mandate to implement the Clean Air Act (CAA). In 2008, NOAA entered into a five year agreement to provide air quality research and operational modeling in support of CAA requirements for the National Ambient Air Quality Standards and State Implementation Plans. This agreement expires in 2013.

The National Weather Service proposes the following:

- Discontinue national numerical air quality forecast guidance including ozone prediction, currently operational in 50 states, which is used by EPA for health-based air quality index summaries, and by state and local agencies who issue Air Quality Index (e.g. code orange) forecasts
- Discontinue support for continued research and development of air quality models and chemical data assimilation including those efforts focused on aerosol, dust, and particulate matter prediction

**Base Resources Assessment:**

The base resources for this activity are described in the Local Warnings and Forecasts base narrative.

**Schedule & Milestones:**

- Direct NWS support for air quality forecast guidance will be terminated in FY 2013
- Direct NWS support for Air Quality Index will be terminated in FY 2013
- Forecast operations for Alaska volcanic ash, Alaska smoke, and emergency releases nationwide maintained (2013 – 2017)

**Deliverables:**

- Volcanic ash forecast in Alaska
- Smoke predictions in Alaska
- On demand forecast of emergency releases nationwide

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

Activity: National Weather Service  
Subactivity: Operations & Research

| <b>Object Class</b>                                      | <b>2013<br/>Decrease</b> |
|--|--------------------------|
| 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                        | <u>0</u>                 |
| 12 Civilian personnel benefits                           | 0                        |
| 13 Benefits for former personnel                         | 0                        |
| 21 Travel and transportation of persons                  | (42)                     |
| 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                                      |                          |
| 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                  | (913)                    |
| 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   | (2,167)                  |
| 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   | <u>0</u>                 |
| 99 Total obligations                                     | <u>(3,122)</u>           |

**Sustain Cooperative Observer Network (Base Funding: \$1,865,000 and 0 FTE; Program Change: -\$867,000 and 0 FTE):** NOAA requests a decrease of \$867,000 and 0 FTE for a total of \$998,000 and 0 FTE to Sustain the Cooperative Observer Network.

**Proposed Actions:**

In FY 2013, NWS will complete the installation of the Fischer & Porter Rain Gauge Replacements (FPR). NWS will delay by one year the purchase of wireless thermometer systems and air and water temperature sensors required to complete the network modernization. In addition, NWS will delay the conversion of Network data into a digital format for archiving at the National Climatic Data Center. However, all data will continue to be preserved.

The requested funding provides required sustainment and modernization activities, as recommended by the National Research Council in 1998.

**Base Resources Assessment:**

The base resources for this activity are described in the Operations and Research base narrative.

**Schedule & Milestones:**

FY 2013

- Final Fischer & Porter Rain Gauge Replacements (FPR) installed
- Purchase and install replacement Cotton Region Shelters for field use until wireless sensors are deployed

FY 2014

- Purchase and installation of 200 wireless thermometer systems
- Purchase 50 pan evaporation water temperature sensors
- Purchase 100 soil temperature sensors

FY 2015

- Purchase and installation of 200 wireless thermometer systems
- Purchase 50 pan evaporation water temperature sensors
- Purchase 100 soil temperature sensors

FY 2016

- Purchase and installation of 200 wireless thermometer systems
- Purchase 50 pan evaporation water temperature sensors
- Purchase 100 soil temperature sensors

FY 2017

- Purchase and installation of 200 wireless thermometer systems
- Purchase 50 pan evaporation water temperature sensors
- Purchase 100 soil temperature sensors

**Deliverables:**

- FPR project complete – total installed 2,298 – project completed with spares in stock
- Install 800 of needed 3,000 wireless thermometer systems
- Install 200 of needed 330 pan evaporation water temperature sensors
- Install 400 of needed 1,600 soil temperature sensors

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

Activity: National Weather Service  
Subactivity: Operations & Research

| <b>Object Class</b>                                      | <b>2013<br/>Decrease</b> |
|--|--------------------------|
| 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                        | <u>0</u>                 |
| 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                                      | (867)                    |
| 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                                     | <u>(867)</u>             |

**NOAA Profiler Network (Base Funding: \$4,228,000 and 7 FTE; Program Change: - \$2,417,000 and -3 FTE):** NOAA requests a decrease of \$2,417,000 and 3 FTE for a total of \$1,811,000 and 4 FTE in its NOAA Profiler Network (NPN) Program to continue operations and maintenance support of three profilers located in Alaska.

**Proposed Actions:**

Given current plans to turn off wind profilers that will experience operating frequency interruptions once the European Galileo satellites are launched, less funding is needed for NPN Operations and Maintenance (O&M). Thus, NOAA proposes to significantly decrease its NPN O&M, using remaining funds to support three critical profilers located in Alaska that have been converted to new frequencies to avoid interference with the Galileo satellites. The cost to support these three profilers in Alaska is as follows:

|                           |                      |
|---------------------------|----------------------|
| Labor (4 FTE):            | \$0.68 million       |
| Operations:               | \$0.69 million       |
| Maintenance:              | \$0.43 million       |
| <b>Total annual cost:</b> | <b>\$1.8 million</b> |

Originally developed and deployed by NOAA’s Office of Atmospheric Research, the Alaska NPN consists of three Doppler radar sites that provide vertical wind profile data. This data is utilized as a forecast tool to validate numerical weather model information and to provide fidelity in forecast parameters which support public and aviation weather warnings in Alaska. The most critical use of the Alaska profiler network is to support the production of aviation warnings of volcanic ash, as ash can cause catastrophic engine failure for aircraft in flight; there are over 100 volcanoes in Alaska - 40 of which are considered active.

The data are also used to evaluate the strength and timing of down-slope wind events along the Alaska Range (e.g., major fire weather and aviation hazards, as well as impacts to the Valdez Oil Terminal) and determine the potential for heavy snow events and blizzards affecting the Anchorage area, the largest population center in the state. The data are also used in the preparation of weather forecasts for Mt. McKinley (elevation ~21,000 ft) that are used to support search and rescue missions in Denali National Park, as visitors from around the world attempt to climb North America's highest peak.

**Base Resources Assessment:**

The base resources for this activity are described in the Operations and Research base narrative.

**Schedule & Milestones:**

- Steady State

**Deliverables:**

- Operational NPN in Alaska

**PROGRAM CHANGE PERSONNEL DETAIL**

Activity: National Weather Service

Subactivity: Operations & Research

| <b>Title:</b>                   | <b>Location</b> | <b>Grade</b> | <b>Number<br/>of Positions</b> | <b>Annual<br/>Salary</b> | <b>Total<br/>Salaries</b> |
|---------------------------------|-----------------|--------------|--------------------------------|--------------------------|---------------------------|
| Electronics Engineer            | Boulder, CO     | GS-14        | -1                             | 105,211                  | (105,211)                 |
| Physical Scientist              | Boulder, CO     | GS-14        | -1                             | 105,211                  | (105,211)                 |
| IT Specialist                   | Boulder, CO     | GS-14        | -1                             | 105,211                  | (105,211)                 |
| <b>Total</b>                    |                 |              | <u>-3</u>                      |                          | <u>(315,633)</u>          |
| less Lapse                      |                 | 25%          | <u>0</u>                       |                          | <u>0</u>                  |
| Total full-time permanent (FTE) |                 |              | -3                             |                          | (315,633)                 |
| FY 2012 Pay Adjustment (0%)     |                 |              |                                |                          | 0                         |
| FY2013 Pay Adjustment (0.5%)    |                 |              |                                |                          | 0                         |
| <b>TOTAL</b>                    |                 |              |                                |                          | <u>(315,633)</u>          |

**Personnel Data**

|                                 | <u>Number</u> |
|---------------------------------|---------------|
| Full-Time Equivalent Employment |               |
| Full-time permanent             | -3            |
| Other than full-time permanent  | 0             |
| Total                           | <u>-3</u>     |
| Authorized Positions:           |               |
| Full-time permanent             | -3            |
| Other than full-time permanent  | 0             |
| Total                           | <u>-3</u>     |

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

Activity: National Weather Service  
Subactivity: Operations & Research

| <b>Object Class</b>                                      | <b>2013<br/>Decrease</b> |
|--|--------------------------|
| 11 Personnel compensation                                |                          |
| 11.1 Full-time permanent                                 | (\$316)                  |
| 11.3 Other than full-time permanent                      | 0                        |
| 11.5 Other personnel compensation                        | (7)                      |
| 11.8 Special personnel services payments                 | 0                        |
| 11.9 Total personnel compensation                        | <u>(323)</u>             |
| 12 Civilian personnel benefits                           | (127)                    |
| 13 Benefits for former personnel                         | 0                        |
| 21 Travel and transportation of persons                  | (2)                      |
| 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                    | (1,411)                  |
| 25.2 Other services                                      | (554)                    |
| 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                                     | <u>(2,417)</u>           |

**Strengthen U.S. Tsunami Warning Program (Base Funding: \$23,466,000 and 19 FTE; Program Change: -\$4,554,000 and 0 FTE):** NOAA requests a decrease of \$4,554,000 and 0 FTE for a total of \$18,912,000 and 19 FTE. This reduction terminates NOAA's partner funding for education and awareness programs to the National Tsunami Hazard Mitigation Program (NTHMP) within the Strengthen U.S. Tsunami Warning Program (SUSTWP) and reduces funding for maintenance of the DART buoy network.

**Proposed Actions:**

NOAA proposes to terminate grant funding supporting local education, awareness, and inundation and evacuation map development within the National Tsunami Hazard Mitigation Program (NTHMP). In addition, NOAA proposes to increase the time between scheduled maintenance intervals for the DART buoy network, which is expected to lower network data availability from 80 percent to 72 percent. NOAA will continue to fund critical components within the SUSTWP in order to ensure timely and accurate tsunami advisories and warnings. This includes:

- Support for the operation of Tsunami Warning Centers (Pacific Tsunami Warning Center and West Coast and Alaska Tsunami Warning Center, \$3.0M);
- The operations, maintenance, and lifecycle management of the Deep-Ocean Assessment and Reporting of Tsunamis (DART) buoy network (\$11.5M);
- The sustainment of critical observing system networks and the operations and maintenance of (tsunami-reporting) seismic sensors and sea-level stations (\$1.3M);
- The NOAA TsunamiReady Program (\$0.8M)
- The continued transition of Tsunami inundation forecast models to operations (\$1.8M);
- And the O&M support for NOAA's International Tsunami Information Center (ITIC) and archiving of tsunami data (\$0.5M).

The lower data availability of the DART network will not impact the issue of warnings; however, without these data, warnings may extend to a larger area than necessary and for a longer time. NOAA will continue to provide support to the NTHMP by: setting standards of accuracy for NTHMP-developed inundation models; promoting community outreach and education networks to ensure community tsunami readiness; promoting the adoption of tsunami warning and mitigation measures by Federal, State, tribal, and local governments and non-government entities; conducting tsunami research; and operating the U.S. Tsunami Forecasting and Warning Program.

**Base Resources Assessment:**

The base resources for this activity are described in the Operations and Research base narrative.

**Schedule & Milestones:**

FY 2013 - 2017

- Operate Tsunami Warning Centers (Pacific Tsunami Warning Center and West Coast and Alaska Tsunami Warning Center)
- Operate, maintain, and conduct lifecycle management of DART buoy network
- Sustain critical observing system networks and the operations and maintenance of (tsunami-reporting) seismic sensors and sea-level stations
- Recognize TsunamiReady Communities

**Deliverables:**

- Operational Tsunami Warning Centers
- Operational DART buoy network
- Operational observing system network
- TsunamiReady Communities

**Performance Goals and Measurement Data:**

| <b>Performance Measure:</b> | <b>FY 2011</b> | <b>FY 2012</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> |
|-----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Tsunami Ready Communities   | <b>Actual</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  |
| With decrease               | -              | 100            | 103            | 106            | 109            | 112            | 115            |
| Without decrease            | 90             | 100            | 108            | 116            | 124            | 132            | 140            |

**Description:** This measure represents the cumulative number of communities that NOAA designates as being adequately prepared for a tsunami. As a voluntary program, the communities earn the designation through spreading awareness of tsunamis, educating community members, and improving emergency evacuation plans. NOAA has identified 784 communities that would benefit from becoming TsunamiReady.

| <b>Performance Measure:</b>                                  | <b>FY 2011</b> | <b>FY 2012</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> |
|--|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Observational Data Availability of DART Network (% Annually) | <b>Actual</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  |
| With Decrease  | -              | -              | 72%            | 72%            | 72%            | 72%            | 72%            |
| Without Decrease   | 84%            | 80%            | 80%            | 80%            | 80%            | 80%            | 80%            |

**Description:** This measure captures the data return from the DART network expressed as average percent available annually.

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

Activity: National Weather Service  
Subactivity: Operations & Research

| <b>Object Class</b>                                      | <b>2013<br/>Decrease</b> |
|--|--------------------------|
| 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                        | <u>0</u>                 |
| 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                                      | (554)                    |
| 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                   | (4,000)                  |
| 42 Insurance claims and indemnities                      | 0                        |
| 43 Interest and dividends                                | 0                        |
| 44 Refunds   | <u>0</u>                 |
| 99 Total obligations                                     | <u>(4,554)</u>           |

**National Mesonet Network (Base Funding: 0 FTE and \$10,965,000; Program Change: 0 FTE and -\$10,965,000):** NOAA requests a decrease of 0 FTE and \$10,965,000 for a total of 0 FTE and \$0 for the congressionally directed use of funds for the National Mesonet Network. NWS will be using congressionally directed FY 2012 funding as indicated in the Commerce, Justice, Science, and Related Agencies Appropriations Act, 2012 to convene a peer-reviewed study to create a national mesonet program plan within NOAA with recommendations for implementation as appropriate. NOAA will also continue to develop the Meteorological Assimilation Data Ingest System (MADIS) for validation and quality control of mesonet data, and to continue to ingest data from mobile observational systems. NOAA will continue to pursue ways to improve forecasting of severe weather within local NWS field offices, including collaboration with non-NOAA partners.

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

Activity: National Weather Service  
Subactivity: Operations & Research

| <b>Object Class</b>                                      | <b>2013<br/>Decrease</b> |
|--|--------------------------|
| 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                        | <u>0</u>                 |
| 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                                      | (10,965)                 |
| 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                                     | <u>(10,965)</u>          |

**Advanced Hydrologic Prediction Service: Flood Forecasts (Base Funding: 0 FTE and \$8,173,000; Program Change: -0 FTE and -\$1,964,000):** NOAA requests a decrease of 0 FTE and \$1,964,000 for a total of \$6,209,000 for the Advanced Hydrologic Prediction Service (AHPS) program. NWS will use FY 2012 funding to support increased flood forecasts as indicated in the Commerce, Justice, Science, and Related Agencies Appropriations Act, 2012. The FY 2013 dual polarization advancements to the NEXRAD radar is expected to dramatically improve quantitative precipitation forecasts, which inform flood prediction. NOAA will continue to collaborate with river commissions to ensure that critical data is coordinated and incorporated in accurate and timely flood forecasts.

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

Activity: National Weather Service  
Subactivity: Operations & Research

| <b>Object Class</b>                                      | <b>2013<br/>Decrease</b> |
|--|--------------------------|
| 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                        | <u>0</u>                 |
| 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                    | (693)                    |
| 25.2 Other services                                      | 0                        |
| 25.3 Purchases of goods & services from Gov't accounts   | (1,271)                  |
| 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                                     | <u>(1,964)</u>           |

**Weather Forecast Office Maintenance (Base Funding: 0 FTE and \$7,422,000; Program Change: -0 FTE and -\$834,000):** NOAA requests a decrease of 0 FTE and \$834,000 for a total of \$6,588,000 to the National Weather Service (NWS) Weather Forecast Office (WFO) Maintenance program.

**Proposed Actions:**

The WFO Maintenance program allows NWS to protect the capital investment in its previously modernized facilities in accordance with NWS operational standards along with GSA and private industry standards. As WFOs continue to age, the facilities require continued routine maintenance. NWS will continue to prioritize routine maintenance and will extend the time between preventative maintenance actions. NOAA will reduce its effort to address backlogged repairs.

**Base Resources Assessment**

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

**Schedule & Milestones:**

FY 2013-2017

- Conduct routine WFO maintenance

**Deliverables:**

- Routine WFO maintenance

**PROGRAM CHANGE DETAIL BY OBJECT CLASS**

**(Dollar amounts in thousands)**

Activity: National Weather Service  
Subactivity: Operations & Research

| <b>Object Class</b> |   | <b>2013<br/>Decrease</b> |
|---------------------|---|--------------------------|
| 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                        | <u>0</u>                 |
| 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                                      | (834)                    |
| 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                                   | <u>(834)</u>             |

**Central Forecast Guidance: Hurricane Forecast Improvement Project (Base Funding: \$13,004,000 and 1 FTE; Program Change: -\$371,000 and 0 FTE):** NOAA requests a decrease of \$371,000 and 0 FTE for a total of \$12,633,000 and 1 FTE.

**Proposed Actions:**

The proposed reduction will have minimal impact on NOAA’s efforts to improve hurricane forecasting. Under this funding level, NOAA will maintain the already-achieved 15-20 percent improvement in hurricane track and intensity forecast error in a research environment and continue to pursue further improvements in hurricane track and intensity forecasts.

Researchers will continue to make progress toward reducing hurricane track error and will focus particularly on hurricane intensification and its prediction, all within a demonstration environment. HFIP will limit the number of hurricane models processed according to supercomputing availability; models that show promise will be provided to NOAA hurricane forecasters for operational use.

Proposed actions:

- Evaluate and assess hurricane research advances to identify improvements to current NWS operational NWP suite
- Engineer and validate upgrades to NWP suite
- Develop and engineer a new hurricane forecast system based on improved models from HFIP
- Sustain community software architecture to ensure effective and efficient use of NOAA’s suite of numerical weather prediction models and effective leveraging of research advancements
- Sustain the National Unified Operational Prediction Capability Partnership between Department of Commerce and Department of Defense including ensemble global weather modeling system

**Base Resources Assessment:**

The base resources for this activity are described in the Operations and Research base narrative.

**Schedule & Milestones:**

- FY 2013 – 2017 Annual upgrades to operational hurricane models at NCEP
- FY 2013 – 2017 Upgrades to operational data assimilation systems for weather and hurricane forecast

**Deliverables:**

- Experimental real-time forecast guidance to NHC from running the experimental Hurricane Forecast System on the HFIP R&D Computing
- New data assimilation system prototype for hurricane forecast
- Operational implementation of a high resolution advanced data assimilation system focusing on the hurricane core

**Performance Goals and Measurement Data:**

| Performance Measure:              | FY 2011 | FY 2012 | FY 2013 | FY 2014 | FY 2015 | FY 2016 | FY 2017 |
|-----------------------------------|---------|---------|---------|---------|---------|---------|---------|
| 48 hour Hurricane Track Error 15c | Actual  | Target  | Target  | Target  | Target  | Target  | Target  |

|                         |      |    |      |    |      |    |      |
|-------------------------|------|----|------|----|------|----|------|
| <b>With decrease</b>    | -    | 84 | 82.5 | 81 | 79.5 | 78 | 76.5 |
| <b>Without decrease</b> | 70.8 | 84 | 82   | 80 | 78   | 76 | 74   |

**Description:** The public, emergency managers, government institutions at all levels in this country and abroad, and the private sector use NOAA hurricane and tropical storm track forecasts to make decisions on life and property. This goal measures the difference between the projected location of the center of these storms and the actual location in nautical miles (nm) for the Atlantic Basin. The goal is computed by averaging the differences (errors) for all the 48-hour forecasts occurring during the calendar year. This measure can show significant annual volatility. Projecting the long-term trend and basing out-year goals on that trend is preferred over making large upward or downward changes to the targets on an annual basis. These targets, developed from an analysis of performance over a roughly 15-year period, are therefore not affected by year-to-year natural variability in actual forecast errors.

| <b>Performance Measure:</b>           | <b>FY 2011</b> | <b>FY 2012</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> |
|---------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 48 hour Hurricane Intensity Error 15d | <b>Actual</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  |
| <b>With decrease</b>                  | N/A            | 15             | 14             | 14             | 13.5           | 13.5           | 13             |
| <b>Without decrease</b>               | 14.4           | 15             | 14             | 14             | 13             | 13             | 12             |

**Description:** The public, emergency managers, government institutions at all levels in this country and abroad, and the private sector use NOAA hurricane intensity forecasts to make decisions on life and property. This goal measures the difference between the projected intensity of these storms and the actual intensity in knots (kt) for Atlantic Basin tropical cyclones (i.e., tropical depressions, tropical storms, and hurricanes). The goal is validated by computing the average difference (error) for all the 48-hour forecasts occurring during a calendar year. Because tropical cyclones are relatively rare events, this measure can show significant annual volatility. As a consequence, projecting the long-term trend (over a decade or more) and basing out-year goals on that trend is preferred over making upward or downward changes to the targets on an annual basis.

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

Activity: National Weather Service  
Subactivity: Operations & Research

| <b>Object Class</b>                                      | <b>2013<br/>Decrease</b> |
|--|--------------------------|
| 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                        | <u>0</u>                 |
| 12 Civilian personnel benefits                           | 0                        |
| 13 Benefits for former personnel                         | 0                        |
| 21 Travel and transportation of persons                  | (10)                     |
| 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                    | (351)                    |
| 25.2 Other services                                      | (10)                     |
| 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                                     | <u>(371)</u>             |

The following exhibit shows the summary object class detail for Operations & Research program changes less than \$100,000. Please contact the NOAA budget office if details for any of these changes are required.

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

Activity: National Weather Service  
Subactivity: Operations & Research

| <b>Object Class</b>                                      | <b>2013<br/>Decrease</b> |
|--|--------------------------|
| 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                        | <u>0</u>                 |
| 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                                      | 6                        |
| 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                                     | <u>6</u>                 |

## Descriptions of Performance Measures for Local Warnings & Forecasts Base

| GPRA Performance Measure   | Description   |
|--|---|
| Measure 15a, Tornado Warnings Lead Time, Accuracy, and False Alarm Ratio | <p>The lead time for a tornado warning is the difference between the time the warning was issued and the time the tornado affected the area for which the warning was issued. The lead times for all tornado occurrences within the U.S. are averaged to get this statistic for a given fiscal year. This average includes all warned events with zero lead times and all unwarned events. Accuracy is the percentage of time a tornado actually occurred in an area that was covered by a warning. The difference between the accuracy percentage figure and 100 percent represents the percentage of events occurring without warning. The false alarm rate is the percentage of times a tornado warning was issued but no tornado occurrence was verified.</p> <p>Tornado Warning Lead Time for an individual event is not available to an accuracy of half a minute of a report indicating a tornado has touched down. Although we record the timing of the warning transmission to the nearest second, we rarely have more than an estimate to the nearest minute of the time a tornado touches down. While we can compute the average tornado warning lead time to a precision of 30 second increments or less, the reporting of this value implies greater accuracy in the data than currently exists.</p> <p>The annual variation of tornado warning lead time is more closely tied to the variation in storm type than in the performance. Generally, long track tornadic supercell storms are easier to detect and track than tornadoes that develop in squall lines or tropical storms. Changes in performance can be detected over a period of several years, and are better measured to an accuracy of minutes. The natural variability associated with tornado activity will not let us incorporate incremental improvements into this performance measure.</p> |
| Measure 15b, Flash Flood Warnings Lead Time and Accuracy                 | <p>The lead time for a flash flood warning is the difference between the time the warning was issued and the time the flash flood affected the area for which the warning was issued. The lead times for all flash flood occurrences within the continental United States are averaged to get this statistic for a given fiscal year. This average includes all warned events with zero lead times and all unwarned events. Accuracy is measured by the percentage of times a flash flood actually occurred in an area that was covered by a warning. The difference between the accuracy percentage figure and 100 percent represents the percentage of events without a warning.</p>  |
| Measure 15f, Winter Storm Warnings Lead Time and Accuracy                | <p>A winter storm warning provides NOAA customers and partners advanced notice of a hazardous winter weather event that endangers life or property, or provides an impediment to commerce. Winter storm warnings are issued for winter weather phenomena like blizzards, ice storms, heavy sleet, and heavy snow. This performance indicator measures the accuracy and advance warning lead time of winter storm events. Improving the accuracy and advance warnings of winter storms enables the public to take the necessary steps to prepare for disruptive winter weather conditions.</p>   |

| <p>Measure 15g, Marine Wind Speed and Wave Height Forecast Accuracy,</p>  | <p>This performance indicator measures the accuracy of wind speed forecasts, which are important for marine commerce. The measure represents the Percentage of Accurate Forecasts, and accuracy is defined in terms of error. For the marine wind forecast, if the error is less than 5 knots, the forecast is accurate. This measure uses a complex skill score to analyze individual wind speed and wave height components.</p>  |                               |  |     |       |    |       |   |             |   |             |   |             |
|---|--|-------------------------------|--|-----|-------|----|-------|---|-------------|---|-------------|---|-------------|
| <p>Measure 15h, Aviation Forecast IFR Accuracy and False Alarm Ratio,</p> | <p>Visibility and cloud ceiling forecasts are critical for the safety of aircraft operation. Accurately forecasting the occurrence of Instrument Flight Rule (IFR) conditions significantly improves general and commercial aviation flight planning capabilities, improving both flight safety and efficiency. IFRs are rules and regulations established by the Federal Aviation Administration that govern flight under conditions where pilots navigate primarily through instrument guidance. Performance statistics recalculated for the past few years of data (FY05-FY10) uncovered a direct relationship between the ratio of IFR accuracy to false alarm rates and the frequency of occurrence of IFR conditions. For this measure, the false alarm ratio represents the number of times IFR does not occur to the number of times predicted.. Greater accuracy and minimized false alarm rates result in safer flights and fewer flight delays; and conversely, poorer accuracy and increased false alarm rates result in a greater incidence of unnecessary flight delays. The forecast frequency of IFR occurrence and the observed frequency of IFR occurrence are within 0.5% of each other, indicating that forecast errors are likely in the timing of onset and duration rather than solely event occurrence. Because the direct relationship exists, aviation services correlated likely performance levels to the percent frequency of IFR occurrence, and recommends performance metrics that account for IFR frequency and creates a logical performance standard for those areas with very little IFR occurrence and the warm or cool seasons. Performance metric goals for the accuracy and FAR are tied to the frequency of IFR occurrence as shown in the following table.</p> <table border="1" data-bbox="435 1234 1312 1514"> <thead> <tr> <th data-bbox="435 1234 781 1335">% Frequency Occurrence of IFR</th> <th data-bbox="781 1234 1312 1335">National Goals for: Probability Of Detection (POD)/ False Alarm Rate (FAR)</th> </tr> </thead> <tbody> <tr> <td data-bbox="435 1335 781 1371">&gt;10</td> <td data-bbox="781 1335 1312 1371">65/38</td> </tr> <tr> <td data-bbox="435 1371 781 1407">10</td> <td data-bbox="781 1371 1312 1407">63/39</td> </tr> <tr> <td data-bbox="435 1407 781 1442">8</td> <td data-bbox="781 1407 1312 1442">58-62/42-45</td> </tr> <tr> <td data-bbox="435 1442 781 1478">6</td> <td data-bbox="781 1442 1312 1478">57-60/42-45</td> </tr> <tr> <td data-bbox="435 1478 781 1514">4</td> <td data-bbox="781 1478 1312 1514">56-59/44-46</td> </tr> </tbody> </table> <p>For those % Frequency Occurrence of IFR goals with multiple values the lower value Accuracy and higher value FAR are for the warm season and the higher accuracy and lower FAR values are for the cool season. An annual performance metric derives from an average of the monthly performance results anticipated from the latest climate forecast at the start of the measured year.</p> | % Frequency Occurrence of IFR | National Goals for: Probability Of Detection (POD)/ False Alarm Rate (FAR) | >10 | 65/38 | 10 | 63/39 | 8 | 58-62/42-45 | 6 | 57-60/42-45 | 4 | 56-59/44-46 |
| % Frequency Occurrence of IFR   | National Goals for: Probability Of Detection (POD)/ False Alarm Rate (FAR)   |                               |  |     |       |    |       |   |             |   |             |   |             |
| >10   | 65/38  |                               |  |     |       |    |       |   |             |   |             |   |             |
| 10  | 63/39  |                               |  |     |       |    |       |   |             |   |             |   |             |
| 8   | 58-62/42-45  |                               |  |     |       |    |       |   |             |   |             |   |             |
| 6   | 57-60/42-45  |                               |  |     |       |    |       |   |             |   |             |   |             |
| 4   | 56-59/44-46  |                               |  |     |       |    |       |   |             |   |             |   |             |

|   |   |
|---|---|
| <p>Geomagnetic Storm Forecast Accuracy, Measure 15i</p> | <p>Geomagnetic Storm Forecast Accuracy is the percentage of days that a geomagnetic storm event at Earth was correctly forecasted by the Space Weather Prediction Center (SWPC). The annual goal represents a minimum percentage of events for which a Geomagnetic Storm Forecast was successfully issued within the previous 48 hours of the event.</p> <p>One cause of geomagnetic storming is the occurrence of Earth-directed Coronal Mass Ejections (CME) from the sun which interacts with and disturbs the geomagnetic field of the Earth. The majority of CMEs reach the earth within 36-72 hours after they occur at the sun. Extreme events can arrive in as short as 18 hours and minor events can arrive in at most 96 hours. A NASA satellite, the Advanced Composition Explorer (ACE), provides a lead time of 20 to 50 minutes from the moment of detection. The geomagnetic storms associated with shorter CME transit times generally have the most significant effect at Earth. For that reason, this measure focuses on the accuracy of forecasts between 0 and 48 hours, narrowing the performance measure to the most significant geomagnetic storm events.</p> <p>For Solar Cycle 23 (May 1996 – December 2008), the Geomagnetic Storm Forecast Accuracy was 30%. During this cycle, SWPC forecasters issued approximately 30 Geomagnetic Storm Forecasts per year during the most active periods and few or no Geomagnetic Storm Forecasts during the solar minimum years.</p> <p>In FY 2012 SWPC will be transitioning a physics-based solar wind model which will provide guidance to forecasters as to the size, location, and speed of CME's. This guidance is expected to improve estimates of CME arrival times at Earth over what is possible today with current forecasting techniques, leading to increased accuracy of the Geomagnetic Storm Forecasts.</p> <p>For this metric a geomagnetic storm is defined as an event equal to or exceeding the Minor Storming level as defined by the Daily Geomagnetic A-index <math>\geq 30</math> (equivalent to Geomagnetic K-index <math>\geq 5</math> or <math>\geq G1</math> Level on the NOAA Space Weather Scales). The NOAA G-scale indicates CME events between a minor level of plasma emission (G1), causing weak power fluctuations in the power grid and an extreme level of plasma emission (G5) where in affected areas, transformers are severely damaged, the electric grid collapses, pipeline currents corrode, and satellites experience orientation difficulties. To account for solar cycle variability and to maintain statistical significance, this metric will be assessed over either a minimum of a fiscal year or the 30 most-recent geomagnetic storms (during periods of solar minimum).</p> |
|---|---|

**APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH AND FACILITIES**  
**SUBACTIVITY: SYSTEMS OPERATIONS AND MAINTENANCE**

The objectives of the Systems Operations and Maintenance subactivity are to:

- Maintain the operations of systems that collect observations necessary to provide weather forecasts and warnings
- Maintain processing systems

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 2013, 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 NEXRAD operations and maintenance budget is funded at FY 2012 at \$45.9million and 103 FTEs. Resources are allocated to continuous operations, maintenance and sustainment activities that result in a reliable and secure National radar network. Logistics and Sustaining Engineering ensure adequate sparing levels and address component obsolescence through fleet-wide modifications. Radar Repairs are performed by both on-site and dispatched Radar Operations Center technicians, while National Reconditioning Center reconditions failed components and returns the parts to inventory stock. Utilities provides for commercial electricity services for the radars. Training is provided for radar operators/forecasters and electronics technicians. Hardware/Software Maintenance provides for technology refresh of IT components to address obsolescence and maintain IT Security compliance, and provides routine software releases to integrate improved radar science and security patches. Telecommunications provides for telecommunications services to transmit continuous radar data to/from Weather Forecast Offices, to archive and to servers for public access. NWS headquarters support provides Configuration Management, Logistics Management and Telecommunications Management.

**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 NWS/FAA/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 2013 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, DOC, 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 a technologically advanced information processing, display, and telecommunications system that is the cornerstone of the modernized NWS. This system is required to integrate and display all meteorological and hydrological data, and all satellite and radar 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 WFOs and 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.

The AWIPS operations and maintenance budget currently consists of \$39.1 million, including 41 FTE. This budget provides critical operational support for forecast operations at all 122 WFOs, 13 RFCs, 6 National Centers and numerous other test systems and special purpose systems. These investments include the maintenance and support of the critical IT software, hardware, communications and data that all forecasters use to prepare their daily forecast products. The Network Control Center (and offsite backup NCF or BNCF), operated 24 hour a day, 365 days a year, provides contract staff for help desk and system administration and IT support to all offices, as well as centralized network, data storage and satellite uplink services. The Satellite Broadcast Network (SBN) (primary and backup) transmits most of the critical weather data from satellites, NCEP models, observations systems and other sources, to all field office forecasters in a timely manner to support. A continuous technology refresh program replaces all AWIPS servers, workstations and other IT components at all sites, at regular intervals. Contract staff provide regular software updates to the forecast decision support software (AWIPS) as well as bug fixing capability, security patching and operating system upgrades. Routine replacement of failed equipment through a spares program at the National Logistics Support Center (NLSC) and National Reconditioning Center (NRC) and also some on-site contractor support for hardware replacement is also included. O&M costs include communications circuits between the NCF and the BNCF and the SBN Master Ground Station (MGS) and backup MGS (BMGS). A turnkey on-call mobile satellite based communications serves as backup for any office in case of emergency communications failures (via Very Small Aperture Terminal wide area network backup, a small two-way satellite ground station).

### **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.

The NWSTG Backup, with a current budget of \$5.3 million and 0 FTE, will continue operations and maintenance of 169 fielded systems under a new, performance-based operations and maintenance contract. In addition, NWS will continue in-service engineering to ensure the system is available 24 hours per day, 365 days per year, to support the NWS mission of providing climate, water, and weather forecasts and warnings to protect life and property, enhance the national economy, and prevent system obsolescence.

#### **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**

###### **FY 2013**

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

###### **FY 2014**

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

##### **AWIPS**

- Steady State (FY 2013 – 2017)

NWSTG Backup

- Steady State FY 2013 – 2017)

**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

- Continue 24/7 support of operational system
- Continue to refresh hardware based on expected life and warranties
- Continue correction of Discrepancy Reports on the baseline software application suite

NWSTG Backup

- Continue 24/7 support

**Performance Goals and Measurement Data:**

| Performance Measure: NEXRAD   | FY 2011 Actual | FY 2012 Target | FY 2013 Target | FY 2014 Target | FY 2015 Target | FY 2016 Target | FY 2017 Target |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Mission & Business Results: Network availability of 96%   | 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%            | 96%            |
| <b>Description:</b> Measure tracks the uptime of the radars, but excludes planned preventive maintenance. Archived data availability metric tracks the 24-hr availability of radar data directed from the sites to NCDC to archive. |                |                |                |                |                |                |                |

| Performance Measure: AWIPS    | FY 2011 Actual | FY 2012 Target | FY 2013 Target | FY 2014 Target | FY 2015 Target | FY 2016 Target | FY 2017 Target |
|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Customer Satisfaction Surveys | 88%            | 88%            | 88%            | 88%            | 88%            | 88%            | 88%            |
| Workstation                   | 86             | 86             | 86             | 86             | 86             | 86             | 86             |

|   |         |         |         |         |         |         |         |
|---|---------|---------|---------|---------|---------|---------|---------|
| Performance Ratings   | seconds |
| <b>Description:</b> 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. |         |         |         |         |         |         |         |

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**PROGRAM CHANGES FOR FY 2013:**

**Next Generation Weather Radar (NEXRAD) : Operations and Maintenance: (Base Funding: \$46,101,000 and 103 FTE; Program Change: \$146,000 and 0 FTE):** NOAA requests an increase of \$146,000 and 0 FTE for a total of \$46,247,000 and 103 FTE for the continued operations and maintenance (O&M) of NEXRAD. This funding will support on-going O&M at the National Weather Service's 122 operational NEXRADS.

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

Activity: National Weather Service  
Subactivity: Operations & Maintenance

| <b>Object Class</b>                                      | <b>2013<br/>Increase</b> |
|--|--------------------------|
| 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                        | <u>0</u>                 |
| 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                    | 146                      |
| 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   | <u>0</u>                 |
| 99 Total obligations                                     | <u>146</u>               |

**Advanced Weather Interactive Processing System (AWIPS): Operations and Maintenance (Base Funding: \$39,370,000 and 41 FTE; Program Change: \$125,000 and 0 FTE):** NOAA requests an increase of \$125,000 and 0 FTE for a total of \$39,495,000 and 41 FTE for the continued operations and maintenance (O&M) of AWIPS. This funding will support on-going maintenance of the critical IT software, hardware, communications and data that all forecasters use to prepare their daily forecast products.

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

Activity: National Weather Service  
Subactivity: Operations & Maintenance

| <b>Object Class</b>                                      | <b>2013<br/>Increase</b> |
|--|--------------------------|
| 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                        | <u>0</u>                 |
| 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                                      | 125                      |
| 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   | <u>0</u>                 |
| 99 Total obligations                                     | <u>125</u>               |

The following exhibit shows the summary object class detail for Operations & Maintenance program changes less than \$100,000. Please contact the NOAA budget office if details for any of these changes are required.

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

Activity: National Weather Service  
Subactivity: Operations & Maintenance

| <b>Object Class</b>                                      | <b>2013<br/>Increase</b> |
|--|--------------------------|
| 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                        | <u>0</u>                 |
| 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                                      | 53                       |
| 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   | <u>0</u>                 |
| 99 Total obligations                                     | <u>53</u>                |

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**APPROPRIATION ACCOUNT: PROCUREMENT, ACQUISITION, AND CONSTRUCTION**  
**SUBACTIVITY: SYSTEMS ACQUISITION**

The objectives of the Systems Acquisition subactivity are to:

- Upgrade NOAA's operational suite
- Process all of NOAA's operational weather models

**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 the critical surface observations are available to forecasters, Air Traffic Controllers, and the aviation community. Getting more accurate information on the atmosphere more frequently and from more locations is vital to improving 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 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 as the U.S. moves into the NextGen era.

The Automated Surface Observing System (ASOS) serves as the nation's primary surface weather observing network. ASOS is designed to support weather forecast activities and aviation operations and, at the same time, support the needs of the meteorological, hydrological, and climatological research communities. With the largest complement of weather sensors, ASOS significantly expands the information available to forecasters and the aviation community. ASOS works non-stop, updating observations every minute, 24 hours a day, every day of the year. Getting more information on the atmosphere, more frequently and from more locations, is the key to improving forecasts and warnings. ASOS information helps NWS increase the accuracy and timeliness of its forecasts and warnings - the overriding goal of the NWS modernization.

The ASOS Product Improvement program has an annual appropriated budget of \$1,635,000 and 9 FTEs. This funding level is currently being used to complete full-scale production and deployment of replacement Ceilometers for the logistically unsupportable legacy sensors.

**Schedule & Milestones:**

FY 2013

- Production and deployment of 6 Enhanced Precipitation Identifier sensors

FY 2014

- Production and deployment of final 6 EPI sensors

FY 2015-2017

- Product Improvement complete

**Deliverables:**

- Deployment of EPI sensors

**Performance Goals and Measurement Data:**

| Performance Measure   | FY          |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|   | 2011 Actual | 2012 Target | 2013 Target | 2014 Target | 2015 Target | 2016 Target | 2017 Target |
| ASOS sites with enhanced precipitation sensing capability                   | 0           | 6           | 12          | 18          | 18          | 18          | 18          |
| <b>Description:</b> Measure tracks the deployment of EPI to NWS ASOS sites. |             |             |             |             |             |             |             |

**Multi-Year Budget Information (BA in thousands):**

| ASOS Product Improvement  | FY 2012 & Prior | FY 2013 | FY 2014 | FY 2015 | FY 2016 | FY 2017 | CTC | Total  |
|---------------------------|-----------------|---------|---------|---------|---------|---------|-----|--------|
| Changes from FY 2013 Base | 48,203          | 0       | (321)   | (1,635) | (1,635) | (1,635) |     |        |
| <b>Total Request</b>      | 48,203          | 1,635   | 1,314   | 0       | 0       | 0       | 0   | 51,152 |

**ADVANCED WEATHER INTERACTIVE PROCESSING SYSTEM (AWIPS) TECHNOLOGY INFUSION**

The Advanced Weather Interactive Processing System (AWIPS) is the cornerstone of a modernized NWS. AWIPS hardware and software was 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 NWS mission related to the preservation of life and property from severe weather and flooding events, and the enhancement of 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 Government Performance and Results Act goals are based on the effective use of these technology investments along with 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 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.

In 2006 a major software re-architecture (AWIPS II) was begun using the AWIPS prime contractor through a series of task orders. AWIPS II development was completed in late 2011 and deployment began with the first operational site (the Omaha Weather Forecast Office) running on the new software in December 2011.

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 2011. 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, the National Critical IT system designation will require a new NIACAP certification. The certification and accreditation (C&A) update will be performed prior to the new software being released for operational use.

AWIPS II Extended is a multi-phase program to add new and improved functionalities and capabilities for NWS field forecasters, NOAA partners and the public. These 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 to support collaboration among NWS operational units and NOAA trusted partners, improve means to generate information to support decision makers, and improve ways for forecasters to access and visualize meteorological information.

AWIPS II Extended, Phase II implements additional infrastructure enhancements to address existing and emerging NWS mission requirements, including

- Ingest numerous new and enhanced datasets, advanced decision assistance systems
- Improve system robustness to support more agile infusion of new science and technology into the system and to improve collaborative development across the hydrometeorological community.

Forecast Tools & Applications infuses new science and applications to improve forecast accuracy and consistency and Forecast Verification is collaboration with NOAA OAR to develop real-time, net-enabled verification systems to monitor and improve the forecast process.

NWS is extending the AWIPS architecture to address specific shortcomings as it is extended to the entire weather enterprise (AWIPS II Extended):

- NAWIPS Migration:
  - During FY 2011, the NAWIPS software has been integrated into the AWIPS II baseline and is being tested. Deployment began in early FY 2012.
- Thin Client:
  - Production development in progress during FY 2011. Deployment is targeted for third quarter FY 2012.
- Data Delivery:
  - During FY 2011, technical requirements and a high level architecture design have been developed. In addition, exploratory software development (e.g., prototyping) is being conducted. Production development began in the fourth quarter of FY 2011.
- Collaboration:

- During FY 2011, technical requirements for phase I of this project were gathered. The production development of Phase I began in FY 2012.
- Information Generation:
  - Technical requirements and prototyping were executed during FY 2011. Production development began in FY2012.

| <b>FY 2012 Activity</b>                  | <b>Dollars</b> | <b>FTE</b> |
|--|----------------|------------|
| AWIPS II Migration                       | \$2,520        | 0          |
| AWIPS II Extended                        | \$8,825        | 0          |
| AWIPS II Extended – Phase 2              | \$5,746        | 0          |
| Forecast Tools & Apps                    | \$3,427        | 0          |
| Forecast Verification System Development | \$1,280        | 0          |
| Government FTE Costs                     | \$2,336        | 15         |

AWIPS has been operational since 1999 and needs to transform its service delivery to better align itself with the emerging needs of the Department of Homeland Security, Federal Aviation Administration (FAA), emergency managers, decision makers, the American public and industry. Emergency managers, DHS, and industry are demanding increased lead time and more precision and consistency in weather, flood, and hurricane forecasts to improve their decisions for resource planning, evacuation planning, and business operations. These decisions are potentially lifesaving and can have multi-billion dollar impacts on the economy and livelihoods. Customers and users of NWS products and services will fully exploit NOAA investments through this transformation.

**The schedule, milestones, deliverables, and 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 hydro-meteorological 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:

- Awarded a contract for the Dual Polarization of the NEXRAD Fleet
- Prototype Dual Polarization modification completed on Radar Operations Center radar
- Conducted Beta Test Readiness Review
- Completed pre-beta Dual Polarization modification on one radar (Vance AFB)
- Completed Beta Dual Polarization beta modification on one radar (Phoenix AZ)
- Entered Beta Testing

NPI Science Improvements have made significant improvements in NEXRAD performance, products, and data that led to improvements such as 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.

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 percent of ground-truth estimates, will improve to 12.5 percent as demonstrated in a study conducted by National Severe Storms laboratory (NSSL) 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 began in FY 2011 and is scheduled for completion in FY 2013. The program was accelerated in FY 2009 using funds from the American Reinvestment and Recovery Act.

Doppler weather radar is the primary tool for issuing local storm warnings for flash floods, tornados and severe thunderstorms. Currently, NEXRAD only transmits and receives a horizontally polarized signal. Dual Polarization adds a vertically polarized component. The addition of a vertical component greatly improves accuracy in estimation (quantity) and differentiation (rain, hail, snow, freezing rain, etc.) of precipitation. The outcome will be improved flash flood warnings; improved identification of, and warnings for tornadoes, severe hail, dangerous freezing rain, snow; and enhanced water management capability. Expected benefits include:

- NEXRAD enhanced precipitation estimate capability will improve flash flood warnings and water management.
- The Dual Polarization modification to NEXRAD has been demonstrated to greatly improve the probability of hail detection and reduce the false alarm rate which will improve severe weather warnings.
- NSSL dual polarization data have been shown to identify specific tornado debris clouds, a capability which will support greater areal specificity in tornado warnings for rain-wrapped and nighttime tornadoes. This improved accuracy in tornado warnings will increase public confidence in tornado warnings.

- The capability of dual polarization to distinguish between non-meteorological scatterers (e.g., birds) and meteorological scatterers (precipitation) results in higher quality data used across the NWS enterprise and more accurate weather products.

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

### **NWS TELECOMMUNICATIONS GATEWAY (NWSTG) 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.

Base resources are currently being used for the maintenance and operations of the NWSTG and backup to ensure the continuous dissemination of weather data and products. Base funding currently pays for operational FTE's, telecommunication charges, and software licenses. Base funding also provides for the operation of the NWSTG's web servers and file servers that store and provide browser access to and retrieval of all nationally-generated forecast products and observational data. Base funding does not have the resources to take advantage of future new products and data coming into NWS. Beginning in FY 2011, NOAA began a technology re-alignment of NWSTG. This two year effort will replace aging and unsupportable infrastructure while increasing backup capabilities.

Timely, available, and accurate weather forecasts and warnings are critical to the health and well-being of the citizens and businesses in the United States and around the world. 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 including: Tornado Warning Lead Time, Flash Flood Warning Lead Time, Winter Storm Warnings Lead Time, and Hurricane Track Forecasts. The lack of weather forecasts and warnings undermine human health and sustainability of national security and other 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. If any of the above were to occur, the effect on government would most probably come in the form of denial of service to the users of the services. Minutes count in saving lives and the performance of the NWS dissemination systems to supply information needed is crucial.

In FY 2002, the NWS received funding to modernize the NWSTG legacy systems and to establish the backup facility. In FY 2008, NWS received an additional \$700,000 for capacity expansion and initial technology refresh of both systems. By FY 2012, the NWSTG will require a complete re-architecture and technology refresh to ensure its continued viability. Projected data processing requirements (10 terabits per day by FY 2014) dictate a new, scalable system architecture with the inherent design flexibility to expand to process increased environmental products resulting from programs including Geostationary Operational Environmental Satellite-R Series (GOES-R), Joint Polar Satellite System (JPSS), Next Generation Air Transportation System (NextGen), and Dual Polarization Radar. The aging infrastructure, along with the significant increase in processing requirements, represent a major threat to disrupt or degrade

the availability, accuracy, and timeliness of critical products and services that emergency managers and the public rely on during a severe weather, hydrometeorological, and electromagnetic events. Failure to make this investment in a timely manner will halt the utilization of improved data.

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

### **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.

Radiosondes are a primary data source for NWS weather prediction models that support severe storm, aviation and marine forecasts. Radiosonde data is also used by DHS and EPA in modeling the dispersion and mixing of hazardous materials and pollutants that are released into the atmosphere and by policy-makers to set regulations for industrial emissions and to protect public health from hazardous levels of pollution. FAA uses radiosonde data to analyze the effects of freezing precipitation on aircraft which may be used in aircraft design and improved safety measures for air transportation.

The legacy Radio Direction Finding (RDF) 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 86 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 (OBRA) 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.

Activities are centered in two areas: deployment of Radiosonde Replacement System (RRS) to field sites and procurement of GPS radiosondes.

RRS GPS Radiosonde Acquisition: \$2,649  
 RRS GPS Radiosonde Network Deployment: \$1,365

GPS radiosondes, meeting requirements for reduction of radio-frequency spectrum usage, required deployment of new ground station equipment. This ground equipment provides compatibility with more spectrum efficient radiosonde instruments, while replacing obsolete equipment in service for more than 30 years. By the end of FY 2012, 86 of 102 sites (84 percent) will have been deployed in the Continental US, Alaska, and Pacific region. Currently, no FTE's are allocated to these activities.

**Schedule & Milestones:**

FY 2013

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

FY 2014

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

FY 2015-2017

- Steady State

**Deliverables:**

- 102 GPS site network

**Performance Goals and Measurement Data:**

| Performance Measure   | FY 2011 | FY 2012 | FY 2013 | FY 2014 | FY 2015 | FY 2016 | FY 2017 |
|---|---------|---------|---------|---------|---------|---------|---------|
|   | Actual  | Target  | Target  | Target  | Target  | Target  | Target  |
| Number of UA observing sites launching GPS radiosondes  | 80      | 86      | 92      | 102     | 102     | 102     | 102     |
| <b>Description:</b> The radiosonde replacement program was initiated as a result of the 1993 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 (\$ in thousands):**

| Radiosonde Replacement Program & Supercomputing Changes from FY 2013 Base | FY 2012 | FY 2013 | FY 2014 | FY 2015 | FY 2016 | FY 2017 | CTC | Total     |
|---|---------|---------|---------|---------|---------|---------|-----|-----------|
| Prior   | 67,368  | 0       | 0       | 0       | 0       | 0       |     |           |
| <b>Total Request</b>  | 67,368  | 4,014   | 4,014   | 4,014   | 4,014   | 4,014   | N/A | Recurring |

## **WEATHER AND CLIMATE SUPERCOMPUTING**

The NWS 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, execution of complicated prediction models, 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 WCOSS 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 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 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 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 (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.

During FY 2013, NOAA will continue deploying and transferring to a new WCOSS as a result from the contractual re-competition conducted in FY 2011.

### **Schedule & Milestones:**

#### **FY 2013**

- Port, test and verify operational models and other applications from the current to new systems delivered by the new WCOSS Indefinite delivery/indefinite quantity task order
- Insert new WCOSS vendor provided facilities into the Wide Area Network (WAN)
- Achieve IT Security Authority to Operate for new operational supercomputing systems
- Go live with new systems and close out Bridge contract
- Execute task order to exercise WCOSS growth option to increase WCOSS computing capacity including storage

#### **FY 2014**

- Upgrade WCOSS computing capabilities and storage with "built-in" contractual upgrade requirements using steady-state funding
- Go live with WCOSS computing and storage upgrades

#### **FY 2015**

- At the Government's discretion, exercise the WCOSS 3-year option period task order for execution in FY 2016

#### **FY 2016**

- If the WCOSS 3-year option period is exercised, initiate the period of performance for the WCOSS 3-year option period
- Upgrade WCOSS computing capabilities and storage with "built-in" contractual upgrade requirements using steady-state funding
- Go live with WCOSS computing and storage upgrades

#### **FY 2017**

- If the WCOSS 3-year option period is exercised, execute the second year of the WCOSS 3-year option period

### **Deliverables:**

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

**Performance Goals and Measurement Data:**

| <b>Performance Measure</b>   | <b>FY 2011</b> | <b>FY 2012</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> |
|--|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| NCEP Production Suite (NPS) On-Time Product Generation   | Actual<br>99%  | Target<br>99%  | Target<br>99%  | Target<br>99%  | Target<br>99%  | Target<br>99%  | Target<br>99%  |
| <b>Description:</b> Sustain NPS on-time product generation within 15 minutes of target completion times at a rate of 99 percent or better. |                |                |                |                |                |                |                |

| <b>Performance Measure</b>  | <b>FY 2011</b> | <b>FY 2012</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b>  | <b>FY 2016</b>  | <b>FY 2017</b>  |
|---|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|
| Operational Use Time  | Actual<br>99%  | Target<br>99%  | Target<br>99%  | Target<br>99%  | Target<br>99.9% | Target<br>99.9% | Target<br>99.9% |
| <b>Description:</b> Operational Use Time (OUT) is defined as the percentage of time the NCEP Production Suite (NPS) can run on the WCOSS. OUT is determined by considering all WCOSS resources in which a subset of this total resource is necessary to execute the entire NPS. The NPS executes on either the Primary or Backup WCOSS. |                |                |                |                |                 |                 |                 |

| <b>Performance Measure</b>  | <b>FY 2011</b> | <b>FY 2012</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Development Use Time  | Actual<br>99%  | Target<br>99%  | Target<br>99%  | Target<br>99%  | Target<br>99%  | Target<br>99%  | Target<br>99%  |
| <b>Description:</b> Development Use Time (DUT) is defined as the percentage of time development jobs can run on the WCOSS. DUT is determined by considering all WCOSS resources minus the resources necessary to execute the entire NCEP Production Suite (NPS). The Transition to Operations (T2O) executes within the DUT and the T2O will execute on the Primary and Backup WCOSS. |                |                |                |                |                |                |                |

**Outyear funding estimates are provided with the program change requested for this activity.**

**COOPERATIVE OBSERVER NETWORK-MODERNIZATION (NOAA's ENVIRONMENTAL REAL-TIME OBSERVATION NETWORK)**

The US Historical Climatology Network—Modernization (USHCN-M) (also known as the Regional Climate Reference Network (USRCRN), and formerly referred to as the Cooperative Observer Network-Modernization (COOP/Mod and NOAA's Environmental Real-time Observation Network (NERON), will provide and maintain long term, high quality observations of temperature and precipitation to meet the stringent data quality and continuity requirements of the climate science community. When fully implemented, the USHCN-M will consist of approximately 438 newly installed stations, strategically located to a nationwide, 538 grid map. USHCN-M will capture the representative temperature and precipitation records of the nine climate regions of the contiguous U.S. The Southwest Region was completed and commissioned in 2011. The West and Northwest Regions are in progress.

The USHCN-M will introduce automated systems with greater temporal resolution (5-minute observations) which will be made available only hours after measurement. The sites will be deployed against an evenly dispersed grid to ensure exceptional geographical coverage. The new sites will have a triple configuration of high-quality sensing equipment that allow for early

identification and correction of errors – leading to higher confidence in the regional climate signal. The new sites will be rigorously selected as ideal for climate monitoring and free of artificial influences. The station infrastructure will be expandable to allow for additional data sets (soil temperature, soil moisture, snow fall, snow depth, etc.)

The USHCN-M will improve NOAA’s ability to detect regional-scale changes in annual precipitation (as small as 10% per century) and annual averages surface air temperature changes (as small as 0.2 degrees C per century) at the 95<sup>th</sup> percentile in the lower 48 states (Cumulative Total percent confidence of detection). Climate change and variability occur on multiple time scales: decades, centuries, millennia.

Recurring funds will be required to provide adequate maintenance and replenishment to maintain stations at a high level for climate needs.

**Schedule & Milestones**

FY 2013-2017

- 2013 Complete/Commission West Region (total installed 2 Regions 128)
- 2014 Complete/Commission Northwest Region (total Installed 3 Regions 158)
- 2015 Total installed 188
- 2016 Total installed 218
- 2017 Complete/Commission South Region (total installed 4 Regions 248)

Deliverables

- Programmatic Environmental Assessment
- Station Acceptance and Commissioning Package—West Climate Region
- Station Acceptance and Commissioning Package—Northwest Climate Region
- Station Acceptance and Commissioning Package—South Climate Region
- O&M Acquisition Analysis and Recommendation for the Completed HCN-M System

**Multi-Year Budget Information (\$ in thousands):**

| <b>Cooperative Observer Network Modernization (NERON) Changes from FY 2013 Base</b> | <b>FY 2012 &amp; Prior</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> | <b>CTC</b> | <b>Total</b> |
|---|----------------------------|----------------|----------------|----------------|----------------|----------------|------------|--------------|
|   | 27,620                     | 0              | 0              | 0              | 0              | 0              |            |              |
| <b>Total Request</b>  | 27,620                     | 3,700          | 3,700          | 3,700          | 3,700          | 3,700          | N/A        | Recurring    |

## **COMPLETE AND SUSTAIN NOAA WEATHER RADIO**

NWS faces challenges in its efforts to sustain a high level of reliability and maintainability of NOAA Weather Radio (NWR), 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 NWR 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 2013-2017

- Transmitter refurbishment installation
- WRIP O&M
- Transmitter O&M

### **Deliverables:**

- NWR Steady State
- WRIP Steady State

### **Performance Goals and Measurement Data:**

| <b>Performance Measure</b>              | <b>FY 2011</b> | <b>FY 2012</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| <b>Sustain NWR Service Availability</b> | <b>Actual</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  |
|   | 96%            | 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.

**Multi-Year Budget Information (\$ in thousands):**

| <b>Complete and Sustain NWR</b>  | <b>FY 2012 &amp; Prior</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> | <b>CTC</b> | <b>Total</b> |
|----------------------------------|----------------------------|----------------|----------------|----------------|----------------|----------------|------------|--------------|
| <b>Changes from FY 2013 Base</b> | 54,467                     | 0              | 0              | 0              | 0              | 0              |            |              |
| <b>Total Request</b>             | 54,467                     | 5,594          | 5,594          | 5,594          | 5,594          | 5,594          | N/A        | Recurring    |

**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. 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, decreased false alarm rate, and improved 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 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.

Beginning in FY 2013, due to the cost of the conversion and higher priorities within NOAA, NOAA will no longer convert or refresh any systems not already operating on the 449 MHz frequency.

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

## PROGRAM CHANGES FOR FY 2013:

**Advanced Weather Interactive Processing System Tech Infusion (Base Funding: \$24,134 and 15 FTE; Program Change: -\$3,542,000 and 0 FTE):** NOAA requests a decrease of 0 FTE and \$3,542,000 for a total of 15 FTE and \$20,592,000 for Advanced Weather Interactive Processing System (AWIPS) Tech Infusion.

### Proposed Action:

With this reduction, NOAA will slow the implementation of new tools and capabilities aimed at improved decision support services including improved data delivery, collaboration and visualization of meteorological information, and eliminate the Forecast Verification Development work currently being executed by Office of Oceanic and Atmospheric Research /Global Systems Development (OAR/GSD).

Remaining funds support AWIPS II Extended, a multi-phase program to add new and improved functionalities and capabilities for NWS field forecasters, NOAA partners and the public. These capabilities include the National Centers for Environmental Prediction integration with AWIPS (NAWIPS), 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 supporting decision makers; and improved access and visualization of meteorological information.

This reduction will also defer improvements to data delivery processes of higher resolution, timely and more precise weather data, such as the generation and visualization of usable weather sensor information. AWIPS management will re-prioritize planned improvements based on the operational utility the improvement provides users, thereby minimizing the effects on users.

| <b>FY 2013 Activity</b>                  | <b>Dollars</b> | <b>FTE</b> |
|--|----------------|------------|
| AWIPS II Extended                        | \$7,337        | 0          |
| AWIPS II Extended – Phase 2              | \$6,902        | 0          |
| Forecast Tools & Apps                    | \$4,017        | 0          |
| Forecast Verification System Development | \$0            | 0          |
| Government FTE Costs                     | \$2,336        | 15         |

### Base Resources Assessment:

The base resources for this program are described in the Systems Acquisitions base narrative.

### Schedule & Milestones:

FY 2013-2017

- Continue to implement new forecast tools and capabilities, though at a slower rate
- Suspend forecast verification development efforts at OAR/GSD

### Deliverables:

- Full deployment of AWIPS II

**Performance Goals and Measurement Data**

| <b>Performance Measure:</b>  | <b>FY 2011 Actual</b> | <b>FY 2012 Target</b> | <b>FY 2013 Target</b> | <b>FY 2014 Target</b> | <b>FY 2015 Target</b> | <b>FY 2016 Target</b> | <b>FY 2017 Target</b> |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Annual number of new capabilities or products introduced into field operations   |                       |                       |                       |                       |                       |                       |                       |
| <b>With decrease</b>   | N/A                   | N/A                   | 20-30                 | 20-30                 | 20-30                 | 20-30                 | 20-30                 |
| <b>Without decrease</b>  | N/A                   | N/A                   | 50-60                 | 50-60                 | 50-60                 | 50-60                 | 50-60                 |
| <b>Description:</b> AWIPS II Extended will add new capabilities and products to sustain operations and more effectively access and process data, resulting in better forecasts and warning. This performance measure reflects the number of products and capabilities the NWS transitions into field operations per year. In FY 2011 and FY 2012, AWIPS capabilities were frozen during the migration to AWIPS II. |                       |                       |                       |                       |                       |                       |                       |

**Outyear Funding Estimates (\$ in thousands):**

| <b>AWIPS Tech Infusion</b>       | <b>FY 2012 &amp; Prior</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> | <b>CTC</b> | <b>Total</b> |
|----------------------------------|----------------------------|----------------|----------------|----------------|----------------|----------------|------------|--------------|
| <b>Changes from FY 2013 Base</b> |                            | (3,542)        | (3,542)        | (3,542)        | (3,542)        | (3,542)        | N/A        | Recurring    |
| <b>Total Request</b>             | 220,599                    | 20,592         | 20,592         | 20,592         | 20,592         | 20,592         | N/A        | Recurring    |

Outyears are estimates only. Future requests will be determined through the annual budget process.

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

Activity: National Weather Service  
Subactivity: Systems Acquisition

| <b>Object Class</b>                                      | <b>2013<br/>Decrease</b> |
|--|--------------------------|
| 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                        | <u>0</u>                 |
| 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                                      | (3,542)                  |
| 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                                     | <u>(3,542)</u>           |

**Next Generation Weather Radar: NEXRAD Product Improvement: (Base Funding: \$5,819,000 and 0 FTE; Program Change: -\$5,819,000 and 0 FTE):** NOAA requests a planned decrease of \$5,819,000 and 0 FTE for a total of \$0 and 0 FTE for the planned completion of the NEXRAD Product Improvement Program (NPI).

**Proposed Action:**

NOAA proposes to close out this program, as prior year funding will complete the NEXRAD systems upgrade with the Dual Polarization capability. NWS anticipates full deployment of Dual Polarization to the NEXRAD array by the end of 2013.

**Base Resources Assessment:**

The base resources for this program are described in the Systems Acquisitions base narrative. The Dual Polarization modification to the NEXRADs, when fully fielded and with proper NEXRAD Product Improvement investments and algorithm improvements, will improve Precipitation Estimation accuracy from +/- 35 to +/- 20 percent. Hail false alarm rates will drop from ~39 to ~8 percent.

**Outyear Funding Estimates (\$ in thousands):**

| <b>NEXRAD Product Improvement</b> | <b>FY 2012 &amp; Prior</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> | <b>CTC</b> | <b>Total</b> |
|-----------------------------------|----------------------------|----------------|----------------|----------------|----------------|----------------|------------|--------------|
| <b>Changes from FY 2013 Base</b>  |                            | (5,819)        | (5,819)        | (5,819)        | (5,819)        | (5,819)        | 0          | 114,191      |
| <b>Total Request</b>              | 114,191                    | 0              | 0              | 0              | 0              | 0              | 0          | 114,191      |

Outyears are estimates only. Future requests will be determined through the annual budget process.

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

Activity: National Weather Service  
Subactivity: Systems Acquisition

| <b>Object Class</b>                                      | <b>2013<br/>Decrease</b> |
|--|--------------------------|
| 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                        | <u>0</u>                 |
| 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                                      | (5,819)                  |
| 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                                     | <u>(5,819)</u>           |

**NWS Telecommunications Gateway Legacy Replacement: NWS Telecommunications Gateway (TG) and Backup Telecommunications Gateway (BTG): (Base Funding: \$1,195,000 and 0 FTE; Program Change: +\$6,990,000 and 0 FTE):**

NOAA requests an increase of \$6,990,000 and 0 FTE for a total of \$8,185,000 and 0 FTE to design and implement a re-architected Telecommunications Gateway (NWSTG) and its backup to accommodate future data volumes driven by increased climate and satellite observations and other requirements, and to maintain system reliability.

**Proposed Action:**

The funding requested here will support the next phase of the Re-Architecture during FY 2013-16: the *Build, Test, and Deploy phase*. During this phase, NWS will:

- Award implementation services contracts;
- Implement and transition the new architecture into operations, allowing the revamped NWSTG to begin ingesting additional observational data; and
- Deploy fully re-designed NWSTG and backup into operational steady state in FY 2017.

NWS has been collaborating closely with NESDIS to ensure relevant satellite requirements are incorporated into the functional and technical requirements for the NWSTG Re-Architecture initiative. NWSTG received approved baselined Geostationary Operational Environmental Satellite-R Series (GOES-R) requirements and all external requirements, such as Suomi National Polar-orbiting Partnership (Suomi NPP). If any of these programs makes changes to their program baseline requirements, NWSTG requirements will be updated accordingly throughout the project life cycle. As a result of continuous collaboration with NESDIS on relevant satellite data processing requirements, NWS has a high level of confidence in the current cost estimates. However, the outyear budget profile may require some revisions in the FY 2014 budget submission, as finalized satellite requirements will affect final design specifications for the Re-Architecture.

**Statement of Need and Economic Benefits:**

The NWSTG is the Nation's hub for the collection and distribution of weather data and products. The NWSTG is a central collection center and communications data switching system for millions of hydrometeorological observations and products each day for NOAA's internal use as well as other user communities, including other Federal Agencies; international organizations; commercial partners; academia; and the Public. NWSTG operates twenty-four hours a day to acquire data, process observations, construct messages, and disseminate messages and files of observations, model analysis, and forecast products. The NWSTG has been identified as an essential government resource in Presidential Decision Directive 67 – Enduring Constitutional Government and Continuity of Government Operations.

The last NWSTG re-design and significant technology refreshment was completed in 2006. In addition, the planned implementation of Geostationary, Operational Environmental Satellite (GOES) R series, Joint Polar Satellite System (JPSS), and the recently launched Suomi NPP will each place additional data flow requirements on the NWSTG. The projected volumes of observational and weather forecast and warning information cannot be managed with the current system architecture. The aging infrastructure, along with the significant increase in processing requirements, require an upgrade to the infrastructure providing the availability, accuracy, and timeliness of critical products and services that emergency managers and the public rely on during severe weather and electromagnetic events.

**Base Resources Assessment:**

The base resources for this program are described in the Systems Acquisition base narrative.

**Schedule & Milestones:**

FY 2013

- Acquire implementation services and infrastructure

FY 2014

- Build development environment
- Acquire and provision facilities
- Develop Test Plan and Test Scripts
- Build and test staging environment

FY 2015

- Build production environments
- Conduct system and operations test & evaluation
- Obtain Certification and Accreditation

FY 2016

- Cutover -architecture into operations (primary and backup systems)
- Conduct knowledge transfer from Technology Re-architecture IT support contract to Operations and Maintenance IT Support staff

FY 2017

- Maintain NWSSTG and backup using best practices and establish equipment lifecycle refreshment

**Deliverables:**

- Redesigned NWSSTG is operational and scalable to meet increased data flow requirements
- NWSSTG is processing data without decrement to either availability or latency
- NWSSTG backup is fully aligned and capable of failover

**Performance Goals and Measurement Data:**

| <b>Performance Measure:</b> | <b>FY 2011</b> | <b>FY 2012</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> |
|-----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| System Availability         | <b>Actual</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  |
| <b>With increase</b>        | -              | 96.6%          | 98%            | 98%            | 99.0%          | 99.9%          | 99.9%          |
| <b>Without increase</b>     | 99.8%          | 96.6%          | 98%            | 98%            | 96.6%          | 95.6%          | 94.6%          |

**Description:** This metric is a measure of the effectiveness and robustness of the system. It measures the amount of time the system is on-line and available to support the primary mission.

| <b>Performance Measure:</b> | <b>FY 2011</b> | <b>FY 2012</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> |
|-----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| <b>Backup Capability</b>    | <b>Actual</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  |
| <b>With increase</b>        | -              | 4              | 6              | 6              | 19             | 19             | 19             |
| <b>Without increase</b>     | 2              | 4              | 6              | 6              | 6              | 6              | 6              |

**Description:** This metric is the number (19) of mission functions (defined by the Gateway Impact Assessment as the essential business functions of the NWSSTG that must be up and running within 12 hours after an emergency) supported by our backup system. Currently, NWSSTG is capable of supporting the following business functions via the backup system: HAZCollect, GCOM, NDBC, and EMWIN. By FY 2013, the Technology Re-alignment will increase the backup capabilities by 2 additional business functions with the end goal to implement all 19 functions by FY 2016 via the Technology Re-architecture project. The purpose of ensuring all 19 functions are successfully implemented via the backup system within 12 hours is to limit mission interruption and mission degradation to ensure NWS can meet its mission providing timely forecast, watches, and warnings to its customers.

**Outyear Funding Estimates (BA in thousands):**

| <b>NWSTG</b>                     | <b>FY 2012</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> | <b>CTC</b> | <b>Total</b> |
|----------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|------------|--------------|
| <b>Changes from FY 2013 Base</b> |                | 6,990          | 15,020         | 20,020         | 9,050          | 2,000          | N/A        | Recurring    |
| <b>Total Request</b>             | 16,239         | 8,185          | 16,215         | 21,215         | 10,245         | 3,195          | N/A        | Recurring    |

Outyears are estimates only. Future requests will be determined through the annual budget process.

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

Activity: National Weather Service  
Subactivity: Systems Acquisition

| <b>Object Class</b>                                      | <b>2013<br/>Increase</b> |
|--|--------------------------|
| 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                        | <u>0</u>                 |
| 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                    | 6,990                    |
| 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                                     | <u>6,990</u>             |

**Weather and Climate Supercomputing: Hurricane Forecast Improvement Project (HFIP) Research & Development Supercomputer (Base Funding: 0 FTE and \$4,000,000; Program Change: -0 FTE and -\$2,000,000):** NOAA requests a one year decrease of 0 FTE and \$2,000,000 for a total of \$2,000,000 for Weather and Climate Supercomputing to continue operations and maintenance (O&M) on the Hurricane Forecast Improvement Project (HFIP) research and development (R&D) supercomputer located in Boulder, Colorado.

**Proposed Action:**

NWS will continue to operate the HFIP R&D supercomputer located in Boulder, Colorado. This reduction will defer routine FY 2013 hardware replacements. NWS will prioritize computing resources to accommodate the most promising models. This supercomputer will run HFIP models in real-time and results will be provided to the National Hurricane Center (NHC) forecasters as a basis for official hurricane forecasts and warnings.

This is a one-year reduction and continued support for the HFIP supercomputer will be addressed in the FY 2014 budget.

**Base Resources Assessment:**

The base resources for this program are described in the Systems Acquisitions base narrative.

**Schedule & Milestones:**

FY 2013-2015

- O&M on HFIP R&D supercomputer

**Deliverables:**

- Available R&D HPC capacity to provide current development models to the NHC through FY 2015

**Performance Goals and Measurement Data**

| Performance Measure:               |        | FY 2011 | FY 2012 | FY 2013 | FY 2014 | FY 2015 | FY 2016 | FY 2017 |
|------------------------------------|--------|---------|---------|---------|---------|---------|---------|---------|
|                                    |        | Actual  | Target  | Target  | Target  | Target  | Target  | Target  |
| Capacity of HFIP R&D Supercomputer |        |         |         |         |         |         |         |         |
| With decrease                      | Cores  | N/A     | N/A     | 23,050  | 26,000  | 33,000  | 40,000  | 47,000  |
|                                    | Tflops | N/A     | N/A     | 251     | 288     | 366     | 444     | 522     |
| Without decrease                   | Cores  | 16,648  | 23,050  | 30,000  | 37,000  | 43,500  | 51,000  | 57,500  |
|                                    | Tflops | 182     | 251     | 335     | 413     | 490     | 570     | 640     |

**Description:** The performance measure shows the capacity and power in number of cores and teraflops for the NWS HFIP R&D supercomputer. Cores refer the number of central processing units; teraflops are a measure of computing capacity in trillions of floating point operations per second. The table describes the impact that changes in the funding cycle will have on the computer system. Currently, \$1M per year is dedicated to O&M and labor costs while the remaining budget is allocated for system refresh, storage, and the purchase of new equipment. A decrease in funding will defer maintenance activities for the current system, which will be addressed in the FY 2014 budget.

**Multi-Year Budget Information (BA in thousands):**

| <b>Weather &amp; Climate Supercomputing Changes from FY 2013 Base</b> | <b>FY 2012 &amp; Prior</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016*</b> | <b>FY 2017</b> | <b>CTC</b> | <b>Total</b> |
|---|----------------------------|----------------|----------------|----------------|-----------------|----------------|------------|--------------|
|   |                            | (2,000)        | 0              | 0              | 0               | 0              |            |              |
| <b>Total Request</b>  | 10,000                     | 2,000          | 4,000          | 4,000          | 4,000           | 4,000          | N/A        | Recurring    |

Outyears are estimates only. Future requests will be determined through the annual budget process.

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

Activity: National Weather Service

Subactivity: Systems Acquisition

| <b>Object Class</b>                                      | <b>2013<br/>Decrease</b> |
|--|--------------------------|
| 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                        | <u>0</u>                 |
| 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                                | 0                        |
| 31 Equipment   | (2,000)                  |
| 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                                     | <u>(2,000)</u>           |

**NOAA Profiler Conversion: (Base Funding: \$1,700 and 0 FTE; Program Change: -\$1,700 and 0 FTE):** NOAA requests a decrease of \$1,700,000 and 0 FTE for a total of \$0 and 0 FTE to terminate the NOAA Profiler Conversion Program (NPN).

**Proposed Actions:**

NOAA proposes to terminate the conversion and tech refresh of 32 profiler sites from 404 to 449 MHz. Thirty-two of the existing 37 wind profilers use a 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 will be required to cease transmitting on this frequency to avoid interference with the new European Union's Search and Rescue Satellite Tracking (SARSAT) transponders aboard the (Galileo) GPS satellite constellation.

NOAA proposes to terminate the conversion and tech refresh program in FY 2013 and will continue to pursue improvements in detecting tornadoes and other severe weather through other programs. NOAA will continue to use existing observing systems, such as Dual Polarized radar, radiosondes and aircraft observations to the fullest extent to mitigate the loss of profiler data. Three (3) profiler sites in Alaska already operating on the 449 MHz frequency will continue to operate. Additionally, NOAA expects improvements in tornado lead time when GOES-R becomes operational. These profilers will allow NOAA to continue to provide volcanic forecast products to preserve a safe Alaska airspace.

**Base Resources Assessment:**

The base resources for this program are described in the Systems Acquisition base narrative.

**Outyear Funding Estimates (\$ in thousands):**

| <b>NOAA Profiler Conversion</b>  | <b>FY 2012 &amp; Prior</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> | <b>CTC</b> | <b>Total</b> |
|----------------------------------|----------------------------|----------------|----------------|----------------|----------------|----------------|------------|--------------|
| <b>Changes from FY 2013 Base</b> |                            | (1,700)        | (1,700)        | (1,700)        | (1,700)        | (1,700)        |            |              |
| <b>Total Request</b>             | 24,943                     | 0              | 0              | 0              | 0              | 0              | N/A        | 24,943       |

Outyears are estimates only. Future requests will be determined through the annual budget process.

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

Activity: National Weather Service  
Subactivity: Systems Acquisition

| <b>Object Class</b>                                      | <b>2013<br/>Decrease</b> |
|--|--------------------------|
| 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                    | (1,700)                  |
| 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                                     | (1,700)                  |

**Ground Readiness Project: (Base Funding: \$0 and 0 FTE; Program Change: +\$12,400,000 and 0 FTE):** NOAA requests an increase of \$12,400,000 and 0 FTE to ensure utilization of the substantial increase in environmental satellite observations that will help to improve weather warnings and forecasts.

**Proposed Action:**

NWS must update its information technology (IT) infrastructure to ensure adequate processing, delivery and exploitation of new environmental satellite data. In order to improve the fidelity and accuracy of weather warnings and forecasts, NOAA has invested billions of dollars in new satellite sensing systems and data sets within NOAA's National Environmental Satellite, Data, and Information Service (NESDIS) that will come online over the course of FY 2013-2017. These systems and their launch dates are as follows:

| Satellite System   | Launch Date Estimate                   |
|--|--|
| Suomi National Polar-orbiting Partnership (Suomi NPP)                      | 1Q FY 2012 (launched October 2011)     |
| Joint Polar Satellite System (JPSS)  | FY 2017                                |
| Geostationary Operational Environment Satellites - R & S series (GOES-R/S) | 1Q FY 2016 and 2Q FY 2017 respectively |

The investment will prepare NOAA for the three-fold increase in data volume expected from these new systems, which would far exceed the capacity of NWS's current IT infrastructure to transmit the data to NWS forecast offices and between systems. To fully exploit and benefit from these new observations and products, NWS's IT infrastructure must be enhanced.

With this funding, NWS will take a holistic, enterprise-based approach to managing and integrating the necessary IT redesign and upgrades. NWS will boost both data-processing and dissemination capabilities. NWS' primary dissemination capabilities will include delivering data over a satellite broadcast network via Direct Readout (DRO) antennas and terrestrial telecommunication circuits.

Provided below is detailed information on the activities that will be conducted in FY 2013-2017.

- Providing Consolidated Distribution Services (CDS) functionality: NWS will develop a CDS functionality to sectorize, composite, integrate and manipulate the large volumes and types of new data and metadata. This effort will allow NWS to significantly improve current methods of processing and distribution of data by developing smart distribution logic and software (smart push/pull), which ensures that data users receive only the data they request from the system, omitting extraneous data and reducing cost and demands on bandwidth. The system architecture includes the Environmental Satellite Processing Center (ESPC), Advanced Weather Interactive Processing System (AWIPS), NWS Telecommunications Gateway (NWSTG), and National Centers for Environmental Prediction (NCEP).
- Direct Readout (DRO) and Satellite Broadcast Network (SBN) Upgrades: Select NWS sites require direct receipt of satellite observations in order to minimize data delays and to obtain all raw products for meeting timelines to issue severe weather warnings to emergency managers and the general public. Without timely receipt of this data, services are degraded, potentially increasing risk to life and property. Specifically, these

sites require upgrades to direct readout satellite systems to receive GOES-R Rebroadcast (GRB) satellite data. Due to projected changes in future data transmission format, existing GOES-Variable data (GVAR) systems will be upgraded to GRB. In this case, utilization of the direct readout antenna solution is more cost effective than redistribution of a large amount of satellite data through the current terrestrial communication system. GRB antenna upgrades will be provided at the Aviation Weather Center, National Hurricane Center, Space Weather Prediction Center, and the Storm Prediction Center, as well as NWS's Alaska and Pacific Regional Headquarters.

The Satellite Broadcast Network (SBN) is a key component of the AWIPS communication network that sends data from the AWIPS Network Control Facility (NCF) to the public and each Weather Forecast Office (WFO), River Forecast Center (RFC), and National Center. This one-way communication link is the primary delivery mechanism for essential observations, model and warning information to NWS users and the public. Current SBN services will require an approximately three-fold increase in capacity to allow for the transmission of new data. This new satellite data consists of geographically sectorized and re-sampled imagery from GOES-R and Suomi NPP and is compressed and loaded with headers prior to transmittal via terrestrial fiber to the satellite uplink station. It differs from the DRO by being a subset of the full resolution; full disk imagery directly from the satellite. Master ground station, uplink and downlink equipment, and associated satellite provider services will be upgraded.

- Increasing terrestrial telecommunications, processing and interagency peering capabilities: NOAA's three primary systems which produce/disseminate data to internal and external users (NCEP, NWSTG, and AWIPS) must ingest and distribute new satellite observations and products. NOAA will lease terrestrial telecommunications equipment to transmit the data between the various processing and dissemination systems to make products available to NOAA stakeholders.

Additional processing capabilities are required to ingest and process the data into model forecasts and weather products. A phased bandwidth augmentation will be executed with oversight of a centralized project team. Increasing the terrestrial telecommunications capacity in a phased approach will ensure NWS does not incur sustainment costs before the increased capacity is required. The terrestrial telecommunications capacity will include implementation of all Federal Information Security Management Act (FISMA) requirements. Each link will be analyzed for information exchange requirements, data path efficiency and volume of data required. These improvements will comply with Office of the Federal Coordinator for Meteorology Committee for Operational Processing Centers (COPC) agreements to improve NOAA's peering capabilities with the Department of Defense (DoD). This peering capability will provide the network architecture direct connectivity to DoD for sharing large volumes of data at high data rates between its partners.

**Statement of Need and Economic Benefits:**

This investment will enable NWS to better meet the requirements of local, state, and federal first responders, emergency managers and decision-makers for significantly refined warnings and forecasts. In particular, new satellite data and processing capabilities will improve forecasts from the county/multi-town scale to the neighborhood scale, and in some cases, even street level. The activities proposed in this initiative will ensure that NWS is able to exploit new satellite observations, resulting in higher fidelity, more accurate weather prediction models. This will also result in more refined, reliable, and advanced notice of deadly weather events by improving tornado lead time and reducing false alarm rates, which helps to save lives.

This funding profile covers the costs needed to acquire and sustain the IT infrastructure (hardware, software and telecommunications) required to maintain mission continuity and exploit the increased satellite observations. The funding requested is not duplicative of other NWS funding requests. However, the outyear budget profile may require some revisions in the FY 2014 budget submission, as finalized satellite requirements and schedule will affect final design specifications for the IT redesign.

**Base Resources Assessment:**

This is a new initiative and does not have any base funding.

**Schedule & Milestones:**

FY 2013

- Deploy and test NCEP’s additional processing capability in support of GOES-R launch
- Support GOES-R Data Operations Test
- Prototype and test CDS functionality
- Augment COPC network for GOES-R data

FY 2014

- Buy, deploy and test terrestrial telecommunications bandwidth for NCEP, AWIPS in support of GOES-R deployment
- Buy, deploy and test SBN bandwidth in support of GOES-R deployment

FY 2015

- GOES-R launch and post-launch checkout
- Direct readout antenna upgrades at six sites
- CDS operational (supporting post-launch tests)

FY 2016

- Increase terrestrial telecommunications bandwidth for NCEP, AWIPS and NWSTG in support of GOES-S deployment
- Increase SBN bandwidth in support of GOES-S deployment
- GOES-S launch and post-launch checkout
- Direct readout antenna upgrades at 2 sites

FY 2017

- Direct readout antenna upgrades at five sites
- Conduct needed refresh and operation and maintenance activities as new satellite system launches

**Deliverables:**

- Increased telecommunications bandwidth for NOAA and COPC architecture
- Operational CDS functionality
- Three-fold increase in AWIPS SBN capacity
- Replacement of 13 DRO antennas

**Performance Goals and Measurement Data:**

| <b>Performance Measure:</b>   | <b>FY 2011</b> | <b>FY 2012</b> | <b>FY 2013</b> | <b>FY 2014</b> | <b>FY 2015</b> | <b>FY 2016</b> | <b>FY 2017</b> |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Percent (%) of NOAA-managed satellite data processed and distributed within | <b>Actual</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  | <b>Target</b>  |

|                         |     |     |       |       |       |       |       |       |
|-------------------------|-----|-----|-------|-------|-------|-------|-------|-------|
| targeted time           |     |     |       |       |       |       |       |       |
| <b>With increase</b>    | N/A | N/A | 98.5% | 98.5% | 98.5% | 98.5% | 98.5% | 98.5% |
| <b>Without increase</b> | N/A | N/A | 98%   | 98%   | 70%   | 50%   | 30%   |       |

**Description:** The without increase targets reflect the reduction in availability of satellite data. Suomi NPP data would need to be reduced to legacy sizes with full legacy GOES starting in FY 2013. GOES-R data would be reduced to legacy GOES sizes in FY 2015 due to only 1 legacy satellite being fully available with the reduced availability of the new GOES-R data. JPSS and GOES-S will have reduced availability by FY 2017 if NWS remains at legacy capability. The without increase target data are high level estimates based upon the ratio of legacy data to the full data set that each satellite will bring.

**Multi-Year Budget Information (\$ in thousands):**

| Satellite User Readiness & Prior | FY 2012 | FY 2013 | FY 2014 | FY 2015 | FY 2016 | FY 2017 | CTC | Total     |
|----------------------------------|---------|---------|---------|---------|---------|---------|-----|-----------|
| Changes from FY 2013 Base        |         | 12,400  | 15,446  | 18,707  | 15,399  | 15,399  |     |           |
| Total Request                    | 0       | 12,400  | 15,446  | 18,707  | 15,399  | 15,399  | N/A | Recurring |

Outyears are estimates only. Future requests will be determined through the annual budget process.

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

Activity: National Weather Service  
Subactivity: System Acquisition

| <b>Object Class</b>                                      | <b>2013<br/>Increase</b> |
|--|--------------------------|
| 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                        | <u>0</u>                 |
| 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                    | 12,400                   |
| 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                                     | <u>12,400</u>            |

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**APPROPRIATION ACCOUNT: PROCUREMENT, ACQUISITION, AND CONSTRUCTION  
SUBACTIVITY: CONSTRUCTION**

The objectives of the Construction subactivity are to:

- Upgrade and improve NOAA's Weather Forecast and Weather Service Offices (WSO)
- Capital improvements to maintain structural integrity
- Maintain compliance with federal law and national and local building codes

**WEATHER FORECAST OFFICE CONSTRUCTION**

To support its mission, the NWS operates and maintains 122 WFOs; 13 RFCs; 18 WSO; 8 National Centers; 2 Data Collection Offices; and 2 Tsunami Warning Centers. Of the WFOs and RFCs, 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 RFC) and cost approximately \$250 million. Since then, NWS added five WFOs to address service coverage requirements in Guam; Northern Indiana; Caribou, Maine; Huntsville, Alabama; and Key West, Florida. 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 (HVAC), roof and uninterruptible power supply replacements). In addition, this effort is essential to maintaining compliance with federal law and national and local building codes.

**Schedule & Milestones:**

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

FY 2017

- Award Bethel, AK WSO building contract

**Deliverables:**

- Alaska Facility Modernization
- Pacific Facility Modernization

**Multi-Year Budget Information (\$ in thousands):**

| <b>WFO<br/>Construction</b>          | <b>FY 2012<br/>&amp; Prior</b> | <b>FY<br/>2013</b> | <b>FY<br/>2014</b> | <b>FY<br/>2015</b> | <b>FY<br/>2016</b> | <b>FY<br/>2017</b> | <b>CTC</b> | <b>Total</b> |
|--------------------------------------|--------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|------------|--------------|
| <b>Changes from<br/>FY 2013 Base</b> | 126,565                        | 0                  | 0                  | 0                  | 0                  | 0                  |            |              |
| <b>Total Request</b>                 | 126,565                        | 3,150              | 3,150              | 3,150              | 3,150              | 3,150              | N/A        | Recurring    |

Outyears are estimates only. Future requests will be determined through the annual budget process.

**PROGRAM CHANGES FOR FY 2013:**

No program changes requested for this subactivity.

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