National Oceanic and Atmospheric Administration
National Weather Service
NWS Dissemination Systems O&M
04-04-04-001, 04-04-01-005 & 04-04-05-001
Operational Analysis
FY2009

Executive Summary

This operational analysis (OA) is an annual, in-depth review of the NWS Dissemination Systems (NDS) program's performance based on the following measurement areas:

- Customer Results
- Strategic and Business Results
- Financial Performance
- Innovation

The OA focuses on the operational state of the program as of September 30, 2009. The NDS program directly facilitates NOAA's Strategic Goal to "Advance understanding and predict changes in the Earth's environment to meet America's economic, social, and environmental needs." The current program is meeting established cost, schedule and performance parameters.

The NDS program includes three on-going operational NWS information dissemination projects. The first project is the management and contract costs for the NOAA Weather Wire Service (NWWS), a leased satellite-based system that transmits weather forecasts, watches and warnings from NOAA's Weather Forecast Offices (WFO) and selected NWS National Centers (e.g., the National Hurricane Center) to federal, state and local emergency managers, media, and other private sector subscribers. NWWS provides the fastest means of broadcasting severe weather warnings. Severe weather warnings are routinely broadcast from the originating WFO or National Center to the end user in 10 seconds or less 98% of the time. The second project is the management and contract costs for support of the International Satellite Communications System (ISCS) which broadcasts weather information to over 80 countries in the Atlantic and Pacific basins. ISCS provides key information for aviation and supports the data communication requirements of the World Meteorological Organization's Region IV for which the U.S. is the central communications hub. The third project is the management and contract costs for the NOAA Weather Radio (NWR) network and costs to refurbish 400 older (1970s) transmitters that are experiencing increasing down time and maintenance costs. NWR is one of the most efficient and cost-effective methods of disseminating severe weather watches and warnings, flash flood warnings, and other NWS products and services to NWS' constituency, including the general public and all levels of government emergency managers. It is also the only NWS dissemination system capable of reaching individual citizens at nominal cost to citizen (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.

1.0 Customer Results

The NWS provides weather, hydrologic 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. To that end, NDS provides the primary paths for NWS forecasters to disseminate advance warnings of tornadoes, flash floods and winter storms as well as to provide aviation forecasts. Significant findings in analysis of weather data information dissemination show:

1 - The NWWS issues watches and warnings within 10 seconds 98% of the time.
2 - The ISCS Operational Availability is maintained at better than 99.9%.
3 - The NWR coverage availability is better than 97% of the total USA population
4 - The NWR coverage is 100% for areas of High Risk for severe weather events.

1.1 Customer Requirements and Costs

NDS are projects in which DOC has partnered with DHS and FAA to develop, procure, deploy, operate and maintain dissemination capabilities.

The NWWS network provides state and federal government, commercial users, media, and private citizens with timely delivery of meteorological, hydrological, climatological, and geophysical information. The vast majority of NWWS products are weather and hydrologic forecasts and warnings issued around the clock from 141 NWS offices nationwide. An important element of the NWWS mission is providing rapid delivery of critical NWS issued severe weather warnings and watches. All products in the NWWS data-stream are prioritized with weather and hydrologic warnings receiving the highest priority (watches are next in priority). This allows special handling and delivery of warning products ahead of other less critical weather forecast products. NWWS delivers severe weather and storm warnings to users in 10 seconds or less from the time they are issued, making it the fastest delivery system available for these very time sensitive products.

The ISCS network is a satellite data distribution system operated by the NWS providing support to (1) the World Area Forecast System (WAFS), and (2) the Region IV Meteorological Telecommunications Network (RMTN). ISCS support for WAFS is on behalf of the International Civil Aviation organization (ICAO) and World Meteorological Organization (WMO). ISCS/WAFS purpose is to provide the worldwide aviation community with operational meteorological forecasts and information about meteorological phenomena required for flight planning and safe, economic, and efficient air navigation. As a real-time, point to multi-point service, it operates on a 24-hour/365-day basis. NWS obtains funding support for ISCS/WAFS from the United States Federal Aviation Administration (FAA). ISCS support for RMTN is part of a cooperative effort between NWS and WMO to improve the Global Telecommunications System (GTS), in WMO Region IV (North and Central America). RMTN allows for a two-way exchange of meteorological information between the United States and nations in the Caribbean and Central America. It replaced a much slower, less reliable, “daisy chain" of terrestrial circuits.

NOAA Weather Radio All Hazards (NWR) is a nationwide network of radio stations broadcasting continuous weather information directly from the nearest National Weather Service office. NWR broadcasts official Weather Service warnings, watches, forecasts and other hazard information 24 hours a day, 7 days a week. In collaboration with the Federal Communication Commission's (FCC) Emergency Alert System, NWR is an "All Hazards" radio network, making

it a single source for comprehensive weather and emergency information. In conjunction with Federal, State, and Local Emergency Managers and other public officials, NWR also broadcasts warning and post-event information for all types of hazards – including natural (such as earthquakes or avalanches), environmental (such as chemical releases or oil spills), and public safety (such as AMBER alerts or 911 Telephone outages). NWR includes more than 1000 transmitters, covering all 50 states, adjacent coastal waters, Puerto Rico, the U.S. Virgin Islands, and the U.S. Pacific Territories. NWR requires a special radio receiver or scanner capable of receiving the signal. Broadcasts are found in the VHF public service band at seven designated frequencies.

The NDS program is fully meeting the needs of a wide range of customers including:

- NOAA forecasters charged with warning responsibility
- Other Federal Agencies requiring weather data for operational decisions including the FAA, USGS, DHS
- State and local emergency managers and local officials charged with public preparedness and response decisions for extreme events, hazardous spills, homeland security issues, and wild fire incidents
- Private sector environnemental information user
- Weather sensitive businesses including transportation, energy, and agriculture
- National, state, and local media
- Citizens who act on the information or are directed to respond by governmental and other local decision makers
- Waterway and reservoir managers
- Coastal fishing and marine operators
- Military and civil aviation operators and airport managers
- Highway, agriculture and forestry managers

1.2 Performance Measures

Performance of the NDS investment for FY2009 is summarized in the table below. The measures align with Performance Reference Model developed by the Federal Enterprise Architecture Program Management Office (FEA-PMO). The performance goals are achieved by a comprehensive effort that 1) provides for a robust preventive and corrective maintenance program, 2) ensures an adequate and efficient level of spares are maintained at the depot, and 3) supports an aggressive, proactive program to identify and replace components that are vulnerable to technology obsolescence or that are demonstrating excessive failure rates. Components vulnerable to technology obsolescence are identified ahead of time and projects initiated in advance to define and develop replacements. Components having excessive failure rates are identified by monitoring spares usage and projects initiated to increase component reliability. This strategy has resulted in NDS consistently meeting or exceeding its performance goals.

Measurement Area	Measurement Indicator	2008 Baseline	Through September 30, 2009

Mission and Business Results	NWR broadcast coverage for areas at high risk of incidences of severe weather.	100% of areas covered	100% of areas covered
Process and Activities	NWWS warnings throughput	NWWS warnings throughput of warnings 10 seconds or less 98% of the time	Throughput of warnings 9.69 seconds 98% of the time
Customer Results	ISCS network availability	99% network availability	Operational Availability of network at +99.9%
Technology	% of old NWR transmitters refurbished	26% (of 400) old NWR transmitters refurbished	41% (of 400) old NWR transmitters refurbished

2.0 Strategic and Business Results

This investment continues to meet established cost, schedule and performance goals and must continue in order for NOAA to meet its Strategic Goals of Serving Society's Needs for Weather and Water; and Supporting the Nation's Commerce with Information for Safe, Efficient, and Environmentally Sound Transportation. The program also continues to meet the goals of our partners. State and local emergenccy managers rely on NWWS information for timely notification of weather and civil hazards for benefit to public safety. The FAA relies on ISCS information for safe, efficient civil flight operations. Commercial broadcasters rely on NWR for activation of the Emergency Alert System to warn the public of severe weather and other civil hazards. NDS activities are essential to ensuring the continuous flow of weather information to users and to sustaining the operation of the investment in NWWS, ISCS and NWR networks. Program management and controls are in place to ensure the program continues to meet its goals and objectives and monitor how well the program performs.

2.1 Program Management and Controls

The NDS program is managed in accordance with three management instructions for the operation, maintenance, and cost sharing of network O&M costs. NWSI 10-1716 NOAA WEATHER WIRE SERVICE (NWWS) SYSTEMS MANAGEMENT describes how NWS operates and maintains NWWS. NWSI 10-1721 INTERNATIONAL SATELLITE COMMUNICATIONS SYSTEM (ISCS) SYSTEMS MANAGEMENT describes how NWS as the functionary specified in an Inter-agency agreement with the FAA manages, operates and maintains the ISCS. NWSI 10-1711 NOAA WEATHER RADIO ALL HAZARDS (NWR) SYSTEMS MANAGEMENT instruction describes how the NWS manages, operates and maintains the NOAA Weather Radio All Hazards (NWR) network.

In addition, NDS is also subject to, and complies with, the OMB requirements of Circular No. A-11, Planning, Budgeting, Acquisition, and Management of Capital Assets; and NOAA's Planning, Programming, Budgeting, and Execution System (PPBES). This ensures the NDS investment is exposed to a rigorous review and decision making process that assesses NDS performance relative to its contributions to NOAA's strategic goals and that it continues to be a viable and necessary investment.

The day-to-day program and financial management of the NDS program is provided by program managers and analysts within the Office of Operational Services (OOS) and other NWS Line

Office. OOS provides centralized program planning and oversight for decentralized program execution. Critical functional tasks for engineering, configuration management, logistics management, maintenance, telecommunications, and training are centrally planned by OOS and other NWS Headquarters organizations with inputs by Regional field offices. OOS conducts quarterly reviews of program operational performance and monthly reviews of financial performance. Key program milestones are included and tracked in the OOS and NWS Annual Operating Plans, the Exhibit 300, and quad charts. Periodic reviews of project implementation and funding status are conducted by NDS program managers to ensure the FCC inter-agency agreement terms and conditions are adhered to. The oversight of the NDS program has provided a sufficient level of management control and has sustained the continued ability to meet performance goals during the recent difficult budget years.

2.2 Monitoring Cost, Schedule and Performance

OOS program analysts use several systems to measure and track cost, schedule, and performance metrics. Furthermore, the APMC reviews program status quarterly, and is consulted on major project Engineering Change Proposals (ECPs), business case analyzes, and cost schedule and performance projections.

a. Cost: OOS has oversight responsibility for the entire NDS budget. Budget development and execution is accomplished using PC-based spreadsheets (currently Microsoft Excel) linked to the NOAA financial management systems. These spreadsheets compare actual cost data with budget models and to make the required model adjustments for subsequent budget development cycles. For over ten years, OOS Program Analysts have worked with the Regions and other program participants to understand NDS costs and to establish a budget that ensures NDS achieves it performance goals and that NOAA achieves its strategic goals at the lowest life-cycle cost and least risk. Cost and financial data are monitored on a monthly basis to identify discrepancies with the approved financial plan and to develop corrective actions. These data are also used to support program/budget reviews, answer questions from high headquarters, OMB, and Congress.

b. Schedule: NWWS network improvements included a minor expansion as a result of hurricane Katrina. Funding was provided in a FY2006 Hurricane Supplemental appropriation to install a backup communications capability to 25 coastal WFOs (including 10 NEXRAD radar sites) in FY2006/2007. Contract modification and engineering change proposal were completed in April 2007. Site surveys and installation designs were completed in FY2007. Installations were completed in FY2008. For FY2009, the NWWS network continued a steady-state effort with no additional active improvement projects. The ISCS program is a steady-state effort with no active improvement projects. The completion of the NWR transmitter expansion for 100% coverage of High Risk (severe weather) areas was completed in FY2008. The refurbishment of 400 older (1970s) NWR sites is underway with 164 completed sites including the 57 for FY2009. Additional sites are planned for FY2010-2012.

c. Performance: NWWS and ISCS performance is routinely monitored by the service providers under contract and by the NWS Telecommunications Gateway. The NWWS and ISCS service providers provide network operations monitoring at their hub downlink centers with 24/7 staffing with support to all sites in the network. In addition, NWS Telecommunications Gateway personnel provide a 24/7 notification for observed service interruption. NWR performance is routinely and systematically monitored by Remote Off-Air Monitoring hardware at approximately 80% of the sites with the remainder monitored real time by WFO staff and

user/cooperators. In addition, telephone and email trouble reporting is centrally received from users and logged as trouble tickets. Analysis of the trouble tickets generated by each call or email is used to improve maintenance and training, maintenance and operations manuals and other documentation. NWR maintenance and failure information and statistics are tracked in the NWS Engineering Management Reporting System (EMRS). This information is used to calculate service availability, mean time between failures, and mean time to repair. Monthly monitoring of these parameters provides an overall assessment of the health of the system.

2.3 Security

There are three IT systems funded by the NDS program: NWWS - NOAA8105, ISCS - NOAA8209, and NWR - NOAA8103. The ISCS and NWWS systems are supported by contractor staff with contractor-owned equipment and reside in contractor facilities. The nature of the contracted IT services for these systems is operations and maintenance. The following IT Security Program Policies and Acquisition Regulations, as applicable, are used in each contract to meet IT Security requirements, including contract personnel requirements, deliverables, and system compliance standards: Commerce Procurement Memorandum 2003-09 issued November 17, 2003; Commerce Acquisition Regulation (CAR) 1352.239.73 - Security Requirements for Information Technology Resources; Commerce Acquisition Regulation (CAR) 1352.239-74 Security Processing Requirements For Contractors/Subcontractor Personnel For Accessing DOC Information Technology Systems; Commerce Acquisition Manual (CAM) 1337.70 - Security Processing Requirements for Service Contracts; NIST SP 800-64 - Security Considerations in the Information System Development Life Cycle. Background information and checks are conducted in accordance with DOC/NOAA C&A Process and Homeland Security Presidential Directive 12 (HSPD12). Contractor performance of required IT security management, operational, and technical controls is assessed in accordance with NIST SP 800-53 Revision 2, Recommended Security Controls for Federal Information Systems and NIST SP 800-53A, Guide for Assessing the Security Controls in Federal Information Systems, as part of the annual FISMA self-assessment of control effectiveness. Conformance to these contract requirements is the responsibility of the Contracting Officer, the Contracting Officer's Technical Representatives, and the IT Security Officer. Key security related dates included in table below.

Name of System	C&A Date	Date Security Control Testing Completed	Date Contingency Plan Tested
NWWS - NOAA8105	3/30/09	3/20/09	3/20/09
ISCS - NOAA8209	3/30/07	7/24/09	7/24/09
NWR - NOAA8103	3/31/07	8/19/09	8/19/09

3.0 Financial Performance

The purpose of the NDS funding is to pay recurring O&M costs for NWWS, ISCS and NWR network operations, telecommunications, electric utilities, system maintenance and repair, maintenance training for electronic technicians, preventive and depot level maintenance, repair and logistics support, and sustaining engineering efforts with the goal of maintaining the minimum performance measures shown above. The established cost baseline for this performance is an annual, recurring funding level of $10,114M. In FY09, the budget was exceeded at $10,294M for accomplishing unplanned IT Security investments. The program

successfully achieved all performance measures for the year and maintained compliance with IT Security requirements. Subsequent years of funding must be maintained to avoid negative cumulative effects that will result in larger costs and higher risks to system performance. It is critical that FY10 funding continues at or above the FY09 level or the risk of network availability decreasing will increase significantly.

3.1 Joint Funding

In addition to the DOC funding discussed above, funding is provided by the FAA. For FY2009, DOC received $1.400M from FAA. This funding was used to fund the ISCS operations, hardware and software upgrades, depot level maintenance, and labor for government employees.

FY2009 budget execution details are provided in the following table:

Budget Item	NWS	FAA
NWWS O&M	$2.996M	
ISCS O&M	$0.322M	$1.400M
NWR O&M	$4.835M	
NWR Transmitter Operations Earmark	$2.141M	
Total	**$10,294M**	**$1.400M**

3.2 Financial Performance Review

Financial performance is monitored on a monthly basis by OOS program analysts and reviewed with the various NWS and NOAA organizations for reasonableness and cost efficiency. The NDS O&M budget is reviewed quarterly by the OOS Director in conjunction with the overall OOS budget. Where the government contracts for services, monthly reports from contractors are required to ensure the Government has the information it needs to evaluate cost performance. A detailed review of work and priorities is undertaken if cost is significantly above base lined values. Also, any necessary corrective actions are also identified and implemented.

4.0 Innovation to Meet Future Customer Needs

The mission of the OOS is to provide cost effective operations and maintenance support for NWS systems in support of our customers. OOS routinely explores alternative maintenance concepts, best practices, contract strategies, technologies, etc to provide improved services at lower costs. A critical NDS subsystem is rapidly reaching the end of life. The Console Replacement System was designed in the 1980s and has become obsolete, increasingly logistically unsupportable, and cannot support new or changing system and service requirements. The Weather Radio Improvement Project (WRIP) was initiated in 2007 to address future challenges, better meet customer needs, make better use of technology, and lower operating costs. The WRIP combines telecommunication requirements for the NWWS and NWR programs and completes a technology refresh for the operational equipment necessary to sustain NWWS and NWR operations. Likewise, the ability to support the new and evolving IT security requirements is limited due to the commercially unsupportable operating system and hardware architecture of the current networks. The objective of the WRIP development is to bring NWWS and NWR programs into full compliance with IT current security requirements.