THE FEDERAL PLAN FOR METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH

FISCAL YEAR 2003

EXECUTIVE SUMMARY

For Fiscal Year (FY) 2003, the President's budget requests a total of $2.84 billion for meteorological services and supporting research. Of the requested total, $2.46 billion is designated for operations and $384 million for supporting research. Table ES-1 lists a breakout of the FY 2003 budget proposal.

For FY 2003, 93.1 percent of the total funds requested will go to the Departments of Commerce (DOC), Defense (DOD), and Transportation (DOT). The distribution among these three departments is DOC 60.4 percent, DOD 15.6 percent, and DOT 17.1 percent. The other federal agencies will share the remaining 6.9 percent.

By comparison, the FY 2003 request represents an increase of 5.4 percent above the $2.7 billion appropriated in FY 2002. Within the three major departments, DOC and DOD request increases of 8.5 percent and 4.5 percent, respectively; DOT requests a decrease of 1.9 percent. The DOC increase is attributable to requests for increases by NWS, NESDIS, NOS, OAR, and NOAA Corps. The overall DOD increase offsets supporting research decreases in DMSP (69 percent), Air Force (20.4), and Army (23.3 percent). DOT's 1.9 percent decrease is largely attributable to reductions in FAA's operations request.

The budget requests for the other departments are as follows: Department of Agriculture (USDA) an increase of 2.1 percent, Department of the Interior (DOI) no change, Environmental Protection Agency (EPA) an increase of 17.2 percent; National Aeronautics and Space Administration (NASA) a decrease of 0.4 percent; and Nuclear Regulatory Commission (NRC) an increase of 90 percent.

Figure ES-1 depicts each agency's proportion of the requested FY 2003 federal budget for meteorological operations and supporting research. Each agency's portion of the requested funding for meteorological operations is shown in Figure ES-2. Of the $2.46 billion requested for meteorological operations, DOC, DOD, and DOT account for slightly over 99.4 percent of the funds. Overall, operational costs increased by 6.3 percent. Figure ES-3 depicts each agency's portion of the proposed federal supporting research budget. Unlike operations, DOC, DOD, and NASA account for the major share (86 percent) of the supporting research budget. Other requests for supporting research funds are: increases in DOC (9.9 percent), DOT (16.8 percent), and EPA (17.2 percent); decreases DOD (23.1 percent); and no change in NASA.

All agencies project a personnel total of 14,462 full-time equivalent (FTE) to be employed in federal meteorological operations in FY 2003. This figure represents an increase of 0.1 percent from the 14,449 FTE employed in FY 2002.

Table ES-1. Federal Budget for Meteorological Operations and Supporting Research, FY 2003 (in thousands of dollars)

Agency	Operations	% of TOTAL	Supporting Research	% of TOTAL	TOTAL	% of TOTAL
Agriculture	$13,300	0.5	$15,500	4.0	$28,800	1.0
Commerce	1,598,118	65.0	120,037	31.3	1,718,155	60.4
Defense	387,783	15.8	55,610	14.5	443,393	15.6
Interior	1,100	0.0	0	0.0	1,100	0.0
Transportation	456,386	18.6	30,862	8.0	487,248	17.1
EPA	0	0.0	7,500	2.0	7,500	0.3
NASA	2,342	0.1	154,256	40.2	156,598	5.6
NRC	95	0.0	0	0.0	95	0.0
TOTAL	2,459,124	100.0	383,765	100.0	2,842,889	100.0

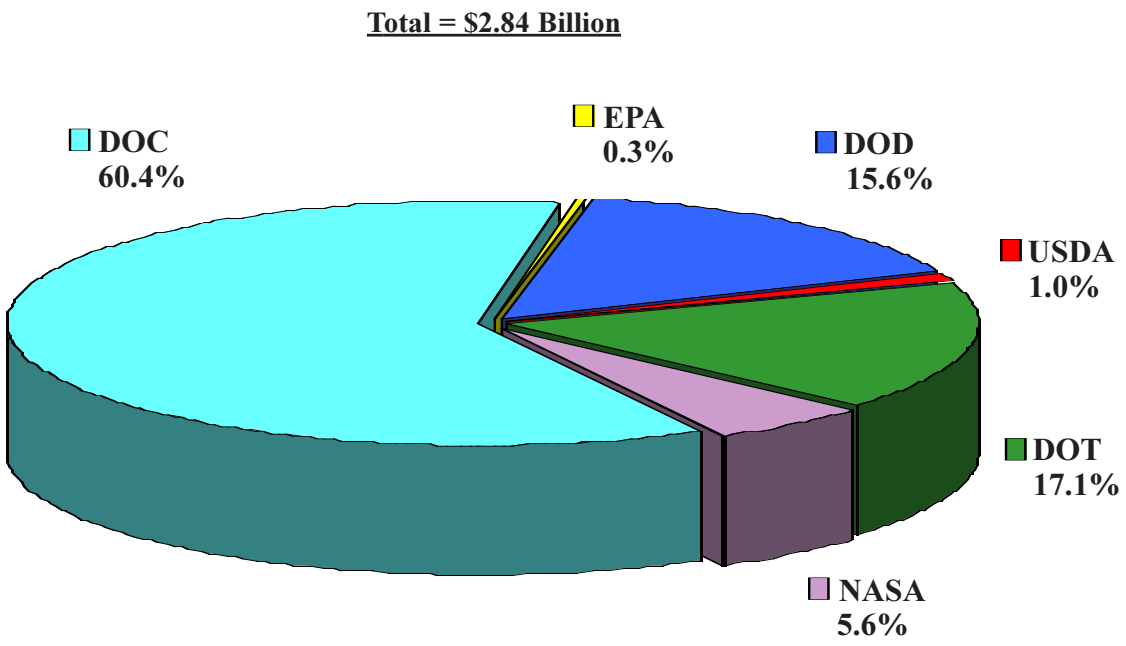

Figure ES-1. Agency Percent of Total Federal Budget for Meteorological Operations and Supporting Research, FY 2003.

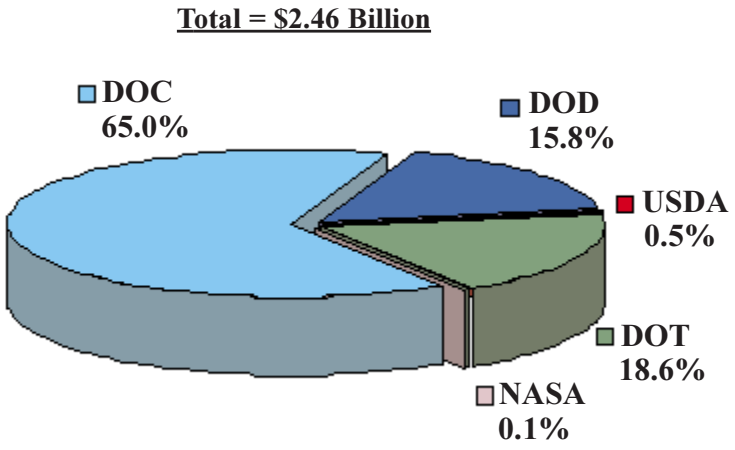

Figure ES-2. Agency Percent of Federal Budget for Meteorological Operations, FY 2003.

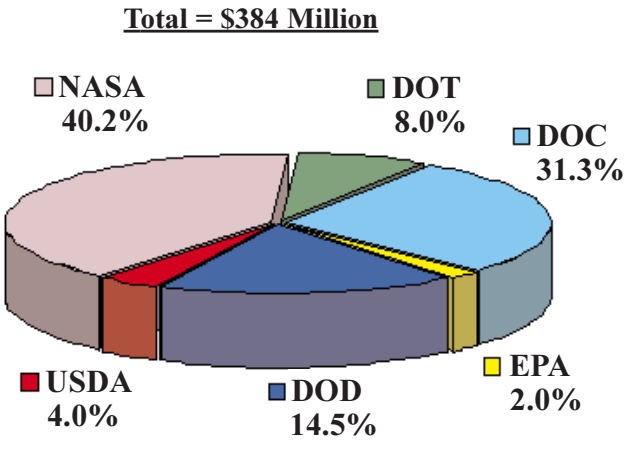

Figure ES-3. Agency Percent of Federal Budget for Supporting Research, FY 2003.

MAJOR PROGRAMS--DOC, DOD, and DOT

Next Generation Weather Radar (NEXRAD). The NEXRAD Program which began in FY 1981 was responsible for procurement, installation, and operation of the Weather Surveillance Radar-1988 Doppler (WSR-88D). The first limited production WSR-88D system was installed at Oklahoma City, Oklahoma in May 1990 and commissioned 4 years later in February 1994. The original program plan called for a total of 161 radars. In response to a National Research Council report, three additional radars were added and raised the total to 164 radar sites. The last system in the basic procurement schedule was installed in June 1996.

By agency, as of June 2001, the DOC/National Weather Service had commissioned 123 sites, the DOD (USAF and Army) had commissioned 32 sites (within the states and overseas), and the DOT/FAA had commissioned 12 sites. DOD has three systems at Keesler AFB, Mississippi, for training; DOC/NWS has one each at the National Reconditioning Center, and NWS Training Center in Kansas City, Missouri and at the Operational Support Facility, Oklahoma City, Oklahoma.

Automated Surface Observing System (ASOS). The ASOS program, began in 1983, as a joint development effort between the DOC, DOD, and DOT/FAA. Installation of ASOS units started in 1992. As of June 2002, a total of 996 units have been purchased. The NWS has purchased, accepted, and commissioned 313 sites. The FAA has purchased 572 units, all of which have been accepted and commissioned by the NWS. The Navy has purchased, accepted, and commissioned 77 sites. The Air Force has purchased, accepted, and commissioned 34 sites. Collectively, a total of 996 ASOS sites have been commissioned.

Automated Weather Information Systems (AWIS). The DOC, DOD, and DOT require AWISs to facilitate the collection, processing, and interpretation of meteorological data. AWISs are being procured to provide an automated, high-speed, user-friendly man/machine interface to access and process large volumes of sophisticated meteorological data. AWIS supports the timely production of accurate and geographically precise warnings, forecasts, and special tailored products. They also provide the communications capability for expeditious product dissemination.

Major agency systems classified as AWISs are: NOAA's Advanced Weather Interactive Processing System (AWIPS), FAA's Weather and Radar Processor (WARP); Air Force's New-Tactical Forecast System (N-TFS) and Operational Weather Squadron Production System, Phase 2 (OPS-II); and Navy's Naval Integrated Tactical Environmental Subsystem (NITES).

AWIPS: In February 1997, the Secretary of Commerce approved the limited deployment of AWIPS at over forty sites. On April 9, 1998, the Secretary authorized full scale production and deployment of AWIPS, through Build 4.2, for the remaining 95 systems. Installation of these 95 systems began in September 1998 and was completed in June 1999. An Operational Test and Evaluation of the commissioning software load (Release 4.2) was successfully conducted from mid-May through June 1999. AWIPS commissioning began in January 2000 and, by August 2001, NWS had commissioned all 139 operational AWIPS systems located at 121 Weather Forecast Offices (WFOs), 13 River Forecast Centers (RFCs), the Spaceflight Meteorology Group (SMG), and 4 National Centers for Environmental Prediction (NCEP).

By early September 2002, the NWS will be well on the way to migrating AWIPS to the Linux open source operating system environment, and have completed the development, integration, and test of the Build 5 software with the successful completion of the release 5.2.2 System Verification Review (SVR). Release 5.2.2 will be fully deployed to all AWIPS sites in early calendar year 2003.

WARP: The FAA's WARP will greatly enhance the dissemination of aviation weather information throughout the National Airspace System (NAS). WARP will automatically create unique regional, WSR-88D-based, mosaic products and send these products, along with other time-critical weather information, to controllers through the Advanced Automation System (AAS) as well as to pilots via the aeronautical data link.

N-TFS/OPS-II: The Air Force is modernizing and improving strategic, operational, and combat level systems. Modernization programs include the Observing System 21st Century (OS-21), N-TFS, OPS-II, Tactical Weather Radar, and Small Tactical Terminal which provides a single system for both garrison and deployed operations. These systems will replace the Automated Weather Distribution System (AWDS) and serve as an in-garrison system as well as a deployable "first-in" combat weather forecast capability. OS-21 will provide a much needed state-of-the-art life-cycle replacement for Air Force observing equipment. OS-21 includes five different configurations: fixed, deployable, remote, manual, and upper air. The manual section is intended for tactical operations and will continue upgrades begun under the Manual Observing System and Tactical Meteorological Observing System modification programs. The Air Force purchased commercial off-the-shelf remote miniature weather sensors to provide accurate real-time weather information from forward unmanned locations to support Kosovo operations. OS-21 will continue to expand this capability.

NITES: The Navy is presently undergoing migration towards a modu-

lar, interoperable suite of systems to ingest, process, fuse, display, and disseminate METOC data. The program consists of five seamless versions known as the NITES versions I-V. NITES systems will be fielded in FY 2000 through FY 2004.

NATIONAL POLAR-ORBITING OPERATIONAL ENVIRONMENTAL SATELLITE SYSTEM (NPOESS)

The NPOESS Program began when Presidential Decision Directive (PDD) NSTC-2 established the Integrated Program Office (IPO) in October 1994. Under the terms of this PDD, the IPO's function is to "...reduce the cost of acquiring and operating polar-orbiting environmental satellite systems, while continuing to satisfy United States DOD (Department of Defense) and DOC (Department of Commerce) operational requirements for data from these systems." Effectively, the directive combines the current operations and future follow-on activities of the DOD Defense Meteorological Satellite Program (DMSP) with the DOC National Oceanic and Atmospheric Administration (NOAA) Polar-orbiting Operational Environmental Satellite (POES) program. The new follow-on system will be called NPOESS. The system will be available to launch after the failure of the last operational DMSP or POES satellite. Cooperation with foreign governments and international organizations are to be encouraged, as well.

NPOESS is an integrated DOC, DOD, and National Aeronautics and Space Administration (NASA) program. Through the IPO, DOC is responsible for operations and overall program management; DOD is responsible for the acquisition of the satellites, launch vehicles, and associated ground systems; and NASA is responsible for insertion of new and innovative technology.

The space segment of NPOESS will include space platforms and sensors that will collect and store environmental and other data until they can be downlinked directly to Operational Weather Processing Centers (i.e. AFWA, FNMOC, NAVO, and NESDIS) and Field Terminals (receivers used by deployed/remote military units and civilian users to obtain environmental data). The space segment will consist of meteorological, oceanographic, terrestrial, space environmental monitoring, and climatic sensors, in addition to other systems such as surface data collection/location and search and rescue. The satellite will store and download all data to ground stations with a latency of less than 90 minutes and will also provide continuous down-link of data for receipt by worldwide civilian and DOD field users.

The NPOESS constellation will notionally consist of at least three United States satellites and will receive data from one EUMETSAT (European Organization for the Exploitation of Meteorological Satellites) satellite via European ground sites. The United States satellites will fly at 833 ± 17 km altitude with an inclination of 98.7 ± 0.05 degrees in three distinct sun-synchronous orbits; early morning, mid-morning, and early afternoon. A wide variety of sensors will be carried aboard these platforms to acquire imagery and other meteorological and environmental data.

Each satellite will carry several types of sensors to accomplish its mission: electrical/optical (E/O), microwave (MW), space environmental, and other specialized sensors. The E/O instruments include a Visible/Infrared Imager/Radiometer Suite (VIIRS) to provide imagery in the VIS and IR spectra, a Cross-track Infrared Sounder (CrIS), a passive IR sounder to provide high-resolution vertical profiles of atmospheric properties in conjunction with MW soundings, and an Ozone Mapping and Profiler Suite (OMPS) to measure ozone in the Earth's atmosphere. The microwave instruments include a NASA developed Advanced Technology Microwave Sounder (ATMS) to measure atmospheric temperature and water vapor profiles and a separate Conical Scanning Microwave Imager Sounder (CMIS), consisting of an imager and a supporting sounder, to measure the critical surface and atmospheric phenomena in the MW spectrum under "all weather" conditions. The space environmental sensor suite (SESS) will measure parameters such as electron density profiles, neutral density profiles, magnetic fields, and charged particle energies. Other NPOESS instruments include the Global Positioning System Occultation Sensor (GPSOS) that will monitor and measure signal variations from 24 GPS satellites to help characterize atmospheric pressure, temperature, and humidity profiles with greater accuracy, NASA's Total Solar Irradiance Sensor (TSIS) to measure solar energy per unit time per unit area, and the Aerosol Polarimetry Sensor (APS) to retrieve specified aerosol and cloud parameters using multispectral photopolarimetry.

NPOESS will carry other payloads that are similar to existing instruments, such as NOAA's managed Data Collection System (DCS), which collects and processes measurements from buoys, free-floating balloons, and remote weather stations, for on-board storage and subsequent transmission from the satellite, and the Search and Rescue Satellite Aided Tracking (SARSAT) system that uses NOAA satellites in low-Earth and geostationary orbits to detect and locate aviators, mariners, and land-based users in distress. The satellites relay distress signals from emergency beacons to a network of ground stations and ultimately to the United States Mission Control Center (USMCC) in Suitland, Maryland. The USMCC processes the data and alerts the appropriate search and rescue authorities.

Additionally, NPOESS will share data from other agencies such as NASA's Radar Altimeter Satellite and the NASA managed Earth Radiation Budget Sensor (ERBS), the Advanced Scatterometer (ASCAT) being flown on METOP for ocean measurements (i.e. surface stress, surface wind, sea ice coverage), and the Clouds and the Earth's Radiant Energy System (CERES) experiment.

FY 2002 has been a very full year for NPOESS. Probably the most significant activity of the year has been the IPO's conduction of a Source Selection to choose the contractor that will be developing and building the next generation weather satellite system.

With DOD's acceptance to participate in NOAA/NASA's Joint Center for Satellite Data Assimilation (JCSDA), a virtual center comprised of NASA DAO, NCEP EMC, NESDIS ORA, and OAR Labs scientists, established to facilitate the use of satellite environmental data by developing new and powerful mathematical techniques to assimilate the data into numerical weather prediction (NWP) models, the IPO is now set to augment this effort with additional funding to ensure NPOESS data is quickly accelerated into weather operations once it begins flowing.

NPOESS also recently sponsored UCAR's (University Consortium for Atmospheric Research) Cooperative Program for Operational Meteorology, Education and Training (COMET) in branching into high-latitude territory. Since the usefulness of geostationary satellites declines rapidly at latitudes above 60° north and south, NPOESS data are especially important toward the poles. COMET is developing a series of modules that orient forecasters to the products available from the polar orbiters. COMET is also developing modules to help prepare forecasters for the data provided by the NPOESS series satellites.

The IPO is looking forward to working with the NPOESS contractor in FY 2003 to begin laying the groundwork to ensure ground systems are in place and operating in time to use NPOESS Preparatory Project (NPP) data in the 2005 timeframe and that all systems are ready for an expected 2008 NPOESS launch. Other FY 2003 activities will see the launch of DMSP F16, which the IPO has Satellite Control Authority (SCA) for as well as responsibility for the command, control, and communications functions of current on orbit DMSP constellation flown out of NOAA's Satellite Operations Control Center (SOCC) in Suitland, Maryland where control of NOAA's Polar Operational Environmental Satellites (POES) also resides. The operational side of the IPO will only get busier with the additional responsibilities of WindSat Coriolis, NPP, and NPOESS being added to the operational control of NPOESS IPO's operational control over the next several years.

More information regarding the NPOESS program can be found at *npoess.noaa.gov/* or *npoesslib.ipo.noaa.gov/*

OTHER AGENCY PROGRAMS

For FY 2003, the Department of Agriculture (USDA) requested $28.8 million for meteorological operations ($13.3 million) and supporting research ($15.5 million). Operationally, the USDA supports specialized weather observation networks and also conducts an active supporting research program to ensure an abundance of high-quality agricultural commodities while minimizing the adverse effects of agriculture on the environment. Under supporting research, USDA focuses on the interactions of weather and climate with plant and animal production and water resources management.

The Department of the Interior's (DOI) FY 2003 request is $1.1 million primarily to support the Bureau of Land Management's remote automatic weather station (RAWS) program.

The budget request for the Environmental Protection Agency (EPA) remains level at $7.5 million to provide user-appropriate and scientifically credible air-quality meteorological programs to support regulatory applications.

NASA requests a total of $156.6 million--$2.3 million for operations and $154.3 million for supporting research. These funding levels are composed of the estimated meteorology share of the supporting research and analysis programs as well as Earth Observing System (EOS) and Earth Probe instruments, EOS science, and the EOS Data Information System elements of the NASA Office of Earth Science budget. Included in NASA's request is $55.7 million for special programs under the category of aviation weather supporting research.

The Nuclear Regulatory Commission's (NRC's) request for $95,000 in FY 2003 is mainly to continue technical assistance for the analysis of atmospheric dispersion for routine and accident releases from nuclear facilities. The NRC will dedicate these funds to obtain and analyze meteorological data and information related to siting new nuclear power plants and related to the safe operation of nuclear facilities, to the protection of public health and safety, and protection of the environment.

FEDERAL COORDINATION

56th Interdepartmental Hurricane Conference (IHC) (March 11-15, 2002). OFCM annually hosts the Interdepartmental Hurricane Conference to provide a forum for the responsible federal agencies, together with representatives of the user communities such as emergency management, to review the nation's hurricane forecast and warning program and to make recommendations on how to improve the program in the future. The 56th IHC was held in New Orleans, Louisiana. The theme for the confer-

ence was *Hurricane Season 2002: 10 years after Hurricane Andrew*. Vice Admiral Conrad C. Lautenbacher, Jr., USN (Ret.), Under Secretary of Commerce for Oceans and Atmosphere, provided the Keynote Address for the Conference. The conference reviewed the 2001 tropical cyclone season in the Atlantic Ocean, Gulf of Mexico, Caribbean Sea, and the Pacific Ocean. The Working Group for Hurricane and Winter Storms Operations and Research met to work on IHC action items and changes to the *National Hurricane Operations Plan*. In May, OFCM published the 40th edition of the *National Hurricane Operations Plan* which provides the basis for hurricane reconnaissance for the 2002 season and details responsibilities of federal agencies; operations and procedures; products; aircraft, satellite, radar, and buoy data collection; and marine weather broadcasts.

Conference results included the need to: (1) continue research in forecasting the intensity and structure of hurricanes and tropical cyclones, (2) fully exploit coupled model technology, which integrates the atmosphere, ocean, and land as one fully coupled system, (3) investigate methods to effectively communicate forecast uncertainty to the public, (4) facilitate and expand collaborations and partnerships at the National Hurricane Center's Joint Hurricane Testbed, which was established to improve the transition of successful hurricane research results into operations, and (5) place increased priority on transitioning proven remote-sensing observational capability to the operational weather reconnaissance aircraft. To that end, the OFCM has provided $200,000 to support the acquisition of the next-generation Stepped Frequency Microwave Radiometer by the NOAA Aircraft Operations Center.

National Hurricane Conference (April 1-4, 2002). OFCM participated in the 2002 National Hurricane Conference in Orlando, Florida. The theme of this 24th NHC was *Preparing for Catastrophic Events: 10 Years after Hurricane Andrew*. There were over 1,100 attendees representing a large cross section of the hurricane emergency planning, response, and recovery communities, including emergency managers, fire and law enforcement officials, public works and transportation officials, news media, hospital and health care officials, engineers, meteorologists and geographers, volunteer agency representatives, and city and county commissioners, managers, and planners. Personnel staffed an OFCM exhibit and distributed copies of *The Federal Plan for Meteorological Services and Supporting Research -- Fiscal Year 2002*, *National Hurricane Operations Plan*, and proceedings from forums on Risk Management and Assessments of Natural Hazards and Weather Information for Surface Transportation. OFCM also made arrangements for an opening session speech by Dr. James R. Mahoney, Assistant Secretary of Commerce for Oceans and Atmosphere, and arranged for a reception for Dr. Mahoney to meet all NOAA employees who attended the National Hurricane Conference. Dr. Mahoney met with David and Stan Tait, the organizers of the National Hurricane Conference, during which he expressed NOAA's continuing support for the NHC. Dr. Mahoney also met with Mr. Joe Allbaugh, Director of the Federal Emergency Management Agency, where he highlighted the need for a strong interagency working relationship between FEMA, NOAA, and the other federal agencies. During his presentation, Dr. Mahoney emphasized that NOAA is focused on three themes: commitment, partnership, and technological progress. Dr. Mahoney was also interviewed by the news media.

Post-Storm Data Acquisition. The OFCM-sponsored Working Group for Natural Disaster Reduction/Post-Storm Data Acquisition coordinated efforts to examine flood damage which occurred in Arkansas at the end of March 2002 and in Southwest Nebraska during July 2002, and to examine the devastation that resulted from the F4 tornado which impacted the La Plata area of southern Maryland at the end of April 2002. Aerial photography support was provided by the Air Force's Civil Air Patrol. The support provided by the Civil Air Patrol, which was negotiated by the working group and documented in a memorandum of understanding, has proven to be both timely and very cost effective.

Fire Weather. OFCM staff participated in the August 13-15, 2002, USDA Forest Service Research and Development/Atmospheric Science Research Program Meeting held at George Mason University, Fairfax, Virginia. Topics addressed include National Fire Plan status, smoke management issues, climate change, air quality, and fire emissions. Work is ongoing between the National Weather Service and the USDA Forest Service in connection with the Fire Consortia for Advanced Modeling of Meteorology and Smoke (FCAMMS), a national initiative under the National Fire Plan to provide mesoscale meteorological products to fire managers. There is also ongoing work between NOAA's Air Resources Laboratory and the USDA Forest Service in connection with air quality.

Environmental Support to Homeland Security. Since September 11, 2001, OFCM has undertaken an important role in the meteorological community in relation to environmental support to homeland security. OFCM formed the Working Group for Environmental Support to Homeland Security (WG/ESHS) to serve as the executive agent to the Federal Committee for Meteorological Services and Supporting Research (FCMSSR) for homeland security issues. Key players

include NOAA (NWS, OAR, NESDIS, NOS), Navy, Air Force, Army, DOE, EPA, FEMA, NRC, FAA, USCG, FHWA, and DTRA. WG/ESHS meets frequently to inventory each federal agency's capabilities to support the requirements of the Office of Homeland Security; document and prioritize unmet needs and requirements for environmental support during crisis and consequence management; and develop a coordinated, interagency concept of operations for providing environmental support to homeland security. Areas of leveraging, areas where we can bring about improvements, and any new requirements are also explored.

FCMSSR Meeting. The Federal Committee for Meteorological Services and Supporting Research met on November 16, 2001, in the White House Conference Center. The meeting was specially called to discuss environmental support to homeland security and was attended by RADM Richard West, USN; Brig Gen David L. Johnson, USAF; and Brig Gen John J. Kelly, Jr., USAF (Ret.), together with other high level agency representatives to the federal committee. The purpose of the meeting was to help increase awareness of capabilities, cooperation, and leveraging opportunities among the federal agencies and to agree on some next steps for specific accomplishments to improve environmental support to homeland security. OFCM action items from the meeting included arranging for representation from the Justice Department and the Office of Homeland Security to work with us on homeland security issues and to attend future meetings related to environmental support to homeland security, establishing an interagency process for identifying requirements and establishing priorities for meteorological support to homeland security, identifying areas for increased leveraging and backup between agencies, hosting a meeting in a classified environment to discuss single points of failure within relevant agencies, establishing a working relationship with the Office of Homeland Security so that the meteorological community can make appropriate contributions, and proceeding with the *Workshop on Effective Emergency Response: Selecting a Suitable Dispersion Model for a Given Application*.

Effective Emergency Response. OFCM conducted a *Workshop on Effective Emergency Response: Selecting a Suitable Dispersion Model for a Given Application* on December 5-6, 2001, in Crystal City, Virginia. The purpose of the workshop was to address issues associated with the number and variety of atmospheric transport and diffusion (ATD) models existing today in the federal government. In particular, participants considered what models should be used in specific situations and how those models are evaluated. The workshop was attended by approximately 90 individuals including representatives of the government, private, academic, and other sectors. Breakout sessions considered planning, response, and recovery applications for four scenarios (sarin release, explosion of a dirty nuclear device, plane crash into a nuclear power plant, and crop duster release of anthrax). Criteria were identified, together with their relative importance, for selecting models for the scenarios. OFCM published the proceedings of the workshop in March 2002. OFCM formed a Joint Action Group for Selection and Evaluation of Atmospheric Transport and Diffusion Models (JAG/SEATD) to take action on initiatives resulting from the workshop on effective emergency response. JAG/SEATD reviewed eight scenarios which covered a wide range of potential threats and exercised a variety of model capabilities. JAG/SEATD has identified 29 operationally relevant models. The Joint Action Group is continuing to identify common evaluation procedures; identify gaps and deficiencies in operational capability that need to be addressed through research and development; and consider ways to leverage agency participation in field experiments (e.g., the Oklahoma City full-scale field experiment). JAG/SEATD has published a report on its findings. The results of this work contributed to NOAA's FY 2004 initiative regarding Urban Weapons of Mass Destruction (WMD) Dispersion Forecasting.

Cooperative Support and Backup. The Working Group for Cooperative Support and Backup (WG/CSAB), which serves as the executive agent for the Committee for Operational Processing Centers, completed an update of the *Federal Plan for Cooperative Support and Backup Among the Operational Processing Centers*. WG/CSAB is also developing a Catastrophic Backup Action Plan to identify catastrophic backup shortfalls that exist at the nation's military and civilian meteorological, oceanographic, and satellite operational processing centers (OPC) that can be addressed in the short term. The document defines the plans, actions, and implementation steps required to minimize the impact of a catastrophic failure at one or more of the nation's OPCs. Eight shortfalls were initially identified, but the plan is intended to be a living document that will be reviewed and updated as required.

Meeting with the Office of Homeland Security (March 1, 2002). The Federal Coordinator arranged a meeting with the Office of Homeland Security to highlight the federal meteorological community's capabilities and responsibilities, and the interagency coordination infrastructure to provide environmental support to the nation's homeland security efforts. NOAA's capabilities in support of Homeland Security were also briefed.

Meeting with the Office of Homeland Security (August 22, 2002). The Federal Coordinator, key OFCM staff, and members of the JAG/SEATD met with the Office of Homeland Security to present the results of the report of the Joint Action Group for the Selection and Evaluation of Atmospheric Transport and Diffusion Models (JAG/SEATD). The report was the culmination of seven months of effort by top-notch agency experts to evaluate the modeling systems available to address the potential threats to homeland security. The report's recommendations included: need for research and development to bridge gaps in understanding and capability (13 research needs are identified in the report); need for more field tests to support both R&D and model evaluation; improved observations and model inputs; need for standard, consensus-based model evaluation procedures; and improved interagency coordination and information exchange.

Annual Federal Plan. OFCM prepared *The Federal Plan for Meteorological Services and Supporting Research -- Fiscal Year 2003*. The Federal Plan is Congressionally mandated and is a one-of-a-kind document which articulates the meteorological services provided and supporting research conducted by agencies of the federal government. The Federal Plan helps to reduce duplication among the agencies. It is a comprehensive publication that documents proposed programs for Fiscal Year 2003 and reviews agency programs in Fiscal Year 2002. The plan demonstrates to the Congress and to the Executive Branch how the federal agencies work together to accomplish their missions in an effective and efficient manner.

Weather Information for Surface Transportation. OFCM continued its extensive involvement in the area of Weather Information for Surface Transportation (WIST). The bottom line is that improvements in surface transportation weather support will result in safer and more efficient operations by all users. OFCM has prepared a report addressing meteorological needs/requirements for the six core modes of surface transportation: roadway, railway, transit, marine transportation/operations, pipeline, and airport ground operations. This activity has included formation of a joint action group to address meteorological requirements for surface transportation; questionnaires; surveys; WIST symposia conducted jointly with the Federal Highway Administration (FHWA); meetings with railroad, pipeline, and emergency managers; and participation on panels concerning public-private partnerships in transportation and Intelligent Transportation Systems. The national needs assessment report is a culmination of intensive OFCM efforts in this area. OFCM personnel participated in the 12th Annual Meeting and Exposition of the Intelligent Transportation Society of America, with special attention given to the road weather management and traveler information/511 areas. There was overwhelming positive response to OFCM at the ITS-A meeting and exposition. A survey performed at the meeting showed that 40 percent of those surveyed believed that weather was their highest priority. OFCM personnel also participated in the Cooperative Program for Operational Meteorology, Education and Training (COMET) Review of the Progress of Surface Transportation/ Weather Research Projects sponsored by FHWA on September 17, 2002. Participants included FHWA, COMET, Desert Research Institute, Iowa State University, Pennsylvania State University, State University of New York, and University of Utah.

Aviation Weather. OFCM has also continued its extensive involvement in the area of Aviation Weather Services. OFCM has undertaken a leadership role in coordinating the establishment of a National Training Program to improve aviation weather training for users and providers of aviation weather information. Our primary objectives are to coordinate development and implementation of comprehensive aviation weather training programs, to improve awareness of and access to aviation weather training, and, ultimately, to improve the practical skills of users and providers of aviation weather services. In that regard, OFCM has published the document *Aviation Weather Training: A Report on Training for Emerging and Recently Implemented Aviation Weather Programs*. The purpose of the report is to evaluate how well training is being addressed for the aviation weather programs/projects in the April 2001 OFCM publication *National Aviation Weather Initiatives Final Baseline Report*. The transition from research and development to operations is not complete without training and the combined efforts of all concerned are needed to ensure that training is an integral part of the development process. OFCM's Joint Action Group for Aviation Weather also continues to establish, validate, and prioritize requirements for aviation weather services. OFCM is also continuing efforts concerning volcanic ash and expects to publish *A National Framework for Volcanic Ash Hazards to Aviation* during FY 2003.

Wind Chill Temperature Index. Under the leadership of OFCM's federal coordinating infrastructure, United States federal agencies, Canadian participants, and the academic research community have taken an important step towards improving the Wind Chill Temperature (WCT) Index, which will provide the citizens of the United States and Canada better protection of life and property. The previous wind chill index attempted to measure the rate of heat loss by the human body as wind blows across it at different tem-

peratures and speeds. The index was developed in the 1940's during an Antarctic expedition and was known to overestimate the effect of wind by at least ten degrees. This fact provided a false sense of security, and people were sometimes not aware or prepared for the danger of severe winter weather. OFCM led the improvement effort by creating a Joint Action Group for Temperature Indices within its federal coordinating infrastructure, and this Joint Action Group pulled together the various United States, Canadian, and academic entities to develop the new WCT Index based on 21st Century science. NOAA's National Weather Service, the United States Air Force, and the Meteorological Service of Canada implemented the new WCT Index during the winter season of 2001-2002. This new WCT Index is a substantial improvement over the previous practice and is based on a human face model. The index uses wind speed calculated at the average height of the human body's face, incorporates modern heat transfer theory, lowers the walking speed threshold used in calm wind situations, and uses a consistent standard for skin tissue resistance. Further refinements will include adjustments for solar radiation for a variety of conditions.

Strategy for Providing Atmospheric Information. OFCM conducted a forum to respond to agency priorities and to address Leadership and Management Recommendation 1 of the National Research Council/National Academy of Sciences Board on Atmospheric Sciences and Climate (BASC) report *The Atmospheric Sciences Entering the Twenty-First Century*, which states: "The Federal Coordinator for Meteorological Services and Supporting Research should lead a thorough examination of the issues that arise as the national system for providing atmospheric information becomes more distributed. Key federal organizations, the private sector, academe, and professional organizations should all be represented in such a study and should help develop a strategic plan." The *Workshop on Strategy for Providing Atmospheric Information: Planning to Exploit our National Investment in Weather Technology* was conducted December 3-5, 2001, in Crystal City, Virginia, and included sessions on handling atmospheric information in some key meteorological disciplines (climate, urban meteorology, and technological hazards) and interoperability, compatibility, and accessibility (observation/instrumentation standards, formatting the information, and communications issues). Proceedings from the workshop have been published. OFCM will use the results of the workshop to form the basis for strategic guidance as the United States system for providing atmospheric information continues to rapidly evolve. In his concluding remarks for the workshop, the Federal Coordinator noted that the highest priority near-term challenge must be to determine how to effectively acquire data in support of homeland security.

Collaboration with the United States Weather Research Program. The mission of the United States Weather Research Program (USWRP) is to accelerate forecast improvements of high impact weather and facilitate full use of advanced weather information. The program's vision is to mitigate the effects of weather-induced disasters; reduce the costs associated with routinely disruptive weather; create opportunities for increased productivity through better weather information; and assist the military in the accomplishment of its mission. The current USWRP team includes NOAA as the lead agency, National Science Foundation, National Aeronautics and Space Administration, and the United States Navy. The Federal Coordinator has contacted additional agencies to broaden federal participation in the USWRP in accordance with an action from the Interdepartmental Committee for Meteorological Services and Supporting Research, direction from the Chairman of the Federal Committee for Meteorological Services and Supporting Research, and a recommendation from the National Academy of Sciences/National Research Council Board on Atmospheric Sciences and Climate (BASC). The additional agencies included Federal Aviation Administration, Federal Highway Administration, United States Air Force, Department of Energy, United States Department of Agriculture, and Federal Emergency Management Agency. This has led to more interaction directly between the leadership of the USWRP and interested agencies to discuss in more detail agency specific needs which may be benefited by the program. It is expected that several additional federal participants will join the USWRP and that the USWRP priorities will be expanded to address their needs. An OFCM representative also attends all meetings of the Interagency Working Group of the United States Weather Research Program.

Collaboration with NAS/Board on Atmospheric Sciences and Climate. OFCM continued its mutually beneficial interactions with the National Research Council/National Academy of Sciences. OFCM conducted a forum to respond to agency priorities and to address Leadership and Management Recommendation 1 of the National Research Council/National Academy of Sciences Board on Atmospheric Sciences and Climate (BASC) report *The Atmospheric Sciences Entering the Twenty-First Century*. In the June 2000 BASC Letter Report on the United States Weather Research Program, BASC recommended that the FCMSSR Chairman use that role to bring other agencies into the program. The

August 8-11, 2000, BASC Summer Study on Climate Services at Woods Hole, Massachusetts, was a result of an earlier FCMSSR/BASC joint meeting, and resulted in the 2001 publication *A Climate Services Vision: First Steps Toward The Future*. OFCM's Committee for Climate Analysis, Monitoring and Services (CCAMS) has adopted the BASC definition of climate services to be "The timely production and delivery of useful climate data, information, and knowledge to decision makers." The committee is also following up on recommendations from the BASC Climate Services report to "inventory existing observing systems and data holdings," and to "promote efficiency by seeking out opportunities to combine the efforts of existing observation networks to serve multiple purposes in a more cost-effective manner." Subsequent to the November 14, 2000, FCMSSR meeting which was attended by BASC representatives, FCMSSR recommended communication of weather and climate information for the BASC 2001 Summer Study, and the report of this activity is pending. The Federal Coordinator also participated in the BASC 2002 Summer Study on *Tools for Tracking Chemical/Biological/Nuclear Releases in the Atmosphere: Implications for Homeland Security*, and participated in the weather modification study conducted by BASC.

Collaboration with CENR/Subcommittee on Natural Disaster Reduction. OFCM has been an active participant in the work of the Committee on Environment and Natural Resources (CENR) Subcommittee on Natural Disaster Reduction (SNDR). Over the past several months, the focus of this group has been to define its strategic vision in coordination with the White House Office of Science and Technology Policy and the Office of Homeland Security. Through OFCM representation on the SNDR, OFCM has helped craft the subcommittee's charter and annual operating plan. The major thrust of these documents is to: (1) promote effective strategies for reducing national vulnerability to disaster risks and losses by leveraging expertise and information across the federal government and (2) establish focused outreach to the academic and private communities. To achieve these goals, the OFCM is committed to working with SNDR to provide a forum for information sharing, development of collaborative opportunities, and interactive dialogue with the United States policy community to advance informed strategies for managing risks associated with natural and technological disasters.

COOP Modernization Partners' Forum. The National Oceanic and Atmospheric Administration (NOAA) conducted a *COOP Modernization Partners' Forum: Building a National Observing Capability for the Future* in Rockville, Maryland, on September 18, 2002. NOAA's goal is to upgrade approximately 8,000 volunteer Cooperative Observer Network (COOP) stations nationwide to provide accurate, secure, hourly temperature and precipitation data in addition to daily snowfall and snow depth observations. For the first time, data will be available in real-time from this network. The forum was cosponsored by the National Weather Service Office of Climate, Water, and Weather Services; National Climatic Data Center; NOAA Climate Observations and Services Program; and Office of the Federal Coordinator for Meteorology. NOAA provided customers of the COOP data with detailed information on the technical proposal for modernizing the COOP network system architecture, including observation instrumentation, data communications, archiving, and quality control. The forum allowed customers direct exchange with NOAA COOP management personnel to provide their input. The Federal Coordinator chaired a session on the NOAA COOP Modernization Proposal and Benefits.

Interagency Task Force on Risk Management. The purpose of the Interagency Task Force on Risk Management is to examine and report on the role of precaution in risk management decisions by managers or decision makers in both the public and private sectors, especially regarding risks to human welfare, quality of life, and environmental protection. The Federal Coordinator represented NOAA at the June 24, July 19, and August 7, 2002, meetings of the Interagency Task Force on Risk Management. At these meetings, agencies discussed and are providing the following relevant information: precautionary/regulatory risk management standards and guidelines; risk assessment and management requirements/practices; decision criteria regarding different risks; and historical examples where risk management decisions incorporated too much, too little, or the appropriate amount of precaution.

Lightning Data User Requirements. OFCM's Joint Action Group for Lightning Detection Systems (JAG/LDS) met several times to obtain federal agency requirements for lightning data. The requirements will serve as input to the National Weather Service contract solicitation to acquire lightning data on behalf of all federal agencies.

GOES Users Conference II. The Federal Coordinator participated in the GOES Users Conference II, October 1-3, 2002, Boulder, Colorado. Goals of the Conference were to (1) inform users of future capabilities and potential applications of the GOES-R Series; (2) determine user needs for new products, distribution of GOES data and products, instruments of opportunity, access to sample data prior to launch of next series, and education, training and outreach;

(3) assess user and societal benefits of future systems; and (4) develop methods to improve communication between NESDIS and the GOES user community (develop, present, and refine a process for determining and updating requirements). The Federal Coordinator made a presentation on the role of OFCM in interagency coordination.

American Meteorological Society. During FY 2002, OFCM joined leading environmental science and service corporations in supporting undergraduate scholarships in the atmospheric and related oceanic and hydrologic sciences. The scholarships, awarded for the junior and senior years, are designed to encourage outstanding undergraduates to pursue careers in the fields covered by the awards. OFCM plans to continue this support. OFCM also supports American Meteorological Society endeavors by participating in AMS conferences and workshops and other environmental science education and outreach programs.

PUBLICATIONS AND OFCM'S WEBSITE

The following plans and publications were prepared in hardcopy form and most have been placed on OFCM's website (*www.ofcm.gov*):

- T*he Federal Plan for Meteorological Services and Supporting Research -- Fiscal Year 2002*
- *National Hurricane Operations Plan*
- *55th Interdepartmental Hurricane Conference (Minutes)*
- *Proceedings of the Workshop on Strategy for Providing Atmospheric Information: Planning to Exploit our National Investment in Weather Technology*
- *Proceedings of the Workshop on Effective Emergency Response: Selecting a Suitable Dispersion Model for a Given Application*
- *Aviation Weather Training: A Report on Training for Emerging and Recently Implemented Aviation Weather Programs*
- *Selection and Evaluation of Atmospheric Transport and Diffusion Models*
- *Weather Information for Surface Transportation*

The following documents are planned for publication during FY 2003:

- *The Federal Plan for Meteorological Services and Supporting Research -- Fiscal Year 2003*
- *National Hurricane Operations Plan*
- *56th Interdepartmental Hurricane Conference (Minutes)*
- *Proceedings of the Risk Assessment/Risk Management Workshop*
- *Proceedings of the Workshop on Weather Support for the United States Marine Transportation Service*
- *National Plan for Post-Storm Data Acquisition*
- *A National Framework for Volcanic Ash Hazards to Aviation*

During FY 2002, OFCM continued to make substantial progress on its use of the Internet. In addition to information about the office, OFCM has placed its current publications on its website, and keeps the website current with information regarding workshops and symposia being conducted by the office. OFCM will continue to make information available on the Internet during FY 2003.