SECTION 2

RESOURCE INFORMATION AND AGENCY PROGRAM UPDATES

The tables in this section summarize budgetary information of the federal government for Fiscal Years 2001 and 2002. The funds shown are those used to provide meteorological services and associated supporting research that has as its immediate objective the improvement of these services. Fiscal data are current as of the end of June 2001 and are subject to later changes. The data for FY 2002 do not have legislative approval and do not constitute a commitment by the United States Government. The budget data are prepared in compliance with Section 304 of Public Law 87-843, in which Congress directed that an annual horizontal budget be prepared for meteorological programs conducted by the federal agencies.

AGENCY OBLIGATIONS FOR METEOROLOGICAL OPERATIONS AND SUPPORTING RESEARCH

Table 2.1 contains fiscal information, by agency, for meteorological operations and supporting research. The table shows the funding level for Fiscal Year (FY) 2001 based on Congressional appropriations, the budget request for FY 2002, the percent change, and the individual agencies' percent of the total federal funding for FY 2001 and FY 2002.

DEPARTMENT OF AGRICULTURE (USDA)

The USDA budget request for FY 2002 is $28.2 million for operations and supporting research and representing a minor increase from FY 2001. One additional staff meteorologist was added to USDA's World Agricultural Outlook Board. The USDA assists the Department of Commerce in determining farmers' needs for weather information and in disseminating the information to them. Major USDA activities related to weather observations include incremental modernization of the snow telemetry (SNOTEL) system operated by the Natural Resources Conservation Service (NRCS) and the replacement of manual fire rating stations with remote automated weather stations (RAWS) by the Forest Service. The SNOTEL and RAWS networks provide cooperative data for NOAA's river forecast activities, the irrigation water supply estimates, and Bureau of Land Management operations.

For supporting research, USDA requested $15.5 million to focus on the interactions of weather and climate with plant and animal production and water resources management. The goal of supporting research is to develop and disseminate information and techniques to ensure an abundance of high-quality agricultural commodities and products while minimizing the adverse effects of agriculture on the environment. The research budget does not include the coordinated effort with EPA on ultraviolet radiation. The Forest Service supports a research program, initiated in 1988, for a long-term monitoring network to assess potential effects of global climate change and variability on forest health and productivity. Work also continues in forestry ecological systems modeling.

DEPARTMENT OF COMMERCE (DOC)

All reported DOC meteorological activities are within the National Oceanic and Atmospheric Administration (NOAA). The NOAA FY 2002 total congressional request of $1.59 billion for meteorological programs represents an increase of 10.1 percent over the FY 2001 appropriated funds.

NOAA's FY 2002 operations and supporting research requests for major line office activities are described below:

Weather Services

Mission: The National Weather Service (NWS) 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 other governmental agencies, the private sector, the public, and the global community.

America's vulnerability to weather related hazards is rising as more of the population moves into weather threatened regions, and national and global economies become more complex. Approximately 40 percent of all Americans, some 100 million people, currently reside in areas of high risk to natural disasters, with the number climbing yearly. Today, 90 percent of all presidentially declared disasters are weather and flood related. Moreover, water resources are the lifeblood of the economy and our standard of living. During the next century, weather will continue to impact our lives and significantly impact the U.S. economy. In fact, the NWS was recognized last year as one of thirty-two high impact federal agencies. By working with our partners, especially the private sector and emergency management community, NWS is striving to ensure our products and services are responsive to the needs of the American public.

TABLE 2.1 METEOROLOGICAL OPERATIONS AND SUPPORTING RESEARCH COSTS*, BY AGENCY

(Thousands of Dollars)

	Operations			% of FY2002	Supporting Research			% of FY2002	Total			% of FY2001	% of FY2002
AGENCY	FY2001	FY2002	%CHG	TOTAL	FY2001	FY2002	%CHG	TOTAL	FY2001	FY2002	%CHG	TOTAL	TOTAL
Agriculture	12600	12700	0.8	0.6	15500	15500	0.0	4.0	28100	28200	0.4	1.1	1.0
Commerce/NOAA(Subtot)	1344501.5	1485104	10.5	64.4	102661.5	107832	5.0	27.7	1447163	1592936	10.1	54.8	59.1
NWS	692830	727606	5.0	31.5	23054	17414	-24.5	4.5	715884	745020	4.1	27.1	27.6
NESDIS	624999	727788	16.4	31.5	20172	24471	21.3	6.3	645171	752259	16.6	24.4	27.9
OAR	3000	3124	4.1	0.1	45094	48692	8.0	12.5	48094	51816	7.7	1.8	1.9
NOS	12872.5	15786	22.6	0.7	12872.5	15786	22.6	4.1	25745	31572	22.6	1.0	1.2
NOAA Corps	10800	10800	0.0	0.5	1469	1469	0.0	0.4	12269	12269	0.0	0.5	0.5
Defense(Subtot)	408866	376109	-8.0	16.3	97825	71479	-26.9	18.4	506691	447588	-11.7	19.2	16.6
Air Force	189315	184527	-2.5	8.0	42789	28467	-33.5	7.3	232104	212994	-8.2	8.8	7.9
DMSP**	36324	24687	-32.0	1.1	25139	12259	-51.2	3.1	61463	36946	-39.9	2.3	1.4
Navy	124797	123368	-1.1	5.3	12730	17893	40.6	4.6	137527	141261	2.7	5.2	5.2
Army	58430	43527	-25.5	1.9	17167	12860	-25.1	3.3	75597	56387	-25.4	2.9	2.1
Interior/BLM	1100	1100	0.0	0.0	0	0	0.0	0.0	1100	1100	0.0	0.0	0.0
Transportation(Subtot)	453985.2	429243.7	-5.4	18.6	27840.8	31582.5	13.4	8.1	481826	460826.2	-4.4	18.2	17.1
CG	6000	6000	0.0	0.3	0	0	0.0	0.0	6000	6000	0.0	0.2	0.2
FAA	447985.2	423243.7	-5.5	18.3	25110.8	28682.5	14.2	7.4	473096	451926.2	-4.5	17.9	16.8
FHWA	0	0	0.0	0.0	2730	2900	6.2	0.7	2730	2900	6.2	0.1	0.1
EPA	0	0	0.0	0.0	6400	7500	17.2	1.9	6400	7500	17.2	0.2	0.3
NASA	3472	2845	-18.1	0.1	165700	155400	-6.2	39.9	169172	158245	-6.5	6.4	5.9
NRC	117	50	-57.3	0.0	0	0	0.0	0.0	117	50	-57.3	0.0	0.0
TOTAL	2224641.7	2307151.7	3.7	100.0	415927.3	389293.5	4.0	100.0	2640569	2696445.2	2.1	100.0	100.0
% of FY TOTAL	84.2%	85.6%			15.8%	14.4%			100.0%	100.0%			

*The FY 1999 funding reflects Congressionally appropriated funds; the FY 2000 funding reflects the amount requested in the President's FY 2000 budget submission to Congress.

**DMSP is the Defense Meteorological Satellite Program that supports all DOD Components and other government agencies. It is primarily funded and managed by the Air Force.

The FY 2002 President's Budget Request supports the funding and program requirements to enable the NWS to better use science to serve our citizens and fulfill its vision of becoming America's "no surprise" weather service. This vision states that the NWS will produce and deliver forecasts you can trust when you need them most, use cutting-edge technologies, provide services in a cost-effective manner, strive to eliminate weather related fatalities, and improve the economic value of weather information. In FY 2002, the NWS will continue its mission of providing weather and flood warnings and forecasts to the public and improve the overall warning lead times for tornadoes, severe thunderstorms, and flash floods, as well as improve the accuracy of hurricane landfall predictions.

The NWS contributes to three of NOAA's Strategic Plan goals: Advance Short-Term Warning and Forecast Services, Implement Seasonal to Interannual Climate Forecasts, and Predict and Assess Decadal to Centennial Change. The NWS request also supports investments in the Natural Disaster Reduction Initiative (NDRI) as well as the NOAA Climate Observations and Services Initiative.

Overall, NOAA requests a total of $727.6 million for the National Weather Service operations, a net increase of $34.8 million above the FY 2001 enacted. This includes a total of $658.5 million for Operations, Research, and Facilities (ORF) and $69.1 million for Procurement and Acquisition and Construction (PAC). In FY 2002, the budget priorities for NWS include sustaining current services, replacing obsolete technology, enhancing services to the public and its private partners, and infusing new technology.

Operations, Research, and Facilities

The FY 2002 President's Budget includes a request of $658.5 million which represents an increase of $29.0 million over the FY 2001 enacted. The increase allows NWS to maintain current services, begin modernization of the Cooperative Observer Network, and sustain operations at the National Centers for Environmental Prediction (NCEP). Specifically, the net increase of $29.0 million includes $24.3 million for Mandatory Pay Raises and Inflationary Costs, $1.2 million to restore the FY 2001 rescission, $1.9 million to sustain the Cooperative Observer Network, $1.7 million to sustain operational forecast models at NCEP's Environmental Modeling Center, $3.0 million to increase the NWS investment in data assimilation development efforts at NCEP including the NOAA/NASA Joint Center for Satellite Data Assimilation, and $0.3 million for Weather Forecast Office (WFO) Maintenance. In addition, the NWS request includes a reduction of $3.3 million to reflect completion of one-time activities or programs. The specific details on each of these requests are outlined below:

- Mandatory Pay and Inflationary Costs (+$24.3 million). NOAA requests an increase of $24.3 million to fund Adjustments-to-Base (ATBs) for NWS base operations and system accounts. The increase will fund the FY 2002 federal pay raise of 3.7 percent and annualize the FY 2001 pay raise of 3.7 percent. The increase will also provide mandatory inflationary increases for non-labor activities, including service contracts, field office lease payments, and rent charges from the General Services Administration (GSA).
- Restoration of FY 2001 Rescission (+$1.2 million). NOAA requests an increase of $1.2 million to restore the FY 2001 rescission. Restoration of these funds in FY 2002 is required to sustain NWS warning and forecast services to the Public. In FY 2002, NWS will restore funding to provide critical training for weather office staff, repair and maintenance of the NOAA Weather Radio network, and replacement of remote river and flood gage communication devices.
- Terminations (-$3.3 million). The NWS requests a decrease of $3.3 million to reflect the completion of the following one-time activities or programs: the Cooperative Institute for Regional Prediction in support of the 2002 Winter Olympics in Salt Lake City, Utah ($0.6 million); acquisition and installation of NOAA Weather Radio Transmitters at specified locations during FY 2001 ($1.9 million); Mt. Washington Observatory ($0.5 million); and the North Dakota Agricultural Weather Network ($0.3 million).
- Sustain Cooperative Observer Network (+$1.9 million). NOAA requests a total of $2.3 million to sustain the nation's cooperative observer network. The request represents a $1.9 million increase over the FY 2001 appropriation. The cooperative observer network is a nationwide network of over 11,000 volunteer operated weather observing sites used by NOAA to maintain the nation's climate record and to provide data to local NWS field offices. In a recent report, the National Research Council (NRC) recommended that NOAA take immediate steps to sustain and modernize this critical network. The instruments used to detect daily minimum and maximum temperatures as well as rain gage recording devices for measuring precipitation are obsolete and increasing costly to maintain. In many instances, spare parts are no longer commercially available for these measuring devices.

In FY 2002, NWS plans to replace 900 rain gauges and

200 temperature sensors. This rescue effort will proceed over 3 years with the replacement of 2,700 rain gages and 5,000 temperature sensors.

- Weather Forecast Office (WFO) Maintenance & Repair (+$0.3 million). NWS requests a total of $4.6 million for WFO Maintenance, an increase of $0.3 million over the FY 2001 enacted level. The FY 2002 request will allow NWS to fund recurring maintenance contracts and address a backlog of over $7.0 million in deferred maintenance repair actions. WFOs provide forecasters with modernized facilities, supporting the advanced technology systems and the provision of weather service to the public. As the WFOs continue to age, the facilities require a significant investment in recurring and cyclic maintenance, including replacement of major facility support systems such as power backup and heating, ventilation, and air conditioning (HVAC). The request will allow NWS to protect the $250 million capital investment in modernized facilities in accordance with GSA and private industry standards.
- NCEP Environmental Modeling Center - Sustain Current Operations (+$1.7 million). NOAA requests an increase of $1.7 million to sustain operations at NCEP's Environmental Modeling Center (EMC). The EMC develops the computer models and other numerical forecast products which provide the basic guidance that forecasters use in making weather and climate forecasts. Today, the EMC is overly dependent on external sources of funding for its operations, degrading its ability to transfer proven weather forecasting science into NWS operations. The NRC report *From Research to Operations in Weather Satellites and Numerical Weather Prediction: Crossing the Valley of Death*, states "Almost all of the nation's operational weather and climate guidance products come from EMC, which does not presently possess the necessary resources to transfer many of the United States advances in observations and modeling to operations." In FY 2002, NWS plans to provide direct base support for its suite of operational forecast models, including the aviation, regional, and global models.
- NCEP Data Assimilation and Modeling (+$3.0 million). NOAA requests $3.0 million to improve to data assimilation and modeling at NCEP. Data assimilation is the collection and processing of weather observations (satellite, aircraft, radar, data buoys, upper air balloons) for use in operational numerical weather prediction models. These models are the foundation for all general weather forecasts (2 days and beyond) including aviation, marine, hurricane, rainfall, and severe weather. The objective of this critical funding request is to improve forecasts through the use of enhanced satellite data and other data sets in the NCEP prediction models, leveraging the nation's large capital investment in global observing systems. These activities will be implemented through the NOAA/NASA Joint Center for Satellite Data Assimilation which is funded in part through this initiative. Today, only 1/7th of the nation's satellite data are utilized in operational weather forecast models and too few resources are available for new data assimilation. The NRC report *From Research to Operations in Weather Satellites and Numerical Weather Prediction: Crossing the Valley of Death*, states "In most cases, when new sensors are developed, insufficient budget is provided to develop algorithms necessary to introduce those sensors into the operational system. There is limited capability to address the special needs associated with assimilation of large volume of new satellite observations." The report also stated the slow pace of improving weather prediction models could place United States industry at a competitive disadvantage and potentially impact National Security. In FY 2002, NWS plans to provide critical funding support to the NOAA/NASA Joint Center, enhance efforts to develop a community weather prediction model, and improve assimilation of new satellite data sets into NCEP operational prediction models.
- Advanced Hydrologic Prediction Service (AHPS). In FY 2002, NOAA will also continue implementation of AHPS in the Mississippi and Ohio River Basin, focusing on high priority flood prone areas. The OR&F request includes a total of $1.0 million for this critical service improvement program. AHPS is already improving both the lead time and accuracy of flood forecasts as well as water resource management by extending river flood stage forecasts from days to months in the future. The AHPS is also providing new probability forecasts for rivers, providing critical information which can be used by water resource and emergency managers for risk based decision making. The Service has been successfully tested on major river basins in North Dakota, Iowa, Georgia, West Virginia, and Pennsylvania. Once deployed, AHPS will save lives and provide over $600 million in annual savings to the United States economy.
- Systems Operations. NOAA requests a total of $84.1 million in Systems Operations, an increase of $2.7 million from the FY 2001 enacted level. The Systems

Operations total includes $40.0 million for NEXRAD Operations and Maintenance (O&M), $7.6 million for ASOS O&M, and $36.5 million for AWIPS O&M. The FY 2002 increase is required to fund $2.5 million in Adjustments-to-Base (ATBs) related to the federal pay raise and inflationary costs as well as restore $0.2 million for the FY 2001 rescission.

Procurement, Acquisition and Construction (PAC)

As indicated above, NOAA requests $69.1M for NWS PAC, an increase of $5.7 million over the FY 2001 enacted. The specific requests are listed below:

- Automated Surface Observing System (ASOS) (+$1.3 Million). NOAA requests a total of $5.1 million for the ASOS PAC account, an increase of $1.3 million over the FY 2001 enacted. These funds are required in FY 2002 to ensure planned completion of the new ASOS dewpoint sensor acquisition (the highest failure rate sensor in the ASOS suite), and ASOS processor unit acquisition (current processor over capacity), and begin acquisition of the all-weather precipitation gage necessary for climate record continuity and aviation safety. Specifically, in FY 2002, the NWS will complete acquisition of 346 dewpoint sensors, and 346 processors; deploy 314 processors; and acquire 115 all-weather precipitation gages.
- NWS Telecommunications Gateway Backup - Critical Infrastructure Protection (+$7.4 Million). NOAA requests a total of $7.4 million to provide critical infrastructure protection for the NWS Telecommunications Gateway (NWSTG). The NWSTG is the nation's critical telecommunications hub for collecting, processing, and distributing weather data and information. The data processed by the NWSTG are used by hundreds of customers world-wide, affecting a wide-range of economic and emergency management decisions. These users include: the NWS WFOs and NCEP, the private meteorological industry, broadcast media, foreign countries, and the United States military. The current NWSTG facility, located in NWS headquarters in Silver Spring, Maryland, has no operational back-up and is therefore a single point of failure vulnerable to natural disasters, human error, computer viruses, hacker attacks, and terrorism. The requested funding increase will enable the NWS to acquire the equipment and facility infrastructure necessary to ensure continuity of operations at the NWSTG. Today, if the NWSTG were to fail, 90 percent of weather observations required for weather prediction models would be lost; no national radar or prediction models would be sent to the field; no weather observations or products would be sent to commercial users/vendors; no access or exchange of observations and products with other federal agencies or nations would be possible; and all NWS centrally provided Internet services would be halted. This investment will mitigate these risks and will enable the NWS to comply with Presidential Directives on critical infrastructure protection and continuity of government operations.
- NWS Weather Forecast Office (WFO) Construction (+$2.5 million). NOAA requests a total of $12 million to continue critical facility modernization efforts in the National Weather Service. The request represents an increase of $2.5 million over the FY 2001 appropriation. In FY 2002, NWS plans to finalize construction of the new Weather Forecast Office in Caribou, Maine and complete the new Alaska Tsunami Warning Center in Palmer, Alaska. NWS also plan to complete modernization of the weather offices in Hilo, Hawaii, and Kotzebue, Alaska.
- NEXRAD. NOAA requests a total of $8.3 million for the NEXRAD PAC account. The request will allow NWS to continue NEXRAD Product Improvement (NPI) activities by infusing new technology into the current radar network. The current system processor utilizes obsolete technology developed in the late 1980s. As a result, a number of new forecast and detection techniques, that are tested and ready for operational use, cannot run on the current system. Combined with AWIPS build 5.0 technology, NEXRAD NPI will allow NWS forecasters to improve the lead times for tornado warnings and the accuracy of severe thunderstorms forecasts. In FY 2002, NWS will complete critical hardware retrofits on a total of 126 NWS NEXRAD sites.
- AWIPS. NOAA requests a total of $16.3 million for the AWIPS PAC Account. In FY 2002, NWS will complete a three year effort to develop and deploy AWIPS build 5 software. NWS plans to deploy AWIPS build 5 in three major builds (5.0,5.1,5.2) over a 3 year period, beginning in October of FY 2000 and ending in October of FY 2003. In FY 2002, NWS will complete the distribution of build 5.1 and 5.2 after a rigorous test and evaluation process. AWIPS build 5 technology will provide NWS field forecasters with critical warning decision support systems to monitor and prioritize severe weather systems, automated product generation to improve efficiency, and improved radar and satellite display imagery. Combined with NPI, AWIPS build 5 will allow NWS forecasters to significantly improve

tornado warning lead times and improve the accuracy of severe thunderstorms forecasts.

- Central Computer Facility - NWS Weather and Climate Supercomputing. NOAA requests a total of $15.1 million to operate and maintain the NWS (Class VIII) Weather and Climate Supercomputer located in the Census Facility in Bowie, Maryland. The NWS supercomputer is the foundation for all NWS weather and climate forecasts. In FY 2002, NWS plans to improve weather forecasts by improving the resolution of the regional weather model (Eta) from 22 to 12 kilometers and the global weather model from 75 kilometers to 55 kilometers. The NWS also plans to improve and expand operational climate forecasts and implement a new regional climate model. NWS will continue to issue the Drought Monitor, Climate Threats Assessment, and the Extreme Heat Index. NWS will also utilize the supercomputer to improve forecasts for El Niño and La Nina events, and other climate oscillations.
- Radiosonde Replacement Network. NOAA will continue the replacement and modernization of the upper air radiosonde network . The PAC request includes a total of $5.0 million for this activity in FY 2002. The radiosonde network provides critical upper air observations for NWS weather forecasters and serves as the principal data source for all weather forecast models. The current network is obsolete and nearing collapse, risking widespread loss of data within the next two to three years. In FY 2002, NWS plans to complete the third year of a five year modernization effort by replacing 35 (out of 102) ground tracking systems. NWS also plans to replace the remaining obsolete IBM XT microcomputers that are used to track and process data.
- Evansville Doppler Radar (-$5.5 million). This decrease reflects the completion of one-time costs associated with the planned acquisition, deployment, and installation of a Doppler weather radar for the Evansville, Indiana, area during FY 2001.

Environmental Satellite, Data, and Information Services

Proposed funding for FY 2002 includes an increase in the Polar-Orbiting Satellite Program of $93.0 million and an increase in the Geostationary Satellite Program of $3.1 million. These changes allow for continuation of procurements to provide the spacecraft and instruments, launch services, and ground systems necessary to assure continuity of environmental satellite coverage. The FY 2002 budget request will maintain a system of polar-orbiting satellites that obtains global data and a system of geostationary satellites that provides near-continuous observations of the Earth's western hemisphere. Funding is included for NOAA's share of the converged NOAA and Department of Defense (DOD) polar-orbiting system that will replace the current NOAA series and the DOD Defense Meteorological Satellite Program (DMSP).

A total of $4.0 million is requested to continue the Ocean Remote Sensing Program, which began in FY 1995. During the next several years, NOAA will acquire data from foreign and other non-NOAA satellites that will provide measurement of ocean currents, surface winds and waves, subsurface temperature and salinity profiles, ice thickness and flows, and other marine factors.

An increase of $16.3 million is included to maintain basic mission services including maintenance and operation of satellite ground facilities; provision of satellite-derived products, including hazards support; and conduct of research to improve the use of satellite data. An increase of $0.75 million is requested to accelerate the assimilation and use of satellite-based data in numerical weather prediction models and an offsetting decrease is included as the result of reducing funds for the Global Winds Demonstration Program (-$1.993 million).

Budgetary changes netting to a decrease of $9.5 million are included in the NOAA Data Centers and Information Services subactivity. The changes include an increase in base operating funding (+$4.3 million). Decreases include elimination of funding for Regional Climatic Centers (-$2.9 million), reductions in Coastal Data Development (-$1.4 million), and reductions in funding for Data Preservation (-$9.5 million).

Ocean Service

Funding provided through the FY 2002 budget should allow the initial steps of the second generation of the NOS CO-OPS advanced data quality control program, the Continuous Operational Real-time Monitoring System (CORMS II), as well as the implementation of its development program of the Ocean Systems Test and Evaluation Program (OSTEP). NOS considers the size of the problem for these projects to be $5.0 million per year.

Under the budget initiative “Promote Safe Navigation” Implementation Plan FY 2002-2006 (when approved in present form), adequate funding would be available by FY 2006 and beyond to satisfy user requirements, and provide the necessary up-to-date high resolution predictions of all navigationally significant weather and oceanographic conditions for a national PORTS™ network.

Office of Atmospheric Research

Requested funding for FY 2002 for Weather Research and Solar-Terrestrial Services and Research is $51.8 mil-

lion--a net increase of $3.7 million. Increases included a base adjustment of $1.7 million to partially cover inflationary cost increases as well as a very small base restoration of $0.1 million. There also were programmatic increases of $2.2 million for the United States Weather Research Program, directed principally toward improving hurricane track predictions. A program decrease was also requested to terminate the $0.3 million "STORM" Program at the University of Northern Iowa. Finally, the space-based wind profile lidar technology add-on for incorporating wind profile data into forecast models was incorporated into the Weather Research base program.

DEPARTMENT OF DEFENSE (DOD)

The DOD total budget request for FY 2002 is $447.6 million which represents a funding decrease of 11.6 percent from FY 2001. Specific highlights for each of the military departments are described below:

United States Air Force

United States Air Force (USAF) resources for meteorological support fall into several categories: general operations, investment and research, DMSP operations, and DMSP and National Polar-orbiting Operational Environmental Satellite System (NPOESS) supporting research. The Air Force request (including DMSP and NPOESS) for FY 2002 is $249.9 million.

General Operations: The operations portion of the FY 2002 budget request is $184.5 million and provides the day-to-day environmental support to the DOD. These funds will pay for support to the USAF (both active duty and reserve components), the United States Army, nine unified commands, and other agencies as directed by the Chief of Staff of the Air Force. Over 4,900 people conduct these activities at over 200 worldwide locations. These people include active duty military, Air Force reservists, Air National Guard weather flight personnel, weather communications and computer specialists, and civilians.

General Supporting Research: The FY 2002 budget request for Air Force supporting research is $28.5 million. The Air Force continues development of the Space Weather Analysis and Forecast System (SWAFS). This project and other research efforts will investigate the electrodynamics of the Sun and Earth's magnetosphere, ionospheric dynamics, mesoscale meteorology, visible and infrared properties of the environment, and cloud parameterization and prediction.

DMSP Operations: Though funding for DMSP comes from the Air Force, this system is the major source of space-borne meteorological data for the military services and other high-priority DOD programs. Environmental data from DMSP sensors is also distributed to the National Weather Service (NWS), National Environmental Satellite, Data, and Information Service (NESDIS), the Navy's Fleet Numerical Meteorology and Oceanography Center (FNMOC) and the Naval Oceanographic Office (NAVOCEANO), and AFWA according to the Shared Processing Program agreement.

The operations portion of the FY 2002 budget request is $24.9 million. The major portion of this funding is for on-orbit operations, tactical terminal maintenance, and long-haul communications. These funds also pay operations costs for one dedicated command and control facility. DMSP funds for 66 military and civilian personnel associated with the operation of, and to a much smaller extent, the procurement of the DMSP system.

DMSP and NPOESS Supporting Research: The FY 2002 budget for DMSP R&D is $12.3 million. The funds will be used for launch vehicle integration; system integration and testing; and mission sensor calibration, validation, and algorithm development efforts. The FY 2002 DOD R&D budget for NPOESS is $157.4 million. FY 2002 funds will be used for the development of system architecture, technology development efforts, and critical sensor and algorithm development. NPOESS is scheduled to be available in 2008 as a backup to the final launch of the NOAA polar-orbiting satellites and DMSP satellites. This system will exploit advanced hardware and software technologies to produce a more reliable, longer-lived spacecraft with greater mission capability.

United States Navy

The United States Navy FY 2002 budget request for meteorological programs is $141.3 million. The request includes $123.4 million for operational programs and $17.9 million for supporting research.

The Navy Meteorology and Oceanography (METOC) program is truly unique. Focusing support in the environmentally complex coastal/littoral regions around the globe, Navy METOC is required to provide an assessment of the impact of weather and ocean phenomena on weapon systems. Additionally, and just as important, Navy METOC provides for safe flight and navigation in support of Naval, joint, and combined forces operating throughout the world's oceans. This support is done with a cadre of highly-trained military and civilian personnel, schooled in both the sciences and warfighting applications. By teaming with and leveraging the efforts of other agencies and activities, Navy METOC meets these challenges in a most cost-effective manner, providing a full spectrum of products and services with only about 5 percent of the federal weather budget.

The Navy METOC program is required to provide comprehensive and integrated weather and ocean support worldwide. The Oceanographer of the Navy sponsors programs in four closely related disciplines - meteorology,

oceanography, geospatial information and services, and precise time and astrometry. All are used to protect ships, aircraft, fighting forces, and shore establishments from adverse ocean and weather conditions, and to provide a decisive tactical or strategic edge by exploiting the physical environment to optimize the performance and efficiency of platforms, sensors, and weapons.

Owing to the crucial interrelationship of the oceans and the atmosphere, the Navy requires various oceanographic products to provide the requisite meteorological services. In addition to aviation and marine METOC support, the Navy provides a variety of unique services on demand, such as electro-optical, electro-magnetic and acoustic propagation models and products, METOC-sensitive tactical decision aids, and global sea ice analyses and forecasts.

Support to Navy operations is provided under the direction of the Commander Naval Meteorology and Oceanography Command located in Stennis Space Center, Mississippi. Naval METOC support starts with sensing the battlespace physical environment and culminates with weapons arriving on target and personnel operating in the battlespace without being adversely affected by physical environmental phenomena. Operational support for the Navy and Marine Corps includes the day-to-day provision of meteorological and oceanographic (METOC) products and services. As Naval operations in the littoral increase, Navy METOC support is directed towards providing on-scene capabilities to personnel that directly furnish environmental data for sensor and weapon system planning and employment. These on-scene capabilities are key elements for enabling the warfighters to take advantage of the natural environment as part of battlespace management.

Navy METOC systems acquisition is accomplished through the Space and Naval Warfare Systems Command, San Diego, California. Several major METOC operations support systems are being procured or undergoing upgrades.

Navy METOC Research and Development (R&D) is cooperatively sponsored by the Oceanographer of the Navy and the Chief of Naval Research. This area is not generally system-specific; instead, Navy R&D efforts typically have applications to meteorological, oceanographic, and/or tactical systems. Navy's tabulation of budget data includes R&D funding for basic research, applied research, demonstration and validation, and engineering and manufacturing development.

Initiatives of the Navy and Marine Corps, under sponsorship of the Oceanographer of the Navy, transition projects from exploratory development to operational Naval systems. Such efforts include advances in the Navy's METOC forecasting capability, enhancements to communications and data compression techniques, further development and improvement of models to better predict METOC parameters in littoral regions, and an improved understanding of the impact these parameters have on sensors, weapon systems, and platform performance.

United States Army

The United States Army has programmed $43.5 million for operational support and $12.9 million in research and development in FY 2002. Operational support is projected to decrease approximately $14.9 million over the FY 2001 expenditures, research is estimated to decreases about $4.3 million from the previous year, and real staffing should increase slightly. Systems upgrades and acquisition at TRADOC and AMC funded in FY 2001 but not in FY 2002 account for the bulk of the projected decrease in funding for the Army in this year's report.

The Eighth United States Army has programmed $1.28 million to fund weather operations during FY 2002. This includes $710,000 for Army ARTYMET operations, $5,000 for the upgrade and maintenance of new FALOP systems, $40,000 for the purchase of new automated COTS observing systems for the DMZ area and other locations in the ROK, and $520,000 for USAF weather support.

United States Army Europe has programmed $2.38 million to fund weather operations during FY 2002. $2.09 million is targeted for operational support, such as Artillery Meteorology, exercise support, and supplies, infrastructure, and automation related to meteorological support. USAREUR estimates costs of $295,000 for special programs related to training and operations and maintenance.

The United States Army Special Operations Command (USASOC) provides Army funding to the 10th Combat Weather Squadron (10 CWS) for operations and maintenance of equipment used by Special Operations Weather Teams (SOWTs) providing weather support to USASOC Major Subordinate Commands. USASOC has programmed $45,000 for these expenses in FY 2002.

USARPAC has programmed $220,000 for FY 2002, an increase over the $185,000 for FY 2001. This delta is due to IMETS operations and maintenance costs of the two units at 172nd SIB and 25th ID. These costs are estimated at approximately $16,000 each per year. In addition, a one-time requirement of $3,000 will be used to install a lightning detection system at the recently activated 17th Operational Weather Squadron. This will enhance resource protection of Oahu Army installations with a real-time lightning detection meteorological watch.

Forces Command has programmed approximately $7.18 million in FY 2002 for Operations Support. Of this amount, $560,000 will be targeted

for facilities, supplies, and travel for FORSCOM weather teams, and $6.62 million for support of FORSCOM ARTYMET operations.

DEPARTMENT OF THE INTERIOR (DOI)

The DOI/BLM funding request for FY 2002 is $1,100,000. This figure is for meteorological operations and support of the Bureau of Land Management (BLM) remote sensing requirements for Remote Automatic Weather Station (RAWS) and Lightning Detection Programs. Normal operations and maintenance of the restructured Fire RAWS program is approximately $800,000 beginning this year. (This includes personnel, vehicles per diem, normal procurement and facilities).

The BLM optimization effort in RAWS will continue in 2002. Major efforts are underway among the Wildland Fire Agencies to consolidate our efforts in Fire Weather and National Fire Danger Rating Support. Continued optimization will take place over the next few years. Subsequent cost savings in operations costs will be used to replace aging equipment and upgrade sensors packages. Proposed changes in Lightning Detection operations will further reduce the out-year expenditures in this program. Coordination between DOI agencies and the USDA Forest Service regarding combined meteorological requirements for the National Wildland Fire support functions is ongoing. During the coming geographic area review efforts, interagency RAWS replacement coordination will continue to maximize National Fire Danger Rating System (NFDRS) sampling points and minimize the total number of systems required in the West.

DEPARTMENT OF TRANSPORTATION (DOT)

The DOT total budget request for FY 2002 is $460.8 million which represents a funding decrease of 4.4 percent from FY 2001. The meteorological programs for the Federal Aviation Administration, Federal Highway Administration, and the United States Coast Guard for FY 2002 are described below:

Federal Aviation Administration (FAA)

The FAA request for aviation weather in FY 2002 is $451.9 million for both operations and supporting research; the FY 2001 funding was $473.1 million. The changes in the budget are decreases (5.5 percent) for operations (acquisition and operational support) from $448 million to 423.2 million while supporting research has increased (14.2 percent) from $25.1 million to $28.7 million.

In FY 2002, the requested funding for system acquisitions decreases by 22.5 per cent to $96.2 million. This change reflects major progress as a number of systems are being commissioned in the field and leave the acquisition process. Individual programs with changes greater than $2 million are listed below:

Programs	Changes ($ Millions)
Systems Acquisition:	
Operational and Supportability Implementation System (OASIS)	2.1
Terminal Doppler Weather Radar (TDWR)	-2.1
New Generation Runway Visual Range (NGRVR)	-5.0
Integrated Terminal Weather System	-8.2
Automated Surface Observing System	3.2
Weather System Processor	-18.6
Stand Alone Weather Sensor	-3.2
NEXRAD Enhancements	2.9
Operations Support:	
Contract Weather Observations (CWO)	-5.0
Flight Service Stations	4.6
Research	
Aviation Weather	3.6

The request for funding in FY 2002 increases by $2.4 million to $319.1 million. The change reflects a large decrease in costs for CWOs which is countered by large increases in personnel salaries. Other changes are smaller and reflect normal adjustment to support costs both up and down.

The Aviation Weather Research Program (AWRP) has requested an increase in funding for FY 2002 of 14.2 percent for a total program of $28.7 million. The AWRP will continue work on the operational impacts of weather phenomena which threaten safety and efficiency.

Federal Highway Administration (FHWA)

The total FHWA request for surface transportation weather programs in FY 2002 is $2.9 million all of which will be used for supporting research and special programs.

In 1999, the FHWA began documentation of road weather requirements, which will serve as the basis for the majority of future work in this area. This work includes addressing the technical aspects of the road transportation system (including weather data collection, processing and dissemination) as well as the institutional challenges surrounding system implementation. These institutional challenges encompassed coordination within state and local Departments of Transportation as well as across the transportation and meteorological communities. With regard to technical areas of interest, data collection efforts will include increased coverage of road condition observations and incorporate road weather data (e.g., pavement and subsurface observations) into broader meteorological observation networks. Better processing includes the application of higher resolution weather models and the development of road condition prediction models (e.g. heat balance models) that are needed to develop the appropriate

transportation weather information. In addition, surface transportation decision-makers require weather information disseminated in formats that are easily understood and in which human factors issues have already been incorporated. This need will be achieved through the development of improved road weather decision support systems. A multi-year effort has been undertaken by the FHWA in cooperation with six national labs to prototype and field test advanced decision support components for winter maintenance. This effort will lead to an operational test of the MDSS, as well as produce decision support components that private vendors can incorporate into their products. The FHWA will continue to develop outreach and training course material for program delivery, training, and promotion. FHWA is also taking an active role in promoting more efficient transportation operations during hurricane evacuations. The FHWA is currently supporting an Evacuation Traffic Information System (ETIS), which is a web-based program that facilitates the sharing of evacuation and traffic information among states. In addition, the FHWA is investigating other Intelligent Transportation System technologies that can be used to support emergency and transportation managers during evacuations. Finally, the FHWA is researching how transportation operation centers around the country integrate weather information into their traffic management operations. The FHWA is interested in the types of information received (whether generic or tailored) and how that information impacts traffic management decisions. The FHWA is also investigating several other aspects of traffic management with respect to weather, including the modification of traffic signal timing, traffic modeling, and freeway operations in response to adverse weather.

United States Coast Guard (USCG)

All of USCG's funding for meteorological programs is for operations support. For FY 2002, the requested funding level is $6 million. (The Coast Guard does not have a specific program and budget for meteorology--all meteorological activities are accomplished as part of general operations.) The Coast Guard's activities include the collection and dissemination of meteorological and iceberg warning information for the benefit of the marine community. The Coast Guard also collects coastal and marine observations from its shore stations and cutters, and transmits these observations daily to the Navy's Fleet Numerical Meteorology and Oceanography Center and NOAA's National Weather Service. These observations are used by both the Navy and NOAA in generating weather forecasts. The Coast Guard also disseminates a variety of weather forecast products and warnings to the marine community via radio transmissions. Coast Guard shore stations often serve as sites for NWS automated coastal weather stations, and the National Data Buoy Center provides logistics support in deploying and maintaining NOAA offshore weather buoys. The International Ice Patrol conducts iceberg surveillance operations and provides warnings to mariners on the presence of icebergs in the North Atlantic shipping lanes.

ENVIRONMENTAL PROTECTION AGENCY (EPA)

All of the EPA's funding of meteorological programs is for supporting research. The anticipated funding level in FY 2002 for directed meteorological research is $7.5 million which is $900,000 more than the FY 2001 funding level. This level was incremented in FY 2001 due to increased attention being paid to the effects of airborne toxics and particulate matter on human health.

In addition, to promote excellence in environmental science and engineering, the EPA established a national fellowship program and substantially increased its support for investigator-initiated research grants. The increase in funding for grants (with reliance on quality science and peer review) and for graduate fellowships (to support the education and careers of future scientists) will provide for a more balanced, long-term capital investment in improved environmental research and development.

The funding for the grants program will remain about $100 million in FY 2002. This augmented program will fund research in areas including ecological assessment, air quality, environmental fate and treatment of toxics and hazardous wastes, and exploratory research. The portion of these grants that will be awarded for meteorological research during FY 2002 cannot be foreseen, but it is probable that the grant awards will increase the base amount of $7.5 million listed above for directed meteorological research.

The EPA is continuing its development and validation of air quality dispersion models for air pollutants on all temporal and spatial scales as mandated by the Clean Air Act, as amended. Research will focus on indoor, urban, mesoscale, regional, and multimedia models which will be used to develop air pollution control strategies, and human and ecosystem exposure assessments. There will be increased emphasis placed on meteorological research into regional and urban formation and transport of ozone and particulate pollution in support of the revisions to the National Ambient Air Quality Standards. Increased efficiency of computation and interpretation of results are being made possible by means of supercomputing and scientific visualization techniques.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

Nearly all of NASA's funding in meteorology is for supporting research. The requested funding for supporting research in FY 2002 is $155 million, which is nearly 6 percent lower than the FY 2001 funding level. 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. In parallel with deploying EOS, NASA Earth Science Enterprise is looking ahead to determine what will be the important Earth science questions in the next decade, and which require NASA's leadership to be answered. Drawing on existing reports of the National Academy of Sciences and the state of progress in current scientific endeavors, ESE has developed a Research Strategy for 2000-2010. This strategy articulates a hierarchy of one overarching question, five broad subordinate questions and twenty- three detailed questions that can and should be tackled over this decade. For each, the Research Strategy defines the observational requirements, which in turn provide the basis for definition of candidate missions to be pursued. An early, high priority in this time frame is the National Polar-orbiting Operational Environmental Satellite System (NPOESS) Preparatory Program (NPP), which will serve to provide continuity with the Terra and Aqua missions as well as a demonstration of instruments for the converged weather satellite program. NASA and the Integrated Program Office (IPO) jointly fund the NPP mission. The IPO consists of representation from the three agencies participating in NPOESS: NASA, the National Oceanic and Atmospheric Administration, and the Air Force. NASA plans to meet its immediate commitments and ensure the success of the EOS Terra, AQUA, AURA and IceSAT missions. In addition, NASA is committed to deliver a functioning data and information system to support the processing, archival, and distribution of data products from these missions. NASA also funds a $35.25 million program of weather-related research for aviation safety.

NUCLEAR REGULATORY COMMISSION (NRC)

The NRC requested funding is for meteorological operations. The request of $50,000 for FY 2002 is to continue assistance with the analysis of atmospheric dispersion for various potential release scenarios.

The meteorological support program in the NRC is focused primarily on obtaining and analyzing meteorological data to be used in atmospheric transport and dispersion models. These models serve to characterize plume pathways and project doses, and to estimate concentrations related to the safe operation of nuclear facilities. The intent is to protect the public health and safety, and the environment. Obtaining current, accurate, and relevant meteorological information on a real-time basis for use during emergencies is the primary consideration. In addition, the data may be used as input to the assessment of the radiological impacts of routine airborne releases from facilities, and of the potential radiological impacts of engineering changes in plant design or operation proposed by licensees, should unplanned releases occur. The NRC also maintains an interest in the transport and dispersion of airborne, hazardous, non-radioactive materials and their potential effects on the safe operation of nuclear facilities.

AGENCY FUNDING BY BUDGET CATEGORY

Table 2.2 depicts how the agencies plan to obligate their funds for meteorological operations broken down by "budget category." The two major categories are "Operations Support" and "Systems Acquisition." To a large degree, these categories correspond to non-hardware costs (Operations Support) and hardware costs (Systems Acquisition). For agency convenience in identifying small components that do not fit into these two major categories, a third category is added called "Special Programs." Programs that provide support to several government agencies such as the Air Force's DMSP are listed on a separate line.

Table 2.3 describes how the agencies plan to obligate their funds for meteorological supporting research according to budget categories. The agencies' supporting research budgets are subdivided along similar lines--Research and Development (non-hardware), Systems Development (hardware), and Special Programs (for those items that do not easily fit into the two major categories).

TABLE 2.2 AGENCY OPERATIONAL COSTS, BY BUDGET CATEGORY

(Thousands of Dollars)

AGENCY	Operations Support FY2001	Operations Support FY2002	Systems Acquisition FY2001	Systems Acquisition FY2002	Special Programs FY2001	Special Programs FY2002	Total FY2001	Total FY2002	%CHG	% of FY2002 TOTAL
Agriculture	12600	12700	0	0	0	0	12600	12700	0.8	0.6
Commerce/NOAA(Subtot)	707896.2	743416	624829	726658	11776.3	15030	1344501.5	1485104	10.5	64.4
NWS	547783	574324	135542	141282	9505	12000	692830	727606	5.0	31.5
NESDIS	135712	141212	489287	585376	0	1200	624999	727788	16.4	31.5
OAR	3000	3124	0	0	0	0	3000	3124	4.1	0.1
NOS	12144.2	15056	0	0	728.3	730	12872.5	15786	22.6	0.7
NOAA Corps	9257	9700	0	0	1543	1100	10800	10800	0.0	0.5
Defense(Subtot)	281711	283763	126359	91505	796	841	408866	376109	-8.0	16.3
Air Force	123386	123590	65929	60937	0	0	189315	184527	-2.5	8.0
DMSP*	11185	12427	25139	12260	0	0	36324	24687	-32.0	1.1
Navy	123922	122464	875	904	0	0	124797	123368	-1.1	5.3
Army	23218	25282	34416	17404	796	841	58430	43527	-25.5	1.9
Interior/BLM	940	940	160	160	0	0	1100	1100	0.0	0.0
Transportation(Subtot)	322690.9	325051.8	124028.1	96162.4	7266.2	8029.5	453985.2	429243.7	-5.4	18.6
CG	6000	6000	0	0	0	0	6000	6000	0.0	0.3
FAA	316690.9	319051.8	124028.1	96162.4	7266.2	8029.5	447985.2	423243.7	-5.5	18.3
FHWA					------ Not Applicable ------					
EPA					------ Not Applicable ------					
NASA	2538	2257	231	450	703	138	3472	2845	-18.1	0.1
NRC	117	50	0	0	0	0	117	50	-57.3	0.0
TOTAL	1328493.1	1368177.8	875607.1	914935.4	20541.5	24038.5	2224641.7	2307151.7	3.7	100.0
% of FY TOTAL	59.7%	59.3%	39.4%	39.7%	0.9%	1.0%	100.0%	100.0%		

*DMSP is the Defense Meteorological Satellite Program that supports all DOD Components and other government agencies. It is primarily funded and managed by the Air Force.

TABLE 2.3 AGENCY SUPPORTING RESEARCH COSTS, BY BUDGET CATEGORY

(Thousands of Dollars)

AGENCY	Research & Development FY2001	Research & Development FY2002	Systems Development FY2001	Systems Development FY2002	Special Programs FY2001	Special Programs FY2002	Total FY2001	Total FY2002	Total %CHG	% of FY2002 TOTAL
Agriculture	15500	15500	0	0	0	0	15500	15500	0.0	4.0
Commerce/NOAA(Subtot)	71014	78883	12966	7334	18681.5	21615	102661.5	107832	5.0	27.7
NWS	11954	11954	11100	5460	0	0	23054	17414	-24.5	4.5
NESDIS	20172	24471	0	0	0	0	20172	24471	21.3	6.3
OAR	38888	42458	1866	1874	4340	4360	45094	48692	8.0	12.5
NOS	0	0	0	0	12872.5	15786	12872.5	15786	0.0	4.1
NOAA Corps	0	0	0	0	1469	1469	1469	1469	0.0	0.4
Defense(Subtot)	96702	70604	0	0	1123	875	97825	71479	-26.9	18.4
Air Force	42789	28467	0	0	0	0	42789	28467	-33.5	7.3
DMSP*	25139	12259	0	0	0	0	25139	12259	-51.2	3.1
Navy	12730	17893	0	0	0	0	12730	17893	40.6	4.6
Army	16044	11985	0	0	1123	875	17167	12860	-25.1	3.3
Interior/BLM					------ Not Applicable ------					
Transportation(Subtot)	27610.8	31432.5	0	0	230	150	27840.8	31582.5	13.4	8.1
CG					------ Not Applicable ------					
FAA	25110.8	28682.5	0	0	0	0	25110.8	28682.5	14.2	7.4
FHWA	2500	2750	0	0	230	150	2730	2900	6.2	0.7
EPA	6400	7500	0	0	0	0	6400	7500	17.2	1.9
NASA	111500	106500	54200	48900	0	0	165700	155400	-6.2	39.9
NRC					------ Not Applicable ------					
TOTAL	328726.8	310419.5	67166	56234	20034.5	22640	415927.3	389293.5	-6.4	100.0
% of FY TOTAL	79.0%	79.7%	16.1%	14.4%	4.8%	5.8%	100.0%	100.0%		

*DMSP is the Defense Meteorological Satellite Program that supports all DOD Components and other government agencies. It is primarily funded and managed by the Air Force.

TABLE 2.4 AGENCY OPERATIONAL COSTS, BY SERVICE

(Thousands of Dollars)

AGENCY	Basic Meteorology FY2001	Basic Meteorology FY2002	Aviation FY2001	Aviation FY2002	Marine FY2001	Marine FY2002	Agriculture & Forestry FY2001	Agriculture & Forestry FY2002	General Military FY2001	General Military FY2002	Other FY2001	Other FY2002	Total FY2001	Total FY2002
Agriculture	0	0	0	0	0	0	12600	12700	0	0	0	0	12600	12700
Commerce/NOAA(Subtot)	1276861	1414348	35518	35596	29123	32036	0	0	0	0	3000	3124	1344501.5	1485104
NWS	641062	675760	35518	35596	16250	16250	0	0	0	0	0	0	692830	727606
NESDIS	624999	727788	0	0	0	0	0	0	0	0	0	0	624999	727788
OAR	0	0	0	0	0	0	0	0	0	0	3000	3124	3000	3124
NOS	0	0	0	0	12873	15786	0	0	0	0	0	0	12872.5	15786
NOAA Corps	10800	10800	0	0	0	0	0	0	0	0	0	0	10800	10800
Defense(Subtot)	21590	21343	263246	246396	36066	35653	0	0	81350	66178	6614	6539	408866	376109
Air Force	0	0	189315	184527	0	0	0	0	0	0	0	0	189315	184527
DMSP*	0	0	36324	24687	0	0	0	0	0	0	0	0	36324	24687
Navy	21590	21343	37065	36640	36066	35653	0	0	23462	23193	6614	6539	124797	123368
Army	0	0	542	542	0	0	0	0	57888	42985	0	0	58430	43527
Interior/BLM	0	0	0	0	0	0	1100	1100	0	0	0	0	1100	1100
Transportation(Subtot)	0	0	447985	423244	6000	6000	0	0	0	0	0	0	453985.2	429243.7
CG	0	0	0	0	6000	6000	0	0	0	0	0	0	6000	6000
FAA	0	0	447985	423244	0	0	0	0	0	0	0	0	447985.2	423243.7
FHWA							------ Not Applicable ------							
EPA							------ Not Applicable ------							
NASA	0	0	0	0	0	0	0	0	0	0	3472	2845	3472	2845
NRC	117	50	0	0	0	0	0	0	0	0	0	0	117	50
TOTAL	1298568	1435741	746749	705236	71189	73689	13700	13800	81350	66178	13086	12508	2224641.7	2307151.7
% of FY TOTAL	58.4%	62.2%	33.6%	30.6%	3.2%	3.2%	0.6%	0.6%	3.7%	2.9%	0.6%	0.5%	100.0%	100.0%

*DMSP is the Defense Meteorological Satellite Program that supports all DOD Components and other government agencies. It is primarily funded and managed by the Air Force.

TABLE 2.5 AGENCY SUPPORTING RESEARCH COSTS, BY SERVICE

(Thousands of Dollars)

AGENCY	Basic Meteorology FY2001	Basic Meteorology FY2002	Aviation FY2001	Aviation FY2002	Marine FY2001	Marine FY2002	Agriculture & Forestry FY2001	Agriculture & Forestry FY2002	General Military FY2001	General Military FY2002	Other FY2001	Other FY2002	Total FY2001	Total FY2002
Agriculture	0	0	0	0	0	0	15500	15500	0	0	0	0	15500	15500
Commerce/NOAA(Subtot)	88164	90421	1625	1625	12872.5	15786	0	0	0	0	0	0	102661.5	107832
NWS	23054	17414	0	0	0	0	0	0	0	0	0	0	23054	17414
NESDIS	20172	24471	0	0	0	0	0	0	0	0	0	0	20172	24471
OAR	43469	47067	1625	1625	0	0	0	0	0	0	0	0	45094	48692
NOS	0	0	0	0	12872.5	15786	0	0	0	0	0	0	12872.5	15786
NOAA Corps	1469	1469	0	0	0	0	0	0	0	0	0	0	1469	1469
Defense(Subtot)	5906	5924	42859	28537	12730	17893	0	0	36230	19125	100	0	97825	71479
Air Force	0	0	42789	28467	0	0	0	0	0	0	0	0	42789	28467
DMSP*	0	0	0	0	0	0	0	0	25139	12259	0	0	25139	12259
Navy	0	0	0	0	12730	17893	0	0	0	0	0	0	12730	17893
Army	5906	5924	70	70	0	0	0	0	11091	6866	100	0	17167	12860
Interior/BLM							----- Not Applicable -----							
Transportation(Subtot)	0	0	25110.8	28682.5	0	0	0	0	0	0	2730	2900	27840.8	31582.5
CG							----- Not Applicable -----							
FAA	0	0	25110.8	28682.5	0	0	0	0	0	0	0	0	25110.8	28682.5
FHWA	0	0	0	0	0	0	0	0	0	0	2730	2900	2730	2900
EPA	0	0	0	0	0	0	0	0	0	0	6400	7500	6400	7500
NASA	0	0	0	0	0	0	0	0	0	0	165700	155400	165700	155400
NRC							----- Not Applicable -----							
TOTAL	94070	96345	69594.8	58844.5	25602.5	33679	15500	15500	36230	19125	174930	165800	415927.3	389293.5
% of FY TOTAL	22.6%	24.7%	16.7%	15.1%	6.2%	8.7%	3.7%	4.0%	8.7%	4.9%	42.1%	42.6%	100.0%	100.0%

*DMSP is the Defense Meteorological Satellite Program that supports all DOD Components and other government agencies. It is primarily funded and managed by the Air Force.

AGENCY FUNDING BY SERVICE CATEGORY

Table 2.4 summarizes how the agencies plan to obligate operational funds for basic and specialized meteorological services; Table 2.5 is a similar breakout for supporting research funds. Table 2.4 reveals the distribution of operational funds: basic meteorology services receiving 62.2 percent; aviation 30.6 percent; marine 3.2 percent; agriculture/ forestry 0.6 percent; general military services 2.9 percent; and other specialized services accounting for 0.5 percent. Table 2.5 shows the distribution of supporting research funds among the services with basic meteorology receiving 24.7 percent, aviation 15.1 percent, marine 8.7 percent, agriculture and forestry 4.0 percent, general military 4.9 percent, and the remaining 42.6 percent dedicated to other meteorological services.

The definitions of specialized and basic services are described below:

Basic Services

Basic services provide products that meet the common needs of all users and include the products needed by the general public in their everyday activities and for the protection of lives and property. "Basic" services include the programs and activities that do not fall under one of the specialized services.

Specialized Meteorological Services

Aviation Services. Those services and facilities established to meet the requirements of general, commercial, and military aviation.

Marine Services. Those services and facilities established to meet the requirements of the DOC, DOD, and DOT on the high seas, on coastal and inland waters, and for boating activities in coastal and inland waters. The civil programs which are directly related to services solely for marine uses and military programs supporting fleet, amphibious, and sea-borne units (including carrier-based aviation and fleet missile systems) are included.

Agriculture and Forestry Services. Those services and facilities established to meet the requirements of the agricultural industries and federal, state, and local agencies charged with the protection and maintenance of the nation's forests.

General Military Services. Those services and facilities established to meet the requirements of military user commands and their component elements. Programs and services which are part of basic, aviation, marine, or other specialized services are not included.

Other Specialized Services. Those services and facilities established to meet meteorological requirements that cannot be classified under one of the preceding categories; such as, space operations, urban air pollution, global climate change, and water management.

PERSONNEL ENGAGED IN METEOROLOGICAL OPERATIONS

Table 2.6 depicts agency staff resources in meteorological operations. The total agency staff resources requested for FY 2002 is 14,410. This total represents an increase of 0.6 percent from FY 2001.

TABLE 2.6 PERSONNEL ENGAGED IN METEOROLOGICAL OPERATIONS
(Units are Full Time Equivalent Staff Years)*

AGENCY	FY 2001	FY 2002	% CHANGE	% of FY 2002 TOTAL
Agriculture	104	105	1.0	0.7
Commerce/NOAA (Subtotal)	5,742	5,767	0.4	40.0
NWS	4,659	4,681	0.5	32.5
NESDIS	883	883	0.0	6.1
OAR	32	32	0.0	0.2
NOS	114	114	0.0	0.8
NOAA Corps	54	57	5.3	0.4
Defense	4,944	4,979	0.7	34.6
Air Force (Subtotal)	3,266	3,266	0.0	22.7
Air Force Weather	3,201	3,201	0.0	22.2
DMSP	65	65	0.0	0.5
Navy	1,423	1,412	-0.8	9.8
Army	255	301	15.3	2.1
Interior (Subtotal)	12	12	0.0	0.1
BLM	8	8	0.0	0.1
Reimbursed**	4	4	0.0	0.0
Transportation (Subtotal)	3,517	3,546	0.8	24.6
FAA	3,431	3,459	0.8	24.0
FHWA	1	2	50.0	0.0
USCG	85	85	0.0	0.6
EPA	0	0	0.0	0.0
NASA	0	0	0.0	0.0
NRC	1	1	0.0	0.0
TOTAL	14,320	14,410	0.6	100.0

* Numbers of personnel are rounded to nearest whole number.
** "Reimbursed" are personnel funded by other agencies.

INTERAGENCY FUND TRANSFERS

Table 2.7 summarizes the reimbursement of funds from one agency to another during FY 2002. Agencies routinely enter into reimbursable agreements when they determine that one agency can provide the service more efficiently and effectively than the other. While specific amounts may vary from year-to-year, the pattern shown is essentially stable and reflects a significant level of interagency cooperation.

Department of Commerce. NWS will reimburse DOT $2,500 for Alaska housing utilities. NASA will receive $60,000 for stratospheric studies. NESDIS will transfer a total of $365.4 million to NASA for procurement and launches of polar-orbiting ($114.1 million) and geostationary ($251.3 million) satellites.

Department of Defense. The Air Force will reimburse DOC a total of $4.3 million for operations [OFCM support ($140,000), Lightning Data ($551,000), NCEP operations ($12,000), and Shared Processing Network ($193,000)] and supporting research [OAR laboratories ($170,000), Environmental Scenario Generator ($613,000), and NEXRAD ($2.62 million)]. In addition, DOE will receive $484,000 for Argonne Laboratories supporting research; NSF will receive $190,000 for COMET participation and $323,000 for NCAR supporting research. The Navy will reimburse DOC $214,000 for basic climatological analysis and forecasting, and interagency coordination. The Army reimbursements to DOC/NOAA include $770,000 to NWS for maintaining precipitation reporting stations and $290,000 to NOAA laboratories for precipitation modeling and basic/applied research. The Army will also reimburse the AF Air Combat Command $56,000 for operations and maintenance of weather systems and $110,000 for purchase of Tactical VSAT equipment. Finally, the United States Geological Survey will be reimbursed $379,000 for operations and maintenance of hydrologic and precipitation reporting stations.

Department of Transportation. The FAA will reimburse NOAA almost $32.8 million in FY 2002. Included in those funds are development of enhancements and operational support associated with the WSR-88D, ASOS maintenance, the Center Weather Service Units at all Air Route Traffic Control Centers, the World Area Forecast System, for meteorology instructors at the FAA, and for studies and OFCM support.

The FAA will reimburse the Army a total of $195,000, the Navy $683,000, and Air Force $2.572 million for supporting research. The NOAA will receive $7.9 million for various supporting research associated with aeronautical hazards mitigation. The NASA will receive $550,000 for supporting research.

National Aeronautics and Space Administration (NASA). The Air Force will be reimbursed a total of $2.841 million--$2.091 million for observations, forecasts, and operations/maintenance of weather infrastructure and replacement of upper air systems at Trans-Atlantic Abort Landing Sites and $750 million for technology transition at Applied Meteorology Unit, Eastern Range. NOAA's NWS will receive $16,000 for upper air analysis and research; National Data Buoy Center will receive reimbursements of $92,000 for the operation of two data buoys.

Environmental Protection Agency (EPA). NOAA's Air Resources Laboratory (ARL) will receive $6 million for development, evaluation, and application of air quality dispersion models; and for provision of meteorological expertise and guidance for EPA policy development activities.

Nuclear Regulatory Commission (NRC). The NRC will reimburse DOE $87,000 for technical assistance.

FACILITIES/LOCATIONS FOR TAKING METEOROLOGICAL OBSERVATIONS

Table 2.8 indicates the number of facilities/locations or platforms at which the federal agencies carry out (or supervise) the taking of various types of meteorological observations.

TABLE 2.7 INTERAGENCY FUND TRANSFERS FOR METEOROLOGICAL OPERATIONS AND SUPPORTING RESEARCH

Agency Funds Transferred from:	Agency Funds Transferred to:	FY 2001 Funds ($K) Estimated or Planned: Operations	Supporting Research
Commerce/NOAA	DOT/USCG	2.5	
	NASA Studies	60	
	NASA	365,416	
Defense/Air Force	DOC/NOAA/OFCM	140	
	DOC/NOAA/LDS	551	
	DOC/NOAA/NCEP	12	
	DOC/NOAA/SPN	193	
	DOC/NOAA/OAR		170
	DOC/NOAA/ESG		613
	DOC/NOAA/NWS		2619
	DOE/Argonne		484
	NSF/NCAR		323
	NSF/COMET		190
Defense/Navy	DOC/NOAA/NCDC	49	
	DOC/NOAA/OFCM	165	
Defense/Army	DOC/NOAA/NWS	770	
	DOC/NOAA/ETL		65
	DOC/NOAA/ATDD		75
	DOC/NOAA		150
	DOI/USGS	379	
	DOD/USAF/ACC	166	
Transportation/FAA	DOC/NOAA	24,839	7,942
	DOD/USA		195
	DOD/USAF		2,572
	DOD/USN		683
	NASA		550
NASA	DOD/USAF	2,091	750
	DOC/NOAA/NDBC	92	
	DOC/NOAA/NWS		16
EPA	DOC/NOAA/ARL		6,000
NRC	DOE/PNNL	87	

TABLE 2.8 FACILITIES/LOCATIONS FOR TAKING METEOROLOGICAL OBSERVATIONS

TYPE OF OBSERVATION/AGENCY	No. of Locations (FY 2001)
Surface, land	
Commerce (all types)	841
Air Force (U.S. & Overseas)	130
Navy (U.S. & Overseas)	34
Army (U.S. & Overseas)	34
Marine Corps (U.S. & Overseas)	13
Transportation (Flight Service Stn)	8
Transportation (Lim Aviation Wx Rptg Stn)	114
Transportation (Contract Wx Obsg Stn)	189
Transportation (Auto Wx Obsg Stn)	198
Transportation (Auto Sfc Obsg Sys, fielded)	569
Transportation (USCG Coastal)	100
Interior	470
Agriculture	1080
NASA	3
Surface, marine	
Commerce (SEAS-equipped ships)	140
Commerce (Coastal-Marine Autom Network)	65
Commerce (NOAA/NOS/PORTS)	6
Commerce (Buoys--moored)	64
Commerce (Buoys--drifting)	21
Commerce (Buoys--large navigation)	10
Commerce (Water-level gauges)	189
Navy (Ships with met personnel)	29
Navy (Ships without met personnel	287
Transportation (USCG Cutters)	225
NASA	2
Upper air, balloon	
Commerce (U.S.)	86
Commerce (Foreign, Cooperative)	22
Air Force, Fixed (U.S. & Overseas)	12
Air Force, Mobile	15
Army, Fixed (U.S. & Overseas)	10
Army, Mobile	97
Navy, Fixed (U.S. & Overseas)	11
Navy, Mobile	47
Navy, Ships	29
Marine Corps, Mobile	14
NASA (U.S.)	2
Atmospheric Profilers	
Army	7

TYPE OF OBSERVATION/AGENCY	No. of Locations (FY 2001)
Upper air, rocket	
NASA	1
Army (U.S. & Overseas)	1
Doppler weather radar (WSR-88D) sites	
Commerce (NWS)	123
Air Force (U.S. & Overseas)	29
Army (U.S. & Overseas)	3
Transportation	12
Doppler weather radar (Not WSR-88D) sites	
Air Force (Transportable)	4
Navy (Fixed)	9
Marine Corps (Mobile)	14
Off-site WSR-88D Processors (PUPs)	
Commerce (NWS)	63
Air Force	140
Navy	23
Army	10
Marine Corps	9
Transportation	25
NASA	2
Airport terminal Doppler weather radars	
Transportation (Commissioned)	45
Army (not airfield--Test Range/USAREUR)	2
Conventional radar (non-Doppler) sites	
Commerce (NWS)	31
Commerce (at FAA sites)	27
Air Force, Fixed (U.S. & Overseas)	7
Air Force, Remote Displays	2
Air Force, Mobile Units	3
Marine Corps, Mobile units	15
Weather reconnaissance (No. of aircraft)	
Commerce (NOAA)	3
Air Force Reserve Command (AFRC)	10
Geostationary meteorological satellites (No. operating)	
Commerce (planned config of 2)	2
Polar meteorological satellites (No. operating)	
Commerce (planned config of 2)	2
Air Force	4
Navy	(1 in orbit, status TBD)