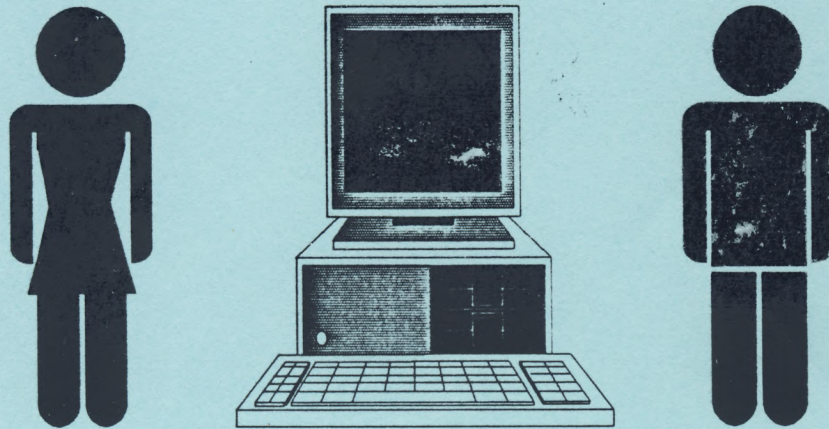


NSF 2000



A Joint Venture by the
Office of Information Systems
and the Division of
Personnel and Management

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NSF 2000

INTRODUCTION

During the past five years, information systems have become increasingly central to how NSF does business. Although most of the major information systems existed five years ago, few staff and almost no program managers or senior staff used them directly. Proposal and reviewer data entry and commitment of funds were done by central staff. Administrative actions such as travel, training and timekeeping were paper-based. Secretaries typed letters and documents which program officers and managers dictated or wrote by hand.

By 1989, almost every aspect of NSF work required the use of information systems. Few, if any, NSF staff complete a work day without using a computer.

Concurrent with changes in information systems were changes in the NSF work force and work assignments. NSF now has more temporary staff as well as a lower ratio of secretary to professional staff.

The Office of Information Systems (OIS) and the Division of Personnel and Management (DPM) conducted a joint study of these changes. Through a review of the literature, a survey sent to all NSF staff, and follow-up interviews, the study sought to identify:

- Changes in information systems between 1984 and 1989
- Changes in work functions and job characteristics as a result of the changes in information systems
- Employee views and perceptions of current NSF information systems; and
- Current and projected changes in NSF work force; and
- Information systems requirements for the 1990s.

The study is presented with the hope that it may prove of value in the shaping of personnel and information systems policies and procedures to better prepare NSF for the year 2000.

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NSF 2000

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Part I - The NSF Work Place and Work Force in Transition

Over the last five years, the Foundation's work force has undergone major changes. These changes reflect broad social, economic and demographic trends as well as changes specific to NSF. This section discusses trends in the NSF work force over the past five years, projected trends in the economy, the U.S. work force and the Federal civil service.

NSF Work Force 1985-1989

Over the past five years, the NSF work force composition has undergone major shifts. Among the changes were:

- o A high turnover among professional staff as a result of the increased reliance upon temporary staff, i.e., IPAs, rotators, and other temporary appointees;
- o An excessively high turnover rate among support staff;
- o A decrease in the quality of the available applicant pool as a result of private sector competition, the smaller number of entrants into the work force, and a growing portion of entrants who are unprepared for the higher skilled jobs being created;
- o An increase in the proportion of minorities; and
- o A change in support staff composition from secretarial and clerical to one administratively and technically oriented.

The following charts illustrate these trends.

Chart 1
Distribution by Type of Appointment

Scientists and engineers with permanent appointments at NSF decreased from 75 percent of the staff in 1984 to 66 percent in 1988.

The percent of NSF IPAs rose from 3 percent in 1984 to 13 percent in 1988.

NSF staff with temporary or Rotator appointments stayed relatively constant from 1984 to 1988.

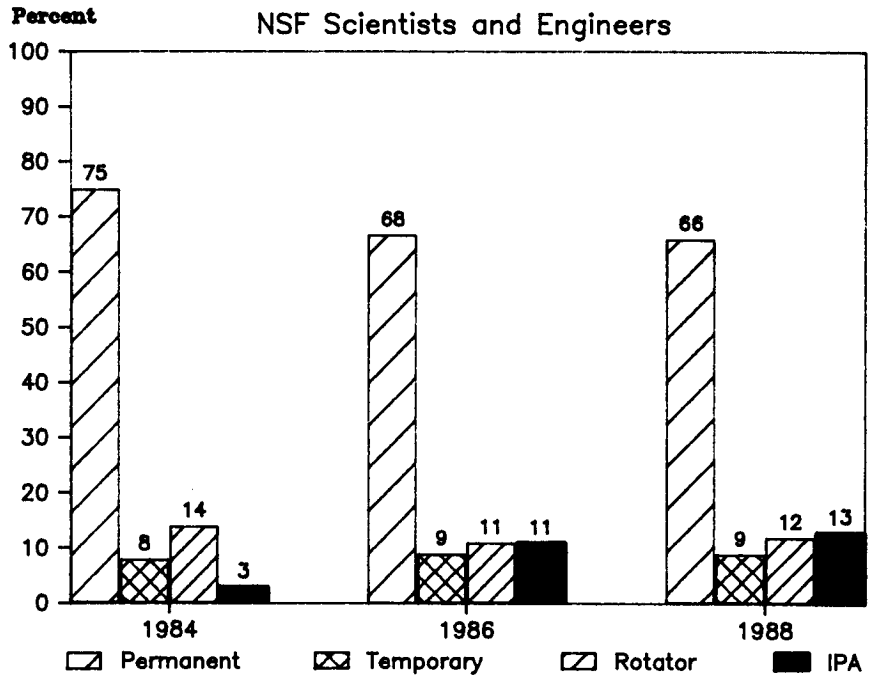
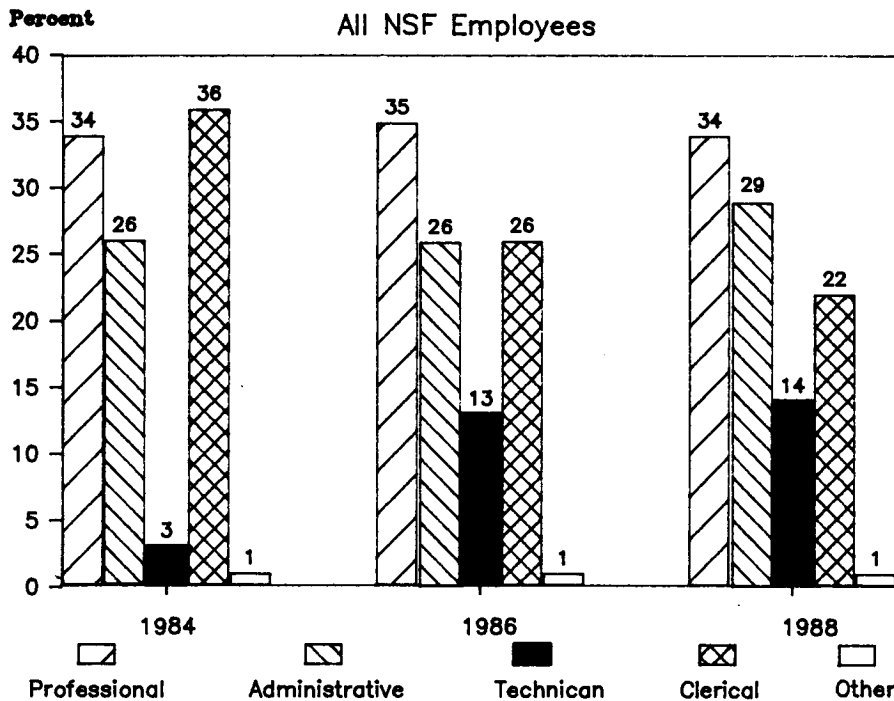


Chart 2
Distribution by PATCO Category

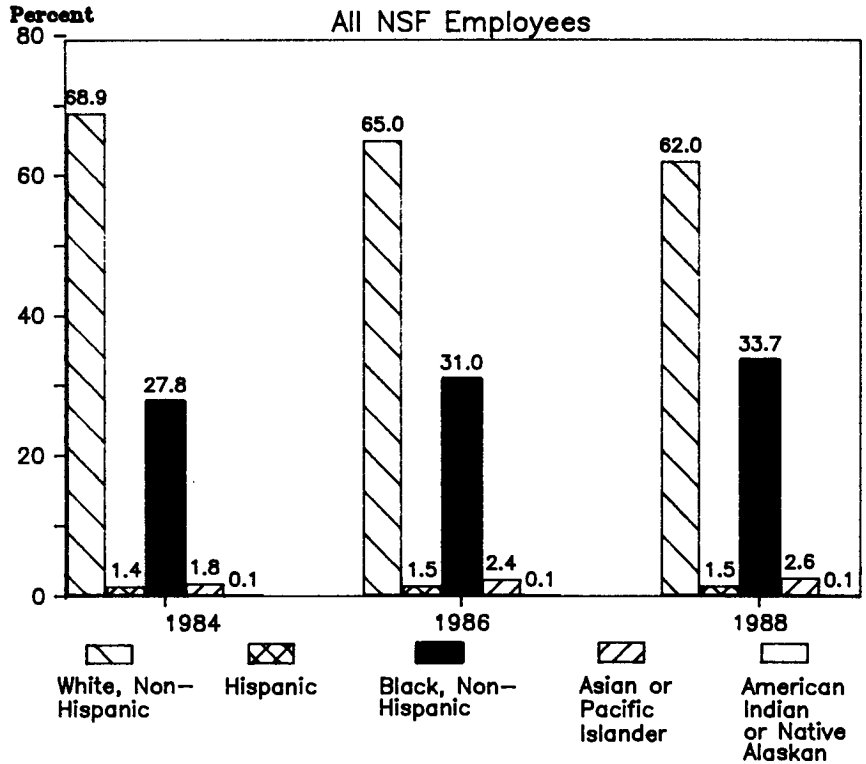


The percent of NSF staff classified as "Professional" remained constant between 1984 and 1988.

Clerical staff declined from 36 percent of the NSF staff in 1984 to 22 percent in 1988.

The percentage of NSF Technical staff grew from 3 percent in 1984 to 14 percent in 1988.

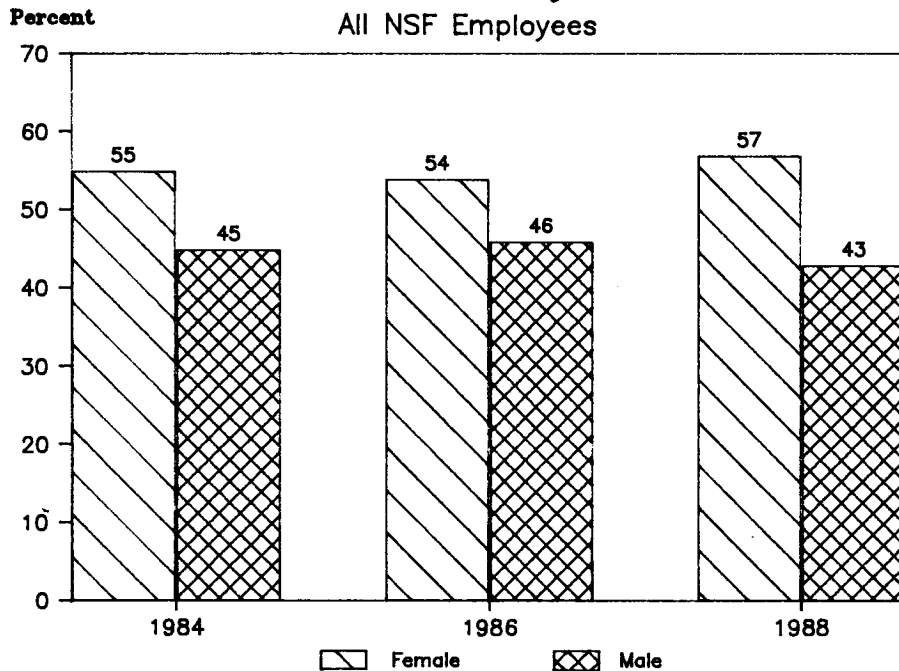
Chart 3
Distribution by Race and National Origin



Black Non-Hispanics increased as a share of the NSF work force from 27.8 percent in 1984 to 33.7 percent in 1988.

White Non-Hispanics as a portion of the NSF work force fell from 68.9 percent in 1984 to 62.1 percent in 1988.

Chart 4
Distribution by Sex



The male-to-female labor force ratio in NSF stayed relatively constant between 1984 and 1988

Work Force 2000 in the U.S.

The changes in the NSF work force over the past five years are likely to accelerate over the next decade as the nation's economy grows and demographic shifts occur. Work Force 2000¹, a study conducted by the Hudson Institute for the Department of Labor, outlined the probable changes in U.S. economy and work force by the year 2000. Among the changes in the economy projected by the Hudson Institute were:

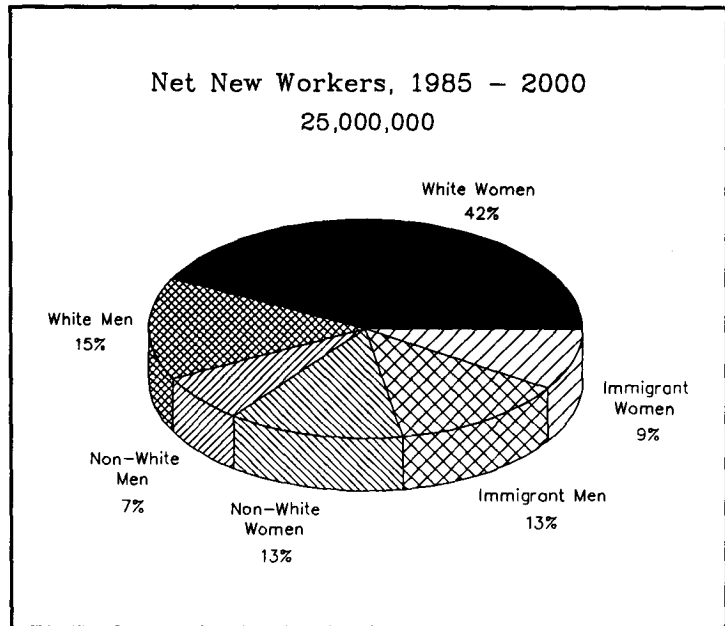
- o The U.S. economy should grow at a relatively healthy rate, nurtured by a rebound in exports, increased production, and a strong world economy.
- o U.S. manufacturing will represent a much smaller share of the economy despite its renewed vigor. Service industries will create all new jobs, and most of the new wealth. Computer- and health-related occupations will grow most rapidly.
- o New jobs will require higher skills because of the increasing introduction of technological innovation. Lower skilled jobs are increasingly being replaced by automation and jobs requiring more sophisticated skills and knowledge. Demand for lawyers, mathematical and physical scientists, health diagnosticians, social scientists, and technicians will increase dramatically. There will be fewer jobs in mining, agriculture, forestry, fishing, and manufacturing. Unemployment will increase among the least skilled and decrease for the better skilled and educated workers.

The Hudson report also projected several changes in the work force, including:

- o The number of workers will fall as a result of the low fertility rate of the "baby boom" generation. Between 1987 and 2000, the number of young workers aged 16 to 24 will decrease by 8 percent, or about 2 million.
- o The average age of workers will rise as fewer younger workers enter the work force. In addition, older workers will probably delay retirement or will re-enter the work force. The average age will increase from 36 to 39 by the year 2000; the over-75 population will increase by almost 46 percent.

¹William B. Johnston and Arnold H. Parker, Work Force 2000: Work and Workers in the 21st Century. The Hudson Institute, 1987.

- o More women will be on the job as a result of on-going social change and an increasing financial necessity. As late as 1960, fewer than 40 percent of women worked outside the home; by 2000, 61 percent of women will do so -- a 50 percent increase. By the year 2000, 47 percent of the U.S. work force will be women. Of the new workers entering the labor force between 1985 and 2000, only 15 percent will be white men.



- o One-third of new workers will be minorities as a result of higher black and Hispanic birth and immigration rates. During the 1980s, the black population grew at almost twice the rate of the white population (15.8 and 8.3 percent respectively) and is projected to grow at 14.6 percent in the 1990s. The U.S. Hispanic population will increase by over 38 percent during the 1990s, and will be the largest U.S. minority by 2020.
- o Immigration will be higher than at any time since World War II. In the 1970s, the U.S. foreign-born population increased by about 4.5 million, primarily from Latin America and Asia. Over 400,000 legal immigrants are expected to enter the country each year through 2000. This estimate does not include projections for undocumented or illegal immigration.

Opportunity 2000², another Hudson Institute report, analyzed strategies innovative businesses were employing to survive and thrive in the tight labor market. Strategies included recruiting women into traditionally male occupations, recruiting women returning to the work force or seeking a second career, reconciling family and work place needs, flexible work schedules, compressed work week, work at home, child care, employee assistance

²Clint Bolick and Susan Nestleroth, Principal Investigators, Opportunity 2000. The Hudson Institute, 1988.

programs, accommodating dual-career couples, professional development and upward mobility, basic skills training, accommodating physical and mental disabilities on the job, and adapting jobs to older workers.

Work Force 2000 in the Federal Civil Service

A third Hudson report, Civil Service 2000³, identifies several trends in the Federal work force:

- o The size of the Federal work force was fairly stable for the past 20 years and is unlikely to grow significantly. Individual agencies may change in size in response to national and international trends. For example, Treasury and Justice may grow because of society's increasing financial complexity and litigiousness, while the Agricultural Department may decline if farm subsidies shrink.
- o Federal government workers are, on average, older than most American job holders. While declining slightly in recent years, the average age should rise over the next decade. Toward the end of the century, the median age is likely to be the highest ever.
- o Federal workers are better educated than the work force as a whole. Like the private sector, Federal jobs will increasingly require even higher skills just as the pool of highly educated workers declines. Competition for well-qualified workers will become more intense. Private employers are likely to respond with higher entry-level wages, aggressive recruitment and training of non-traditional workers, and more flexible benefit packages. Unless Federal agencies respond in similar ways, they may find it increasingly difficult to recruit and keep good employees.
- o The number of Federal employees retiring or crossing from the public to the private sector is likely to climb, partly as a result of the high portability of the Federal Employment Retirement System (FERS).
- o Blacks are a higher proportion of Federal workers than they are of the work force as a whole while Hispanics and women are somewhat under-represented. Reflecting demographic changes, the percentage of minority and female Federal workers is likely to increase over the next decade.

³William B. Johnson, Civil Service 2000. The Hudson Institute, 1988

In addition to demographic changes and competition with private industry, the Federal government faces additional barriers in recruiting and retaining an excellent work force. For many high-skill jobs in expensive geographic regions, Federal compensation is increasingly non-competitive. For many years, public esteem for civil servants and the prestige of government jobs have fallen. Often, Federal employment entails outdated management practices and less attractive working conditions.

The report concludes that the Federal civil service faces considerable challenge as the end of the century approaches.

"The Federal government faces a slowly emerging crisis of competence. For years, many Federal agencies have been able to hire and retain highly-educated, highly-skilled work forces, even though their wages, incentives and working conditions have not been fully competitive with those offered by private employers. But as labor markets become tighter during the early 1990s, hiring qualified workers will become much more difficult. Unless steps are taken now to address the problem, the average qualifications and competence of many segments of the Federal work force will deteriorate, perhaps so much as to impair the ability of some agencies to function."⁴

The report suggests four steps that would enable the Government to attract, motivate and retain talented employees.

- o Decentralize personnel management to give agency managers full responsibility for the human resources they need to accomplish their missions.
- o Continue emphasis on the hiring, training, and promotion of women and minorities.
- o Substantially increase training for Federal workers.
- o Upgrade Federal pay and make benefit packages more flexible. In return, demand performance.

⁴Civil Service 2000, p.29.

Part II - NSF Information Systems in Transition

The changes that occurred in information systems are perhaps more obvious than the gradual changes in the work force. Over the past five years the Foundation has rapidly moved toward the goal of a fully integrated automated system which provides individual, network and mainframe computerization for all. The extent of such changes is very evident when one recalls the NSF information systems environment of five years ago.

- o In 1984, although most current major central systems were implemented on either the Honeywell mainframe or the Hewlett-Packard mini-computers, few division directors, program managers or other staff personally used computers or automated systems as part of their daily work procedures.
- o The Data Support Services Section (DSS) in the Division of Information Systems (DIS) entered all proposal data. After entering data, DSS distributed proposals to appropriate program offices. NSF decentralized this function and assigned data entry staff to Directorates in January, 1986.
- o In January, 1983, DIS began testing a new reviewer system in one directorate. This allowed program staff to enter reviewer data directly on the HPs and generate Form 7s. Until this new system was implemented in all directorates in late 1984, most program officers wrote long-hand notes with the names of reviewers. Secretaries then typed Form 7s. Most secretaries also kept index card files of reviewers to which proposal numbers were added. Form 7s were sent to DSS for data entry -- a process that took six months on the average.
- o On-line attribute searches, panel maintenance procedures, and on-line PI history reports were not implemented until late 1984. Until then, program staff looked up reviewer names in the so-called "Hong Kong" report. DSS distributed this massive computer-generated alphabetical listing of Foundation reviewers.
- o "Dear Colleague" form letters, with a typed program officer's name, were sent to reviewers. In some cases, secretaries used one of the two hundred available word processors or, more frequently, a typewriter to send personalized letters. Rarely did program officers type their own letters.
- o Program managers, pencils in hand and calculators nearby, negotiated budgets with principal investigators. From these long-hand notes, secretaries entered the information in the computers. Indirect cost rates

were not available on-line. No automated procedures existed to recalculate totals if a budget line was subsequently changed.

- o To commit funds, program managers and division directors signed a RAD (Recommend Award Data form) and forwarded it to DFM. Accountants on DFM staff committed funds and sent a printed copy of the RAD to DGC. On-line commitment of funds for proposals by program staff was implemented in 1986; for travel and purchase orders in 1988.
- o Most program staff used index cards or other paper filing systems to keep track of activities. Administrative Officers could get on-line reports on the award status of individual proposals and the Budget Execution Plan. DIS produced a number of batch reports on proposals and awards on a regular or request basis for distribution throughout the Foundation. Since there were no on-line abstracts, searches could not be made on the content of proposals.
- o For special reports, some staff used IQ on the Honeywell. Others were beginning to learn QUIZ and Inform on the HPs. However, secretaries typed most reports from program managers' hand written notes.
- o The Foundation owned few personal computers in 1984. In August, 1983, NSF purchased 98 computers and another 120 in mid-1984. The majority of staff had pcs only after major purchases in 1985 (425) and 1986 (463).
- o Local area networks were virtually non-existent in 1984. BBS installed the first LAN in a directorate in 1983. It ran on an IBM PC with a 20 megabyte hard disk and was used by only five of the staff. By 1987, the majority of NSF staff had computers connected to a LAN. By 1989, the percentage had risen to 95 percent.
- o With so few personal computers in 1984, budget preparation was done by hand, using calculators and paper. Administrative officers submitted requests for changes in operating plans to the Budget Office for approval and data entry. By 1988, administrative officers could change PD&M operating plans directly on the system.
- o Few staff used electronic mail before 1984. The National Science Board began using DIALCOM in December, 1982. During 1984 most of the Executive Council were connected to DIALCOM and by 1986, 200 NSF staff had accounts. NSF purchased the VAX with its NOTE system in 1986, but it was not until early 1987 that the majority of NSF staff had electronic mail capability. In 1988, NSF implemented cc:MAIL, a LAN-based system. By 1989, all staff used one form of electronic mail on a daily basis, some for several hours a day.

- o In 1984, support staff typed or penned-in forms for all administrative actions such as time cards, training and travel requests for supervisor's signatures. Forms were sent to DFM or DPM for approval and data entry. In 1988, NSF implemented on-line time cards and a training request system. During 1989, OIS and DPM completed development of the Personnel Action Tracking System (PATS).

- o Before 1986, the Administrative Directorate controlled funds for information systems. In 1986, NSF distributed PD&M funds to the directorates, including funds for purchasing personal computers, software and other computer-related products. In 1989, funds for repair and maintenance of computers were also distributed. Directorates were also given authority to move funds across PD&M budget lines. Directorates have varied enormously in the percentage of funds they allocate for computers, resulting in wide variation in the Foundation's technological infrastructure.

Part III - The Information Systems Survey

The survey was distributed to all NSF staff February 17, 1989. Four hundred and thirty responses were received, a response rate of 37 percent. A higher percentage of staff in grades 13 and above responded while secretarial and other support staff were under-represented. In terms of Directorate, grade level and length of time at NSF, responses were roughly in proportion to on-board staff. Nevertheless, the responses cannot be viewed as a statistically valid subset of NSF and all percentage responses must be interpreted as approximations, particularly when a subset of responses is discussed.

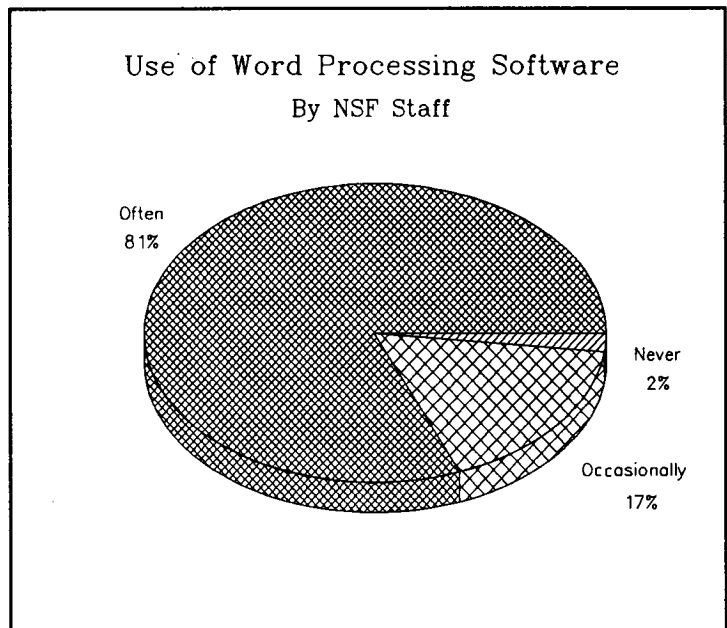
The survey consisted of seven sets of closed-ended and eight narrative questions. Answers were analyzed at the NSF level and then by directorate, grade, type of appointment and years at NSF.

Use of Personal Computer Hardware and Software

The personal computer revolution has come to NSF. Ninety-seven percent of the respondents stated they use a computer as part of their daily work. Analysis across directorates, grade, tenure at NSF or position found few differences.

Over 80 percent of the respondents indicated that they often use word processing and another 17 percent occasionally. Of the program officers responding, 98 percent often or occasionally type their own documents, a percentage that matches secretaries and clerical staff.

Sixty-eight percent of all respondents, and over 60 percent of respondents in all job categories, felt that word processing was an efficient use of their time. Many commented that the widespread availability of word processing capability enhanced efficiency and was the "information system" they liked most at NSF.



Several respondents wrote about word processing in the narrative sections. Comments included:

"The time lapse between draft and final copy of written correspondence is much smaller"

"Memos, letters, reports get done much faster"

"It's easier to compose on a computer"

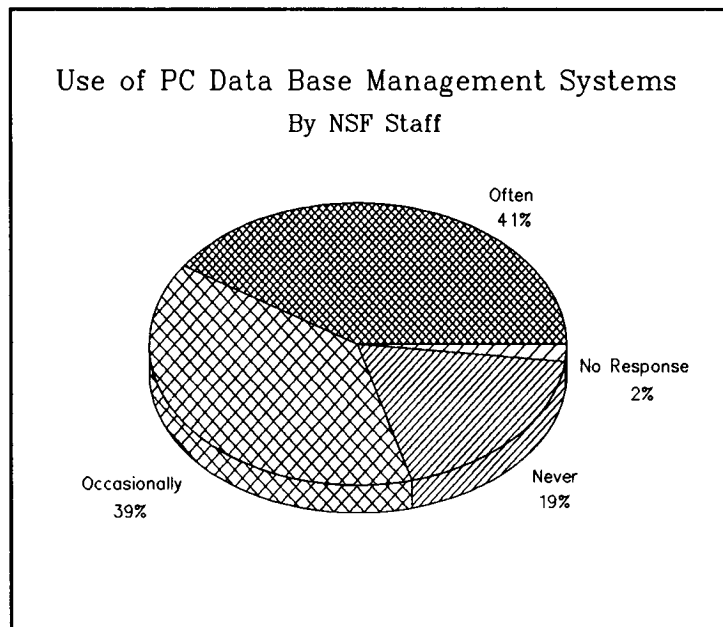
"Word processing is far superior to typing or drafting by hand, in principal part because secretarial delay is greatly eliminated. Our secretary now gets my documents only to print them in final."

Nevertheless, staff at all levels indicate an uneasiness with professionals typing documents. In the narrative sections, program officers and managers complained about an increasing amount of clerical work. Over 100 respondents said they used word processing because no typists were available. A number of respondents did not like having to learn to type. Several staff suggested that record keeping and office control procedures had slipped. One wrote *"Now secretaries make a fuss if you ask them to type anything."*

There was also uneasiness about the effects on support and administrative staff. One person wrote that she is now a program assistant, a much less interesting job than that of a secretary. Some respondents noted that the widespread use of personal computers made it difficult to recruit support staff because they either had to be exceptionally good with computers or were assigned mainly routine, low-skill tasks.

One respondent summarized the uneasiness by writing *"(Personal computers) have transformed secretaries into clerks and program directors into secretaries."*

While not quite as widespread as word processing, personal computer database software is widely used at NSF at all levels. About 80 percent of the respondents stated they frequently or occasionally use Lotus or dBASE. Almost all center managers



indicated that they frequently or occasionally used these software packages. Eighty percent of the program officers, program managers and supervisors did so.

Most respondents who use personal computer database software agreed that it is efficient to do so. The majority of respondents use personal computer databases to keep track of information of interest to the user's division. However, there is some indication that for NSF as a whole, there may be inefficiencies. Almost half of the respondents maintain systems similar to those on the HPs. Reasons varied, but many felt they had better control of data quality, easier access and greater ability to produce reports.

Automated Processes

Responses to central automated systems and processes can best be described as mixed but hopeful.

On-line approval of documents is relatively new to NSF and represents a small portion of the automated systems. Several questions solicited staff attitudes about the review and approval of on-line documents. In each case, responses were evenly divided among "agree", "disagree" and "neutral".

When asked if they thought on-line documents replaced the need for paper files, over 50 percent of respondents disagreed.

Despite this seemingly neutral reaction, over 70 percent of the respondents want NSF to continue to continue automating paper-based processes. Managers and supervisors seemed most in favor of continued automation while center managers and administrative officers were the least supportive.

The few respondents who commented about on-line time cards were split in liking and disliking the system.

The most frequently used on-line approval system is the "DD Concur," used by division directors or administrative officers. While there were no negative comments about the concept of on-line "DD Concur," there were many, very strong complaints about the slowness of the system.⁵

⁵After the survey was distributed, OIS discovered and corrected a database locking problem that caused most of the DD Concur slowness.

Many indicated that automated systems reduced paperwork. Several who had been at NSF for more than five years noted happily the demise of index card file systems.

"Less need for hard copies"

"We now use much less paper than we used to"

"[computer documents] save time and create less filing of paper and handling of paper work"

But lurking behind many comments was a distrust of electronic records. One respondent wrote:

"I feel we sometimes rely too heavily on the information being at our fingertips and are not keeping track of papers that could in the future be important"

A few respondents pointed out an incongruity: paper records such as travel requests and APFs are still typed even though the commitment of funds is done on line.

Other Comments about Information Systems

In the narrative sections, respondents focused on the more frequently used systems such as proposal data entry and the reviewer systems. For these systems, too, there was mixed reaction. In general respondents indicated they could not do their jobs without these systems, but disliked one or more aspects of their implementation.

Overwhelmingly, the most frequent comment concerned the slowness of the central systems. Staff at all levels, job categories and directorates expressed frustration at delays in using all central systems.

Many respondents wrote negatively about user interfaces and inconsistencies among systems. As one respondent wrote, NSF has *"failed to adhere to easy-to-learn, easy-to-use philosophy."* Another summarized a general frustration of respondents by writing *"I hate the inconsistent user interfaces ... The Return, Enter and Plus keys confuse all."*

Another major criticism was the lack of integration within a system (Reviewer) and between systems (Reviewer and Proposal Data Entry). The reviewer system, in particular, was criticized for requiring the user to move back and forth between different functions. One respondent wrote that the system was essential but *"was glad the program assistant was the primary user."*

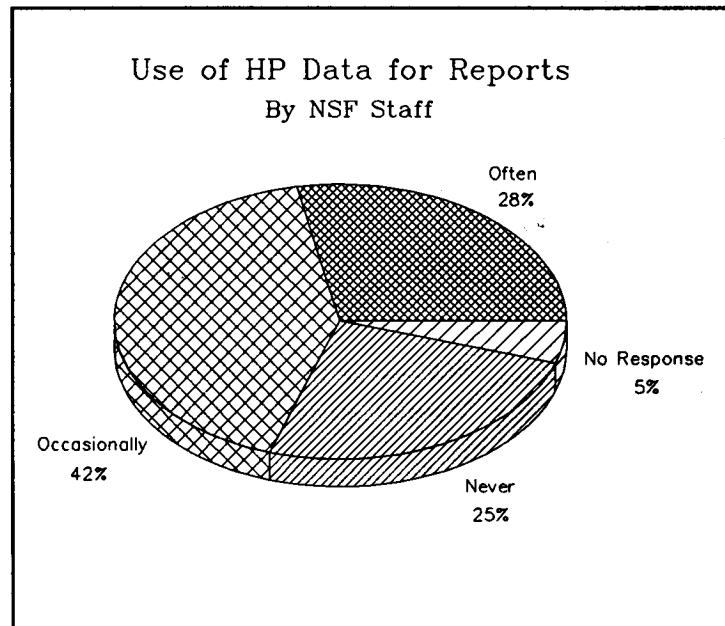
Data Quality and Reports

The fourth set of questions sought information about data quality and reports. Over sixty percent of the respondents agreed that divisions are responsible for data quality and fifty-eight percent agreed that their division took this responsibility seriously. Nevertheless, most respondents indicted concern with data quality.

Forty percent of the respondents agreed with the statement that data in proposal systems were accurate. Thirteen percent disagreed and almost fifty percent were neutral or gave no response. While only 30 percent thought data in PERSY were accurate, over 50 percent indicated they were neutral or had no opinion.

One explanation for the lack of confidence in data quality is that staff don't know how to get data corrected. While one-third of the respondents agreed that they knew how to correct data, another third disagreed. Another possible explanation for the large neutral response is that most people do not use the systems regularly.

Seventy percent of the respondents stated that they used data on the HPs for reports often or occasionally. Of the 107 who never use the HP data for reports, 17 said they didn't trust the data and 31 said they found the data difficult to use. Respondents could check more than one reason.



In response to the open-ended question "What do you like most about NSF automated systems?" many praised the availability of information. Comments included:

"The data are there and reliable"

"The breadth and depth of information available at the touch of a button"

"Accessibility to information"

"With one exception ... an official fact around here can be hunted down electronically with more or less effort"

Conversely, when asked what they liked least about NSF systems, several respondents wrote about the lack of data quality and poor reports. The most frequently stated concern was inconsistency of data among systems. Examples included different addresses for the same reviewer or principal investigator; different institutional information on the award, finance and proposal systems for the same grant.

Other respondents reiterated the problem of getting errors corrected and pointed out the lack of a central place to report data quality concerns.

Many respondents indicated a frustration at getting reliable information from the central systems. The lack of clear, consistent definitions of some important terms -- competitive award, duration -- was mentioned by several respondents.

Others indicated that they found it difficult to retrieve and report on data. At the time of the questionnaire, staff could use QUIZ and INFORM on the HPs⁶. Many felt these languages were too difficult for the average user. Software packages such as dBASE and LOTUS are much easier to use than the HP tools. Several respondents asked for easy ways to download data to personal computers for analysis and reporting.

While some respondents indicated they used the standard reports on the HP, others asked for reports that were easier to use or more flexible.

At least a few respondents indicated concern with the growing "information age." Some suggested program staff are asked to provide data that are, by their nature, inaccurate or incomplete. Others indicated concern that an excessive amount of time is spent reporting on actions, taking time away from the careful review of proposals and grants. While most respondents seem to indicate that on-line data contributed to efficiency, there were disagreements. One wrote that *"people checking on their own time status has become a major industry."*

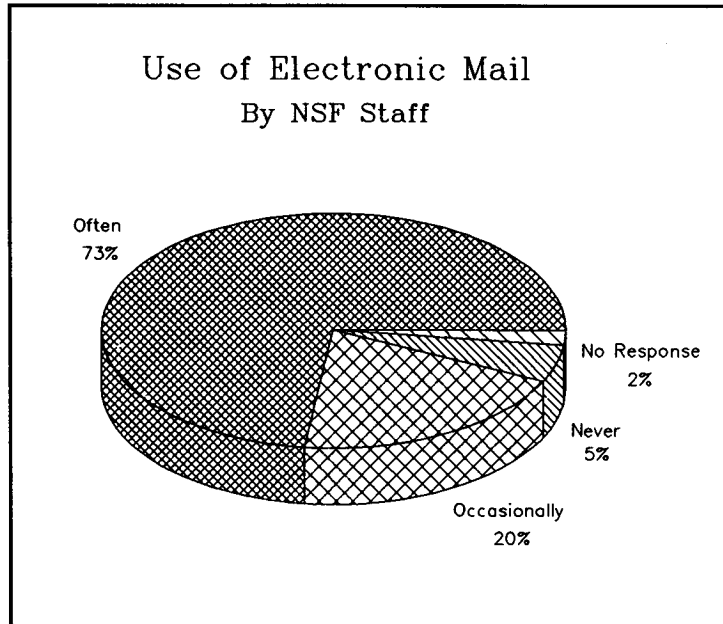
⁶ At the time the questionnaire was sent out, very few users had access to or had training in the QMF/SQL retrieval and report language on the IBM mainframe.

Electronic Mail

In the few years that NSF has had electronic mail, it has become an integral part of the way NSF does business. For most NSF staff, it would be hard to imagine life without E-Mail.

An impressive 93 percent of respondents use E-Mail often or occasionally. On the average, the respondents received 7 messages and sent 4 on a given day. The responses indicate that the more senior a staff member is, the more he or she uses E-Mail.

According to the survey, the primary use of E-Mail is within NSF. This is confirmed by logs kept on the VAX. Almost 70 percent of the respondents felt E-Mail had increased communication with staff outside their division and over 50 percent with staff within their division.



Electronic mail seems to have contributed to some administrative savings. Of those respondents who use E-Mail, over 80 percent say they frequently or occasionally use it in place of inter-office memos or internal phone calls. Over 50 percent often or occasionally use E-Mail in place of external phone calls or letters.

Of all the systems at NSF, electronic mail received the most praise and the most criticism in the narrative sections. Comments included:

"Improved my ability to communicate with colleagues"

"The traffic flow from other divisions gives me some information"

"E-Mail is great"

"Much better communication"

"Less telephone tag"

"Easier to keep the right people informed of things they need to know"

On the other hand, the majority of respondents who answered the open-ended questions criticized the slow response time of NOTE. Some respondents were very critical:

"Waits on NOTE are intolerable"

"Worst of the four (E-Mail) systems I have used"

A number of respondents complained about the lack of ports and getting "timed out" of the system. Several comments also indicated a dislike of the user interface and instructions.

Several respondents did indicate that they particularly liked cc:MAIL, the newer LAN based electronic mail system.

Several comments related not so much to E-Mail as a system as to the users of the system. Several respondents pointed out that junk mail has proliferated and that some users should learn E-Mail courtesy.

Support for Users

At the heart of information systems is the user. Several questions sought to determine if staff felt they had the appropriate tools, training and support to use information systems effectively.

Over 60 percent of the respondents stated that they had appropriate hardware and software to do their jobs, while just about 20 percent felt they did not. The degree of satisfaction with hardware/software ranged across Directorates from 45 percent to 81 percent. Some of the negative comments about NSF information systems included:

"Its quaint and old fashioned,"

"Obsolete hardware, obsolete software"

"No MACs"

"The personal computers are too old. No one should be using an IBM personal computer or XT in 1989. It's 1984 technology."

"I have visited no university or automated office which needs automation so much and has so little."

The majority of comments, however, reflected a general satisfaction with the hardware and software available and the sense that we were ahead of most other Federal agencies. Comments included:

"The distributed responsibility that allows each unit to control its own environment"

"The fact that there is a network"

"Even my brain damaged IBM clone is better than a typewriter"

"What I like best is that we went whole hog into the New Office rather than piddle around with one personal computer per division like other agencies are doing. A friend of mine who works (at another agency) turns green every time I mention that NSF has more personal computers than people, since she is still sharing a Lexitron word processor with three other professionals."

"I think we are doing great, on top of everything, ahead of other agencies, a leader in the field of automation"

Despite the rapid growth of information systems and the high percentage of temporary NSF staff, the majority of respondents indicated that they and their colleagues have sufficient knowledge and skills to use both the personal computers and the HPs. Sixty-six percent felt they could use personal computers effectively, while fifty-four percent felt the same about the HP systems. The majority of respondents also felt that both the professional and support staff in their office had the knowledge and skills to use both the HPs and personal computers.

However, twenty percent of the respondents indicated that both the professional and support staff lacked sufficient knowledge to use the HPs effectively.

A number of respondents expressed a sense of being overwhelmed by the new and changing technology. One wrote *"Learning this is a full time job"* and another *"The software changes so rapidly, it is very difficult to keep up."*

There was widespread criticism that the HP systems are not well documented and are far from user friendly.

Although there was praise for OIS user support, there was also criticism of staff turnover, lack of timely response and sometimes unfriendly service.

Several respondents felt that training was skewed toward the more advanced, "whiz bang" users and ignored the needs of new staff.

A slight majority stated they were kept appropriately informed about information systems policies that affected them and their job.

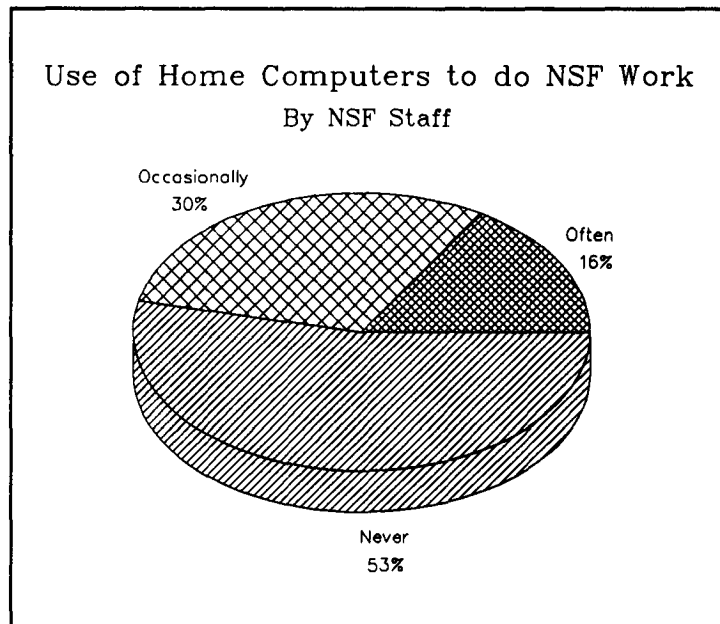
Only thirty percent felt they were appropriately rewarded for learning computer skills.

Home Use of Computers

The last section of the survey focused on how staff use computers at home for NSF work.

Sixteen percent of the respondents wrote that they often work at home using a personal computer and while another 30 percent said they did so occasionally. Forty-seven percent of the program managers and 42 percent of other managers worked at home using computers often or occasionally

At home, most respondents worked on research, analytic or writing tasks. Only a few respondents access HP application systems, but almost half use electronic mail often or occasionally.



To find out more about work at home, additional questions were sent by E-Mail to respondents who had agreed to participate in follow-up interviews and had indicated they worked often or occasionally at home during their normal 40 hour tour of duty. Twenty-three persons answered the follow-up questions.

Only 6 of the respondents confirmed that they worked at home during their normal tour of duty. Amounts of time varied from four to five days a year to once or twice a week. The other 17 said they worked at home at nights and on weekends. Seventeen of the 23 persons who participated in follow up questions said they had access to a personal computer at home and used it for NSF work.

The respondents listed many advantages to working at home including fewer interruptions, increased efficiency, less stress and more comfortable work environment. Among the disadvantages cited were lack of personal interaction, no access to office files, open to abuse and potential difficulties for supervisors.

Most respondents believed that the opportunity to work at home should be available, but at the discretion of supervisors.

Part IV - Implications

- o The "stand alone" professional is fast becoming a reality. Increasingly, division directors, program managers and other professionals will use information systems without support staff.
- o The age of information is here. Increasingly, staff at all levels will have to retrieve and present data about NSF activities.
- o Change and development of information systems will remain a constant at NSF.
- o NSF will continue to have decentralized management. Directorates, divisions and programs will continue to have varied commitment to information systems. Consequently, the distribution of hardware and software, commitment to data quality, and level of technical support provided to staff will vary.
- o Personal computers increase productivity. Computers at home extend the work day for many NSF employees.
- o A high proportion of NSF staff will continue to have temporary appointments.
- o NSF staff are highly educated and demanding. They will continue to expect excellent, not just good, information systems.
- o NSF faces an increasingly competitive labor market. To attract and retain good staff, NSF will need to implement flexible work schedules, tele-commuting and aggressive affirmative action programs.
- o The median age of NSF employees will increase. There will be fewer young new hires as a result of decreased support staff. Science and engineering personnel will be encouraged to delay retirement because of difficulty or inability to replace them.
- o The proportion of women and minorities in the NSF work force will increase. Far more women than men will enter the labor market. Continued affirmative action will provide a larger pool of minority college graduates in occupations relevant to NSF.

Part V - Recommendations

Responsibility for the design, development and implementation of information systems cuts across all directorates and offices at NSF. Proponents of systems (e.g. DFM for finance, DPM for personnel) identify functional requirements and provide training for staff. OIS designs, develops and maintains all central systems. Directorates purchase and install distributed equipment and allocate resources for staff training in information systems. The following recommendations, therefore, identify the primary offices responsible for their implementation.

- o Continue development and enhancement of automated systems, particularly those that reduce paper processing and enhance efficiency. (Proponents, OIS)
- o Replace current, aging distributed equipment over the next few years. (Directorates)
- o Ensure faster, more reliable response time on all central systems. (OIS)
- o Provide greater integration within systems. (Proponents; OIS)
- o Continue efforts at data quality and explore feasibility of centralizing some data quality functions. (Divisions; OIS)
- o Ensure that new systems are thoroughly documented, preferably on-line. Develop easy to use, consistent user interfaces. (OIS; Proponents)
- o Increase information systems training, particularly for new employees. (Divisions; OIS)
- o Recognizing that the ratio of support staff to professionals will probably continue to decrease, develop alternative ways to reduce administrative burden on program staff. (ADA; OIS; Directorates)
- o Continue to explore and promote alternative work force augmentation options (e.g., work-at-home, job sharing, part-time and intermittent employment). (DPM)

- o The proportion of technical and professional positions will increase. The current trend of decreased clerical support staff and increased technical and professional staff will continue. Any increase in NSF FTEs will probably be for professional positions.
- o The proportion of part-time positions will increase, There will be greater utilization of part-time employment to enable NSF to avail itself of highly-skilled women who are unwilling or unable to work full-time.
- o The proportion of handicapped employees will increase. The introduction and utilization of "work-at-home" days in the work schedule will enhance NSF's ability to attract and retain handicapped individuals.

Appendix A
O/D 89-2, The ISS Questionnaire

APPENDIX A

NATIONAL SCIENCE FOUNDATION
OFFICE OF THE DIRECTOR
WASHINGTON, DC 20550

STAFF MEMORANDUM

O/D 89 - 2

February 17, 1989

ADMINISTRATION AND MANAGEMENT

SUBJECT: Information Systems Survey

There is probably not one of us who does not use a computer in our daily work -- for processing proposals, for communicating with colleagues, for producing memos, and for many other purposes.

In order to understand the effects that computers and information systems have had on our staff and to plan for the future, the Office of Information Systems and the Division of Personnel and Management are conducting a study of the future workplace and the labor force. This survey will contribute significantly to that effort by providing a baseline of information about the effects of information systems on NSF employees and their work.

I hope you will participate in this effort by responding thoughtfully to the attached questions.



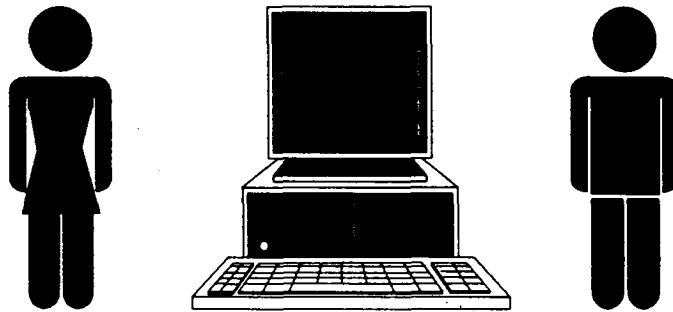
Erich Bloch
Director

Attachment

Distribution: All Employees

Cancellation Date: March 31, 1989

INFORMATION
SYSTEMS
SURVEY



Please return responses within 5 days to :

Andy Conversano
DPM, Room, 208

Section 1: Demographic Data

1.1 How long have you been at NSF?

- Less than one year
- One to five years
- More than five years

1.2 What is your current grade or appointment?

- 1-6
- 7-12
- 13-15
- Excepted Service
- SES
- IPA/Rotator

1.3 What is your organizational title?

- Manager/supervisor (e.g. Asst. Director, Division Director, Branch Chief, Section Head etc).
- Program officer, program manager, other non-supervisory professional staff.
- Center manager, supervisory program assistant or administrative officer.
- Secretary, clerk, program assistant.
- Other (Please specify) _____

1.4 What Directorate are you in?

- | | | |
|-------------------------------|-------------------------------|------------------------------|
| <input type="checkbox"/> O/D | <input type="checkbox"/> STIA | <input type="checkbox"/> GEO |
| <input type="checkbox"/> ADM | <input type="checkbox"/> BBS | <input type="checkbox"/> MPS |
| <input type="checkbox"/> CISE | <input type="checkbox"/> ENG | <input type="checkbox"/> SEE |

OPTIONAL

1.5 Please sign your name IF you are willing to participate in a follow-up interview.

Name: _____ NOTE ID: _____ Phone No: _____

Section 3: Automated Processes

3.1 It takes less time to review and/or approve on-line documents than paper documents.

Disagree 1__ 2__ 3__ 4__ 5__ Agree

3.2 I prefer to review and/or approve on-line documents rather than paper documents.

Disagree 1__ 2__ 3__ 4__ 5__ Agree

3.3 Supervisors are more likely to delegate authority to approve actions on-line than they are to allow staff to sign a paper document for them.

Disagree 1__ 2__ 3__ 4__ 5__ Agree

3.4 Automated application systems have reduced the amount of paper that I handle in an average week.

Disagree 1__ 2__ 3__ 4__ 5__ Agree

3.5 There is no need to keep paper copies of items that are electronically stored.

Disagree 1__ 2__ 3__ 4__ 5__ Agree

3.6 NSF should continue to develop systems that replace paper-based systems.

Disagree 1__ 2__ 3__ 4__ 5__ Agree

Section 4: Data Quality and Reports

Data Quality

- 4.1 Divisions are responsible for the quality of data in the HP proposal systems (includes Proposal Processing, ITRF, PI/PD, Peer Review and Abstracts). Disagree 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ Agree
- 4.2 In my Division, maintaining the quality of data is a high priority. Disagree 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ Agree
- 4.3 Data in the proposal systems are generally accurate. Disagree 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ Agree
- 4.4 Data in systems with centralized data entry such as PERSY and Awards are accurate. Disagree 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ Agree
- 4.5 When I find errors in automated systems, I know how to have them corrected. Disagree 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ Agree
- 4.6 When I find errors in automated systems, I take appropriate steps to have them corrected. Disagree 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ Agree

Reports

- 4.7 I use the data in HP systems to respond to external and internal requests for information. Often ___ Occasionally ___ Never ___

If NEVER, please check reason(s) why:

4.7.1 I don't need to reply to requests. _____

4.7.2 I can get the information more effectively in other ways. _____

4.7.3 I don't trust the data in HP systems. _____

4.7.4 It is difficult to get data from the HPs. _____

4.7.5 Other (please explain) _____

Section 5: Electronic Mail

5.0 I use electronic mail

Often ___ Occasionally ___ Never ___

If NEVER, please skip to section 6.

5.1 Electronic mail has improved communication with my:

5.1.1 supervisor/staff

Disagree 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ Agree

5.1.2 Division/office colleagues

Disagree 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ Agree

5.1.3 other NSF staff

Disagree 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ Agree

5.1.4 colleagues outside NSF

Disagree 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ Agree

5.2 Please indicate how frequently you use electronic mail in place of each of the following oral or written means of communicating:

Type of Communication

Frequency of use
of E-Mail

5.2.1 NSF internal telephone calls

Often ___ Occasionally ___ Never ___

5.2.2 External telephone calls

Often ___ Occasionally ___ Never ___

5.2.3 NSF inter-office memos

Often ___ Occasionally ___ Never ___

5.2.4 Mail going outside NSF

Often ___ Occasionally ___ Never ___

5.2.5 Meeting announcements

Often ___ Occasionally ___ Never ___

5.2.6 Face-to-face conversation

Often ___ Occasionally ___ Never ___

5.2.7 Other (please specify)

5.3 How many electronic mail messages do you receive on an average day?

5.4 How many electronic mail messages do you send on an average day?

Section 6: Home Use of Computers

6.0 I use a computer at home to do NSF work Often ___ Occasionally ___ Never ___

If NEVER, Please skip to Section 7.

6.1 I own my own computer. Yes ___ No ___

6.2 I have an NSF loaner computer. Yes ___ No ___

6.3 How often do you work part of your regular work week at home? Often ___ Occasionally ___ Never ___

6.4 How often do you work in the evenings and on weekends at home doing NSF work? Often ___ Occasionally ___ Never ___

6.5 At home, I use a computer to do the following NSF work:

6.5.1 Access electronic mail Often ___ Occasionally ___ Never ___

6.5.2 Access NSF HP systems Often ___ Occasionally ___ Never ___

6.5.3 Type documents/reports Often ___ Occasionally ___ Never ___

6.5.4. Perform statistical analyses, budgeting, etc. Often ___ Occasionally ___ Never ___

6.5.5 Prepare graphics Often ___ Occasionally ___ Never ___

6.5.6 Other (please specify) _____

Section 7: Support for Users of Information Systems

- 7.1 I have appropriate hardware to do my job. Disagree 1__2__3__4__5__ Agree
- 7.2 I have appropriate software to do my job. Disagree 1__2__3__4__5__ Agree
- 7.3 I have sufficient knowledge and skills to use personal computer software effectively. Disagree 1__2__3__4__5__ Agree
- 7.4 I have sufficient knowledge and skills to use HP systems needed in my job. Disagree 1__2__3__4__5__ Agree
- 7.5 I am kept informed about information systems policies and activities that affect my job. Disagree 1__2__3__4__5__ Agree
- 7.6 I am appropriately rewarded for developing my computer expertise. Disagree 1__2__3__4__5__ Agree
- 7.7 In general, secretaries and program assistants in my Division/office have the knowledge and skills to use:
- 7.7.1 personal computers effectively. Disagree 1__2__3__4__5__ Agree
- 7.7.2 HP systems effectively. Disagree 1__2__3__4__5__ Agree
- 7.8 In general, the professional staff in my Division/office have the knowledge and skills to use:
- 7.8.1 personal computers effectively Disagree 1__2__3__4__5__ Agree
- 7.8.2 HP systems effectively Disagree 1__2__3__4__5__ Agree

Section 8: Narrative Questions (please use additional paper as needed)

8.1 How have NSF information systems changed your job?

8.2 What do you like **most** about NSF information systems?

8.3 What do you like **least** about NSF information systems?

8.4 List any comments or suggestions you may have on any of the following:

8.4.1 adequacy/availability of training to enhance your job-related computer skills.

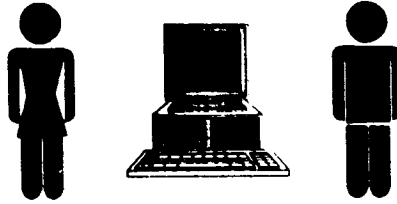
8.4.2 availability and effectiveness of technical support.

8.4.3 increasing the utility and effectiveness of information systems.

8.4.4 additional functions that could be automated.

8.5 Other comments.

Appendix B
Summary of Responses to the ISS Questionnaire



April 3, 1989

To: All NSF Staff

From: Director, Office of Information Systems
Director, Division of Personnel and Management

Subject: Information Systems Survey

Our thanks to all of you who responded to the Information Systems Survey. We received 430 responses, from 37% of the NSF staff. A summary of the responses is attached for your information. These responses will be used as background for the "NSF 2000" study being jointly conducted by OIS and DPM.

"NSF 2000" will examine (1) the impact of computer technology and software systems on tasks performed at NSF, (2) projected U.S. and Civil Service workforces, and (3) the relationship and implications of these changing technology and human resource systems for the way we do business.

A number of those who responded expressed a willingness to be interviewed as part of the study. We will be taking some of you up on that offer. In addition, if any of you have comments or analysis to offer after seeing the summary responses, let us know via NOTE. Thanks again.

A handwritten signature in cursive script that reads "Margaret L. Windus".

Margaret L. Windus

A handwritten signature in cursive script that reads "Constance K. McLindon".

Constance K. McLindon

Attachment

INFORMATION SYSTEMS SURVEY

Section 1: Demographic Data

Note: Data based on 430 survey forms returned to DPM. Responses to some questions are dependent on responses to previous questions and totals will be less than 430.

1.1 How long have you been at NSF?

56 13.0% Less than one year
126 29.3% One to five years
236 54.9% More than five years
12 2.8% No Response

1.2 What is your current grade or appointment?

31 7.2% 1 - 6
88 20.5% 7 - 12
134 31.2% 13 - 15
60 14.0% Excepted Service
53 12.3% SES
50 11.6% IPA/Rotator
14 3.3% No Response

1.3 What is your organizational title?

96 22.3% Manager/Supervisor (Asst. Dir, Division Dir, Branch Chief, Section Head, etc.)
207 48.1% Program Officer, Program Manager, other non-supervisory professional staff
34 7.9% Center Manager, Supervisory Program Assistant, Administrative Officer
45 10.5% Secretary, Clerk, Program Assistant
33 7.7% Other
15 3.5% No Response

1.4 What Directorate are you in?

58 13.5% O/D 57 13.3% STIA 51 11.9% GEO
64 14.9% ADM 51 11.9% BBS 46 10.7% MPS
24 5.6% CISE 39 9.1% ENG 27 6.3% SEE
13 3.0% No Response

Section 6: Home Use of Computers

	<u>Often</u>	<u>Occasionally</u>	<u>Never</u>	<u>No Response</u>
6.0 I use a computer at home to do NSF work.	<u>69</u> (16%)	<u>131</u> (30%)	<u>228</u> (53%)	<u>2</u> (0%)
<u>If NEVER, Please skip to Section 7.</u>				
	<u>Yes</u>	<u>No</u>	<u>No Response</u>	
6.1 I own my own computer.	<u>162</u> (81%)	<u>36</u> (18%)	<u>2</u> (1%)	
6.2 I have an NSF loaner computer.	<u>38</u> (19%)	<u>143</u> (71%)	<u>19</u> (9%)	
	<u>Often</u>	<u>Occasionally</u>	<u>Never</u>	<u>No Response</u>
6.3 How often do you work part of your regular work week at home?	<u>27</u> (14%)	<u>61</u> (30%)	<u>110</u> (55%)	<u>2</u> (1%)
6.4 How often do you work in the evenings and on weekends at home doing NSF work?	<u>66</u> (33%)	<u>124</u> (62%)	<u>5</u> (3%)	<u>5</u> (3%)
6.5 At home I use a computer to do the following NSF work:				
6.5.1 Access electronic mail	<u>47</u> (23%)	<u>51</u> (25%)	<u>84</u> (42%)	<u>18</u> (9%)
6.5.2 Access NSF HP systems	<u>8</u> (4%)	<u>22</u> (11%)	<u>146</u> (73%)	<u>24</u> (12%)
6.5.3 Type documents/reports	<u>74</u> (37%)	<u>110</u> (55%)	<u>12</u> (6%)	<u>4</u> (2%)
6.5.4 Perform statistical analyses, budgeting, etc.	<u>37</u> (18%)	<u>79</u> (39%)	<u>70</u> (35%)	<u>14</u> (7%)
6.5.5 Prepare graphics	<u>22</u> (11%)	<u>55</u> (28%)	<u>102</u> (51%)	<u>21</u> (10%)

Appendix C
Responses to the Narrative Questions

APPENDIX C

RESPONSES TO THE NARRATIVE QUESTIONS

The responses to the narrative questions included in the questionnaire for the Information Systems Survey were sorted into broad but distinctive categories. By categorizing the main thrust of each response, one can gain a much better understanding and clearer perspective of what employees had to say. Following is a summary of the responses to each narrative question. The percentage of the total number of employees who responded to each question is reflected for each category.

Question 8.1 - How have NSF Information Systems changed your job?

There were 270 responses to this question:

- Increased productivity/efficiency (43 or 16%)
- Made my job simpler/easier (38/14%)
- Improved communications (33/12%)
- Negative responses (hasn't changed my job, has made it more difficult to do my job) (27/10%)
- Enhanced word processing capability (17/6%)
- Affected my relationship with support staff (16/6%)
- Reduced Paperwork (15/6%)
- Miscellaneous comments that don't fit other categories (52/19%)
- Neutral responses (noncommittal) (29/11%)

Question 8.2 - What do you like most about NSF information systems?

There were 253 responses to this question:

- Improved data management/accessibility (84/33%)
- Mentioned a specific software system (Note, E-Mail, LAN, etc.) (41/16%)
- Improved work effectiveness/efficiency (21/8%)
- Ease of use (14/6%)
- OIS user assistance (12/5%)
- Improved communications (12/5%)
- Having Personal computers (9/4%)
- Miscellaneous comments (48/19%)
- Neutral/negative comments (12/5%)

Question 8.3 - What do you like least about NSF information systems?

There were 301 responses to this question:

- The configuration of the system(s) (e.g. difficult to use, clumsy, not user friendly, fragmented) (78/26%)
- System response time is too slow (77/26%)
- Quality of the data (23/8%)
- Computer training inadequate (22/8%)
- System reliability/downtime (22/8%)
- OIS support (11/4%)
- Documentation (8/3%)
- Miscellaneous (60/20%)

Question 8.4.1 - List any comments or suggestions you may have on the adequacy/availability of training to enhance your job-related computer skills.

There were 197 responses to this question:

- Training inadequate or not available (57/29%)
- Training adequate and available (47/24%)
- More "in-house" training is needed (18/9%)
- Training funds inadequate (12/6%)
- No time available to take training (9/5%)
- Should utilize VCRs for training (3/1%)
- Miscellaneous (51/26%)

Question 8.4.2 - List any comments or suggestions you may have on availability and effectiveness of technical support.

There were 208 responses to this question:

- Technical support is ok/good/excellent (107/51%)
- Technical support is lacking/poor (49/24%)
- Some good, some bad (24/11%)
- Have to wait too long for support (11/5%)
- Miscellaneous (17/8%)

Question 8.5.3 - List any comments or suggestions you may have on increasing the utility and effectiveness of information systems.

There were 136 responses to this question:

- Improve documentation/training (30/22%)
- Make more user friendly (25/18%)
- Improve system response time (15/11%)

- Improve data quality (5/4%)
- Miscellaneous (61/45%)

Question 8.4.4 - List any comments or suggestions you may have on additional functions that could be automated.

There were 99 responses to this question:

- sign in/out (13/13%)
- Proposal submission/processing (8/8%)
- travel authorizations/vouchers (6/6%)
- telephone directories/dial (6/6%)
- Make current ones work first (6/6%)
- graphics/vugraphs (5/5%)
- calendar (4/4%)
- Requisitions for supplies (4/4%)
- NSF/standard forms (4/4%)
- NSF issuances (4/4%)
- Questionnaire for this survey (3/3%)
- Miscellaneous (36/36%)

Question 8.5 - Other comments.

There were 64 responses to this question:

- Systems quality/reliability (10/16%)
- Systems integration (9/14%)
- Computer applications (9/14%)
- Training (7/11%)
- NSF systems behind the times (5/8%)
- The construction of the questionnaire (3/5%)
- Passwords (3/5%)
- Miscellaneous (18/28%)

Appendix D
Work-at-Home Practices at NSF

APPENDIX D

WORK-AT-HOME PRACTICES AT NSF

In the recent Information Systems Survey (ISS), question 6.3 asked, "How often do you work part of your regular work week at home?" Respondents could check OFTEN, OCCASIONALLY, or NEVER.

The final tabulation of survey results indicated the following responses to this question:

<u>Employee Category</u>	<u>Often</u>	<u>Occasionally</u>	<u>Never</u>	<u>No Response</u>
Manager, Supervisor	13 (21%)	13 (21%)	36 (58%)	0 (0%)
Program Officer, Program Dir, other nonsupvy prof staff	12 (11%)	38 (36%)	55 (52%)	1 (1%)
Center Manager, Admin Officer, Supvy Program Assistant	1 (13%)	1 (13%)	5 (63%)	1 (13%)
Secretary, Clerk, Program Assistant	0 (0%)	0 (0%)	2(100%)	0 (0%)
Other	0 (0%)	5 (33%)	10 (67%)	0 (0%)
Total NSF *	27 (14%)	61 (30%)	110 (55%)	2 (1%)
* Includes: IPA, Rotator	7 (25%)	8 (29%)	13 (46%)	0

A follow-up was conducted with those employees who indicated both (1) that they work part of their regular work week at home OFTEN or OCCASIONALLY and (2) that they would be willing to participate in a follow-up. The follow-up consisted of a confirmation that the employees actually did work at home as part of their regular work week and asked six questions.

- (1) On average, how many of your regular work week hours did you work at home during the past six months?
- (2) During the past 12 months?
- (3) What kind of work do you perform at home?
- (4) Based on your experience in working at home as part of the regular work week, what do you believe are the advantages?
- (5) Disadvantages?

(6) What are your personal views or comments regarding work at home as part of the basic work week?

Seven of the 15 employees who indicated that they work at home OFTEN and were willing to be interviewed responded to the follow-up. Similarly, 16 of the 33 employees who indicated they worked at home OCCASIONALLY responded. Seventeen of the respondents acknowledged that they had misunderstood question 6.3 in the survey. They worked extra hours at home in addition to their regular 40-hour workweek; not as part of their regular workweek.

Six of the respondents (2 OFTEN; 4 OCCASIONALLY) confirmed that they performed work at home as part of their regular work week. Their work-at-home patterns are:

Employee A	OFTEN	1 - 2 days per week on regular basis
Employee B	OCCAS	1 day per week on regular basis
Employee C	OCCAS	4 - 8 hours per week on regular basis
Employee D	OFTEN	4 - 8 hours per week on irregular basis
Employee E	OCCAS	100 hours per year on irregular basis
Employee F	OCCAS	4 - 5 days per year on irregular basis

The responses reported by those who worked at home (whether they worked additional hours or as part of their regular work week) in the order of frequency are:

Kinds of Tasks Performed **

- Review and prepare memos and correspondence
- Read and analyze reports and studies
- Produce, update or analyze reports on p.c.
- Review proposals
- Communicate through E-Mail
- Communicate by telephone
- Research books, documents, papers
- Prepare presentations, briefings, speeches
- Plan meetings and workshops
- Enter data into data base

Advantages of Working at Home

- Increased efficiency, productivity, creativity because of less interruptions and distractions
- Avoids stress, waste of time and energy associated with commuting
- More comfortable work environment
- Less fatiguing
- Beneficial for some physically handicapped
- Cost benefits to NSF and employees if adopted on regular basis

Disadvantages of Working at Home

Lack of personal interaction with managers,
colleagues, visitors, others
No access to office files and documents
Open to potential abuse
Can't adequately fulfill supervisory
responsibilities

Personal Views on Working at Home

Opportunity to work part of week at home
should be made available to employees where
this is practicable. (With one exception
respondents indicated favorable or very
favorable views with respect to employees
being able to work at home as a part of the
regular work week)

There are limited opportunities for
managers and supervisors to work at home
during the regular workweek

The nature of the work is a determining
factor

** Seventeen of the twenty-three respondents to the follow-up
survey made it evident that they had access to a p.c. at home.
The availability of a p.c. at home has a significant bearing on
the kinds of tasks that actually are or could potentially be
performed.