1. Recruitment Literature

2. Job Evaluation System

3. Career Service Occupational Structure

4. Unclassified Occupational Specialty Descriptions

5. DoD Directive 5100.23, "Administrative Arrangements for the National Security Agency"

6. NSA/CSS Directive 10-3, "Delegation of Authority to the Deputy Director for Administration"

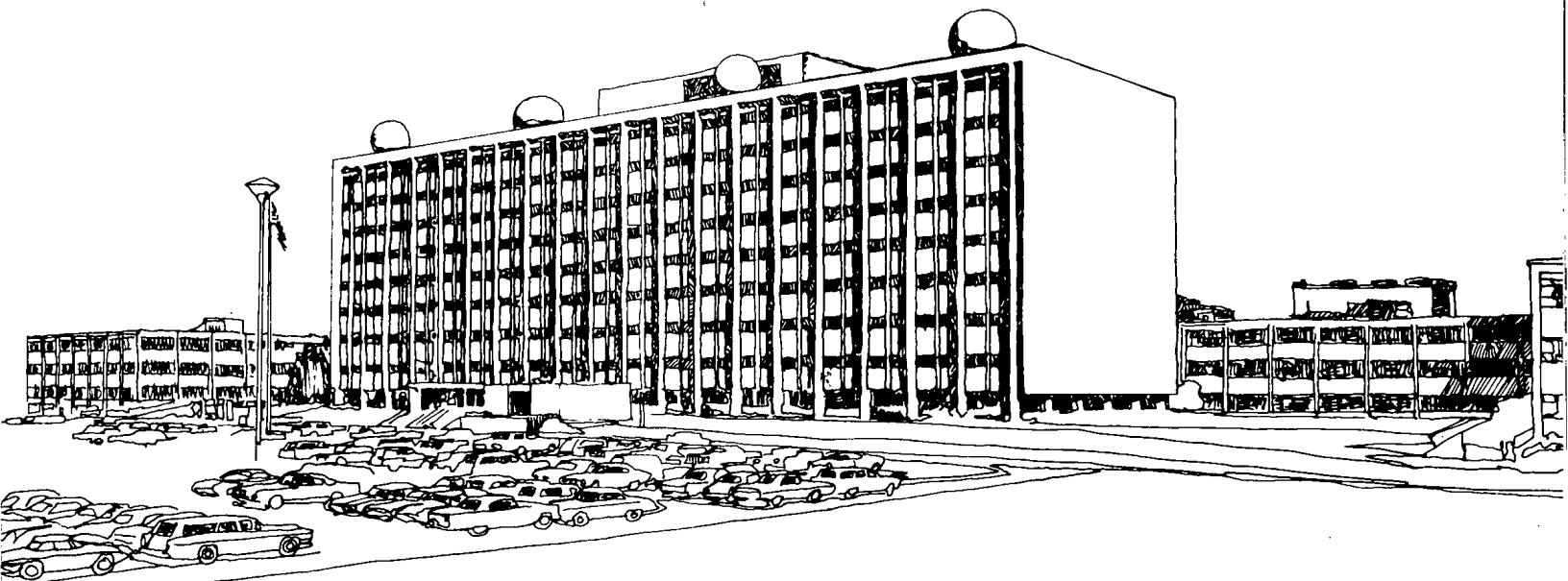7. NSA DDA Directive 1-1988, "DDA Delegations of Authority"

NATIONAL SECURITY AGENCY/CENTRAL SECURITY SERVICE

Fort George G. Meade, Maryland 20755

The National Security Agency was established by Presidential Directive on November 4, 1952 as a separately organized agency within the Department of Defense (DoD). In 1972, the Central Security Service was established, in accordance with a Presidential memorandum, to provide a more unified cryptologic organization within the DoD. Since then, the full name for this Agency has been the National Security Agency/Central Security Service (NSA/CSS). The NSA/CSS has two primary missions—a communications security mission and a foreign intelligence information mission.

Its nine-story Headquarters Building, completed early in 1966, dominates a complex that includes an operations building, a technical library, and other buildings which house logistics and support activities.

Although it is an affiliate of the Department of Defense, over 80 per cent of the NSA/CSS employees are civilians. With the exception of a handful who are on "field assignments" these civilian employees reside in Washington, Baltimore, and the suburbs in between. The remainder of the work force are Army, Navy, Marine, and Air Force personnel who are assigned to NSA/CSS, usually for a three year tour.

Because of the unique nature of the work, NSA/CSS must set its own job definitions, conduct its own aptitude testing, and recruit its new employees directly. Professional and pre-professional hires are recruited from all over the country, especially from college campuses and industry. Highly skilled technicians are found through technology schools and former military personnel.

Clerks, secretaries, and craft employees are drawn mostly from the local Maryland high schools. Depending on prevailing labor market conditions, the NSA/CSS recruitment effort also goes beyond the traditional sources and into student programs involving summer employment, cooperative education, and high school work study arrangements. Full consideration is also given to employment of the handicapped.

Most college and high school hires move into one of three broad occupational areas at NSA/CSS: Some specialize in cryptography (the making and testing of United States codes and ciphers). Some become experts in the computer field. Others will work on the research and development of communications equipment. Altogether, the work force presents an unusual combination of occupational specialties in its professional ranks: electronic engineers, physicists, mathematicians, linguists, computer scientists, and research specialists. It is unusual to find professional people of such high caliber working "under the same roof" in such large numbers.

NSA/CSS conducts one of the U.S. Government's leading Research and Development activities in the field of specialized communications equipment. Some of the R&D projects have been so dramatic as to significantly advance the state-of-the-art in the scientific and commercial world at large. Past breakthroughs originating in NSA/CSS laboratories have included the first large scale computer, the first solid state computer, and certain applications of high density storage technology.

To assist in certain research areas, NSA/CSS calls upon special boards of consultants, outstanding scientists and engineers from industry and academic centers, as well as from other Government agencies. Also, special work is oftentimes done, on contract, by leading commercial engineering and research firms. NSA/CSS scientists and engineers are encouraged to attend, and to participate in, conferences and symposia of professional organizations throughout the country.

Many of the challenges that confront the NSA/CSS researchers provide rare opportunities to explore the most advanced scientific theories and techniques. The constantly increasing demands on the Agency ensure that its mathematicians, scientists, and engineers will continue to face challenging problems of ever greater opportunities for individual achievement and professional growth.

NSA/CSS has always placed great emphasis on the training and development of its people. The establishment of the National Cryptologic School as a separate professional structure is a symbol of this concern. This school not only provides technical and managerial training for the NSA/CSS work force, but is also used as a training resource by several communications elements throughout the Department of Defense. The Agency also sponsors employees for bachelor and graduate level study at schools such as Johns Hopkins and the University of Maryland. Additionally, the NSA/CSS sends employees to attend the Army War College, Air War College, Naval War College, National War College, Industrial College of the Armed Forces and the Armed Forces Staff College.

People at NSA/CSS also have a wide diversity of interests and accomplishments away from the job. Many are engaged in art, music, bridge, chess and athletic endeavors. A number of employees contribute much effort to civic, fraternal, religious and charitable groups. Many NSA/CSS professional personnel teach on a part-time basis at the local universities and colleges.

The exceptional abilities of NSA/CSS professionals have been recognized throughout the years by awards at the highest levels of government. In almost unprecedented actions, Congress has awarded two alumni $100,000 each for their inventions which advanced the science of cryptology immeasurably. Four alumni are also numbered among those who have been awarded the National Security Medal, the highest award that can be granted for contributions to the national defense, and one of them was additionally given the President's Award for Distinguished Federal Civilian Service, the highest award in the Federal civilian service.
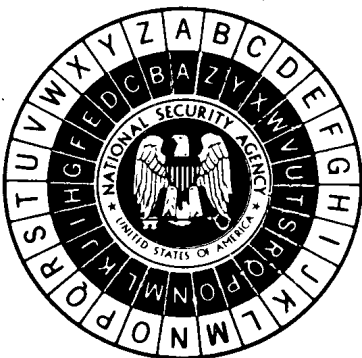
The Cipher Disk

invention it has been repeatedly re-invented in forms only slightly different from the original. Its story shows that man has sought to put the wheel to use in secret communications wherever possible, even as he also does in mechanics.

As invented in Italy sometime before 1470, it had similar concentric disks with the exception that one contained a "mixed" (scrambled) alphabet. Also, in some of the earlier versions, one of the two alphabets was composed of arbitrary symbols in lieu of conventional characters.

The appeal of the disk lay in the fact that with it, encipherment and decipherment could be performed without carrying bulky or compromising written materials.

The cipher disk came into large-scale use in the United States for the first time in the Civil War. The Federals' Chief Signal Officer patented a version of it, very similar to the original Italian disk, for use in flag signaling. Since his flag stations were within the view of Confederate signalmen as often as not, he prescribed frequent changes of setting.

About a half-century later the U.S. Army adopted a simplified version, very similar to this device, in which one alphabet was "standard" and the other "reverse-standard." Although technically this was a step backward, there were compensating advantages since the regularity of the alphabets tended to reduce error. During the period of the First World War and for several years afterward, the Army issued the disk in this form to units that needed a cipher which could be carried and used easily and which would give a few hours' protection to tactical messages.

In using this device you could leave the two disks in the same setting for an entire message, thus producing the simplest possible cryptogram. Or their setting could be changed with every letter of the message and, if the pattern of the setting-changes were complex enough, you would have an extremely secure cipher.

NATIONAL
COMPUTER SECURITY
· CENTER

9800 Savage Rd.
Ft. Meade, MD 20755-6000

THE NATIONAL COMPUTER SECURITY CENTER

The National Computer Security Center was formed to meet the complex and critical challenges that face the nation's ADP community. It has established an aggressive program to study and implement secure computer technology, and encourage the widespread availability of trusted computer systems. The Center believes that this program, and the open and cooperative relationship being forged with Federal agencies, industry, and the academic community, will result in fulfillment of this country's computer security requirements.

The majority of the Center's activities are provided as a service to Government organizations and the computer industry. Among these activities are the development of standards and guidelines; the evaluation of computer hardware and software security properties; the conduct and support of computer security research and development; and the development of programs for wide-ranging computer security education, training, and awareness.

ESTABLISHMENT OF THE COMPUTER SECURITY CENTER

The Department of Defense Computer Security Initiative was established in 1978 by the Assistant Secretary of Defense for Command, Control, Communications and Intelligence to achieve the widespread availability of trusted computer systems* for use throughout the Federal Government. The initiative fostered the development of trusted computer systems through technological efforts, and has provided the basis for computer system evaluation procedures for assessing such systems.

On 2 January 1981, the Director of the National Security Agency assumed responsibility for computer security within the Department of Defense

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*A trusted computer system is a system that employs sufficient hardware and software integrity measures to allow its use for processing simultaneously a range of sensitive or classified information.

1

and for most of the DoD Computer Security Initiative activities. As a result, the DoD Computer Security Center, officially chartered by DoD Directive 5215.1, was established at the National Security Agency. When National Security Decision Directive 145 was signed by President Reagan on 17 September 1984, the Center's responsibilities were raised to the national level, and its name was subsequently changed to the National Computer Security Center.

OPERATIONAL ELEMENTS

The Computer Security Center has three operational elements, with the following responsibilities:

Standards and Products

- Developing and publishing computer security and network security standards, criteria, and guidelines.
- Providing guidance for use in applying policy standards and criteria in a range of operational environments for varying data sensitivities.
- Performing computer security software and hardware product evaluations on commercial and Government-produced computer security products.
- Publishing an Evaluated Products List that shows the results of ADP product evaluations.

Research and Development

- Researching and developing concepts, architectures, and techniques that will support the handling of multilevel classified and sensitive information in trusted computer systems and networks.
- Researching and developing methods, techniques, and tools for the formal specification and verification of software programs.
- Developing methods and tools to support the security analysis and assessment of trusted computer systems and networks.

2

Demonstrating the emerging R&D results by applying them to representative problems where the critical issues of performance and functionality, as well as security, can be addressed.

Technical Support

- Developing, organizing, and conducting education and awareness programs, public seminars, workshops, and other information exchange meetings with private industry, other Government agencies, and academia.
- Operating ADP support for software tools, verification systems, and programming environments to support computer security analysis and evaluation.
- Providing remote access via Government and commercial networks to computer services for information dissemination, and verification tools for Government, academia, and industry.
- Performing short-term, on-site computer security assessments.
- Encouraging system acquisition authorities to use trusted systems, and providing system acquisition advice and technical support for security technology.
- Operating a computer security information center.

THE CENTER AS CLEARINGHOUSE

A key service of the Center to the computer security community is to act as a clearinghouse for technical information, and provide guidance on ADP systems and networking security. The Center provides information on various computer security products that exist in the commercial and Government sectors. The Center actively participates in fostering an increasing awareness of computer security problems and solutions. The Center assists in identifying worthwhile opportunities for computer security education and training. It also conducts vendor conferences, and is active in other public forums to keep the computer industry

3

informed of its activities, and to keep Center personnel informed of what is taking place in industry, Government, and academic institutions.

THE CENTER IN THE SAISS COMMUNITY

NSDD-145 established an organizational structure to guide the conduct of activities directed toward protecting certain Government information processed by telecommunications and automated information systems. The National Telecommunications and Information Systems Security Committee (NTISSC) was established to consider technical matters and to develop operating policies necessary to implement the provisions of NSDD-145. Operating under and established by the NTISSC to discharge its automated information systems security responsibilities is the Subcommittee on Automated Information System Security (SAISS). The SAISS is composed of 22 voting and 8 non-voting representatives from departments and agencies of the Executive Branch. The Director of the National Computer Security Center is the SAISS Chairman.

HOW TO USE THE CENTER

Letter requests for information on or use of Center services should be addressed to:

National Computer Security Center
9800 Savage Rd.
Ft. Meade, MD 20755-6000

The Center will perform the following tasks upon request, if resources are available:
- (a) Provide technical information, advice, and assistance.
- (b) Provide the following specific services:
  - (1) Design guidance on software/hardware computer security technology.
  - (2) Computer accounts for and network access to information services and software tools for security evaluations.
  - (3) Review and critique of concepts, plans, requirements, and RFPs.
  - (4) Recommendations on countermeasures for computer security vulnerabilities.

4

KEY CONTACTS IN THE CENTER

Position	Phone
Director	(301) 859-4371
Deputy Director	(301) 859-4372
Executive	(301) 859-4373
Special Assistant for Civil & Private Programs	(301) 859-4372
NTISSC Staff	(301) 688-7736
Office of Standards and Products	(301) 859-4450
Office of Research and Development	(301) 859-4485
Office of Technical Support	(301) 859-4500

5

GRADUATING COLLEGE STUDENTS

1987 PROFESSIONAL QUALIFICATION TEST

NATIONAL SECURITY AGENCY
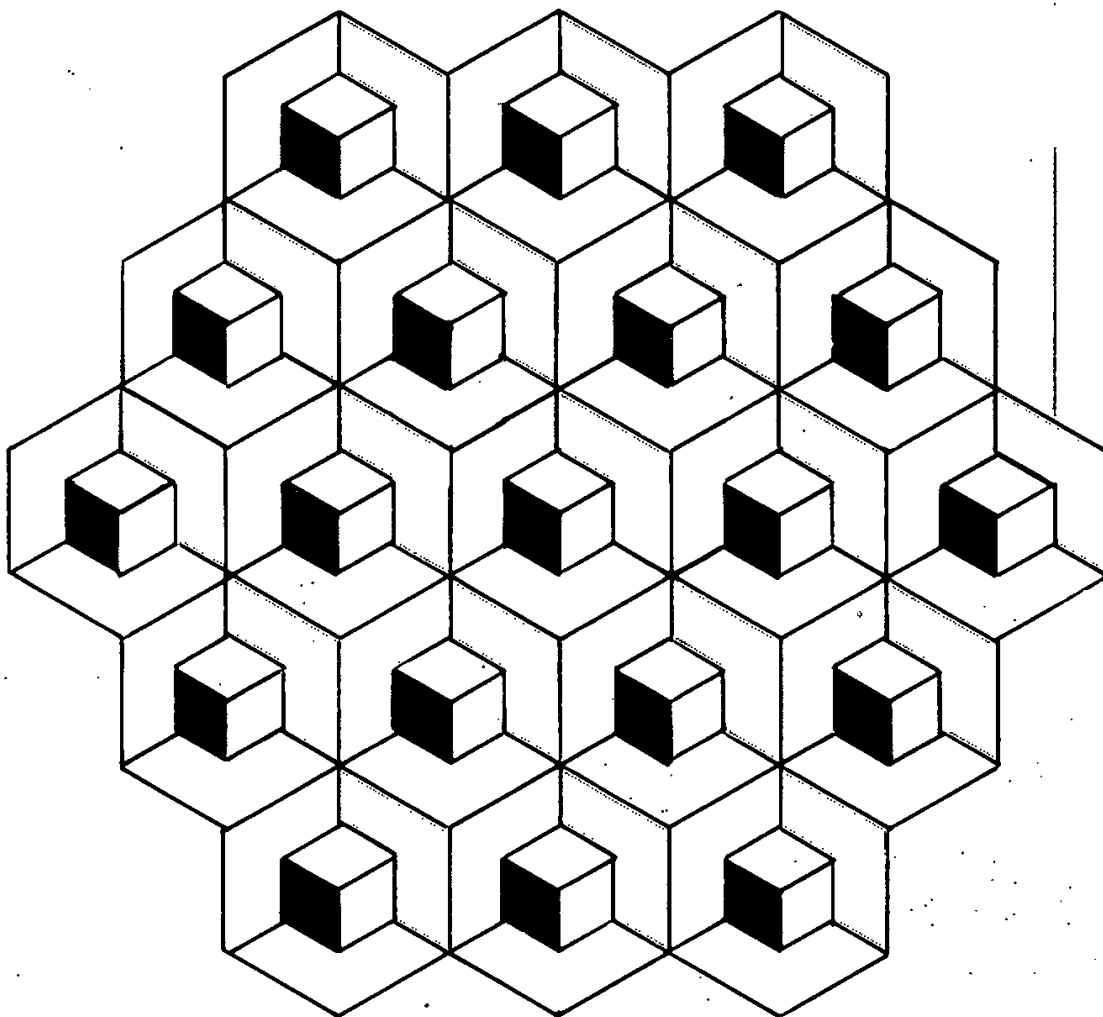
Your
first step
in qualifying
for a career with the
National Security Agency

BULLETIN AND
REGISTRATION FORM

- To apply for a position with the National Security Agency (NSA), all B.A./B.S. degree candidates in the liberal arts, the physical and natural sciences, business and certain foreign languages must take the Professional Qualification Test. To obtain an admission ticket for the test, use the Registration Form bound into this bulletin. Check now (see pages 13 to 15) for the registration deadline, test date, test descriptions, and test centers.

- Information contained in this bulletin applies only to applicants for NSA positions who are holders of degrees awarded prior to February 1989.

- Applicants who have taken the test in a previous academic year must take the 1987 version of the test.

- Physically handicapped applicants who need special test arrangements or large-type or braille materials must attach to the Registration Form a letter on letterhead from a physician or therapist who has treated them for the disability attesting to the need for such arrangements.

- Applicants whose religious convictions prevent them from taking the Professional Qualification Test on Saturday must attach to the Registration Form a letter on letterhead from their religious leader, indicating the need to be tested on a day other than Saturday.

IMPORTANT

- The following majors *need not* take the test. (For career information and application procedures, see the inside back cover.)

Engineering
Computer Science
Mathematics (Graduate level only)
Slavic, Near Eastern, and Asian language majors

AN EQUAL OPPORTUNITY EMPLOYER

CONTENTS

IN BRIEF

The National Security Agency (NSA) is a federal government agency of the Department of Defense and is responsible for three very unique and exciting missions. NSA produces foreign intelligence information crucial to the nation's defense, safeguards the vital communications of our government and military, and establishes computer security standards for use throughout the federal government.

The extraordinary scope and depth of the work conducted at NSA offer challenging and rewarding opportunities to graduates at all levels.

The Agency seeks graduates who possess a combination of such traits as ingenuity, intellectual curiosity, and perseverance, and who desire to apply these assets to unique and rewarding careers in an environment "where imagination is the essential qualification."

The National Security Agency is housed in a complex of buildings located conveniently between Washington, D.C., and Baltimore, Maryland.

2

THE PROFESSIONAL QUALIFICATION TEST

The Professional Qualification Test is an aptitude test that measures an individual's ability to reason logically and to comprehend and manipulate a variety of verbal and quantitative materials. The test is one of the tools used to select college graduates for careers with NSA. Occupational placement is made on the basis of the applicant's demonstrated aptitudes, abilities, and interests as well as the needs of the Agency. Thus, the Professional Qualification Test plays an important role in the selection, placement, and development of the college graduate. There is no test fee, nor does taking the examination obligate one in any way.

WHO IS ELIGIBLE?

United States citizens who will have a bachelor's degree by February 1989 (see inside front cover for test exemptions). Those candidates with at least a 3.0 overall grade point average (on a 4.0 grade scale) will be given employment preference.

BASIC CONSIDERATIONS FOR EMPLOYMENT

In general, an individual will be considered for employment if he or she:

(1) is a United States citizen and all members of his/her immediate family are United States citizens;

(2) has qualified on the Professional Qualification Test;

(3) is of unquestioned loyalty to the United States;

(4) is of excellent character and discretion;

(5) is free from involvement in criminal, infamous, or dishonest conduct;

(6) would not normally be subject to coercion, influence, or pressure that may cause him or her to act contrary to the best interests of the nation's security;

(7) is in good physical and mental health.

Because of the sensitive nature of NSA operations, all applicants for employment are subject to a thorough background investigation.

WHAT ARE THE OPPORTUNITIES?

Many of the challenges that confront the NSA community provide rare opportunities to explore new fields. The constantly increasing demands on the Agency assure that its professional staff will continue to face new and unique problems affording ever greater opportunities for individual achievement and professional growth.

Training and Career Development

Upon coming to work for NSA, the college graduate will participate in one of the Agency's orientation and training programs. These programs are designed to give all newly hired college graduates a broader knowledge of the Agency's mission and operations and to prepare them to enter specific career fields.

To keep abreast of developments, it is the policy of the Agency to stimulate and encourage the professional and intellectual growth of the individual and to provide the means of increasing his or her skills, insight, and knowledge. Applicants who demonstrate exceptional potential may be selected to participate in highly specialized long-range development programs. Under such programs, intensive formal training as well as on-the-job training is provided.

Advancement

Individual performance is the primary basis for advancement at NSA. An employee who performs each assignment to the best of his or her ability may look forward to a rewarding and progressive career. Since NSA is a career agency, promotion from within is the accepted policy.

Diversification

Since NSA is a large, concentrically organized institution, many opportunities for job rotation and job enrichment exist for the typical newly hired graduate. Employees also can consider applying for three- to five-year tours at field sites elsewhere in the United States and overseas.

4

WHAT ARE THE CAREER FIELDS?

Graduates from a broad spectrum of academic disciplines make the transition from campus into our major career areas. If either your major or your minor field of study falls under those listed below, your successful completion of the Professional Qualification Test could lead to placement in a corresponding career program.

Computer Systems (Preferred Majors: Mathematics, Statistics, Physical Science, Data Management)

The new employee will learn to work with applications programming, systems programming, retrieval systems, or data base management through a combination of technical courses and rotating project assignments. Junior programmers are soon given responsible tasks in one of the world's largest and most diversified computer complexes.

Computer science majors are not required to take the Professional Qualification Test; they may go directly to their placement office to schedule an NSA interview.

Language

Romance language majors and other linguists not excluded from having to qualify on the Professional Qualification Test will be utilized in a variety of research and analysis tasks involving translation or transcription. In certain cases, successful candidates will be considered for retraining in another foreign language.

Communications Security (Preferred Majors: Mathematics, Statistics, Physical Science, Operations Research, Information Theory)

Entrants into this career field will be concerned with efforts to protect U.S. communications against exploitation by foreign intelligence or unauthorized persons. The new employee will receive training in a variety of analytic- and research-oriented areas. Training may include formal classroom instruction, courses at local universities, and a series of rotational job assignments of six to nine months' duration.

5

Intelligence Research (Preferred Majors: International Relations,
Modern History, Political Science, Economics, Foreign
Language, Library Science)

Intelligence research analysts assimilate, evaluate, and interpret
intelligence-related information concerning foreign areas of special
interest. The collective results of these varied analytic processes
are ultimately written, published, and disseminated to other con-
cerned government elements.

Cryptography (Preferred Majors: Mathematics, Statistics, Logic)

The development of code and cipher systems is a unique occupa-
tion found at NSA. With the advent of new and increasingly so-
phisticated communications systems, the field of cryptography has
grown dramatically over the years. Scientifically devised, tested,
and selected cryptographic systems are used to ensure the max-
imum degree of security for the transmission of sensitive informa-
tion. NSA professionals use specially designed computers and
other high-speed data recording and processing equipment to pro-
duce and evaluate the Government's "secure" communications
systems. Since cryptography is seldom offered as a course of study
in college, most of the new employee's specialty training is
provided through classes at the National Cryptologic School and
rotating project assignments.

Signals Analysis (Preferred Majors: Physical Science,
Mathematics)

Signals analysts are primarily involved in one of three major areas:
(a) Communications (the identification and classification of elec-
tromagnetic emissions intended to transmit information); (b) Elec-
tronics (the study of physical signal characteristics); and (c)
Telemetry (the study of transmission data and systems).

Management and Administration (Preferred Majors: Personnel
Management, Business, Accounting, Psychology)

Being a large organization, NSA requires administrative and man-
agement elements to provide support services to its main opera-
tions. A select number of college graduates will find applications
for their education in our logistics, resources management, se-
curity, and personnel career fields. Each of these areas has its own
career development program, varying in length and content.

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ADVANTAGES

Salaries

Salaries vary according to individual qualifications. The minimum starting salary for a college graduate is equivalent to Grade GS-07. There will be an opportunity to discuss salary with the NSA representative during the personal interview.

Sick Leave

Sick leave is earned at the rate of 13 workdays per year for illness, injury, or hospitalization. Sick leave accumulates without limitation, thus assuring a measure of security in the event of a long illness.

Insurance

Employees are eligible to participate in an excellent group life insurance plan. Also, the employee may choose one of several health benefit plans. Much of the cost of these programs is paid by the Agency.

Living Environment

City, suburban, or country living is within easy commuting distance of NSA. Houses and apartments are available in a wide price range. The Washington-Baltimore metropolitan areas are rich in cultural and historical attractions and offer a variety of year-round sports events.

Educational Facilities

There are 13 universities located in the Washington-Baltimore area offering graduate work in many fields. Many job-related, after-hours courses are conducted at the local universities, and sponsorship may be available on a tuition-reimbursement basis. The public school systems are among the best and most progressive in the country.

Vacation

There are ten paid holidays a year, and paid vacation leave is earned at the rate of 13 workdays per year for the first three years of federal service (including military service). During the next 12 years, employees earn paid vacation leave at the rate of 20 workdays per year.

Recreation Programs

The National Security Agency offers its employees every opportunity to relax and enjoy themselves during their leisure hours. The NSA Recreation, Employee, and Welfare Group, operated by the employees, sponsors various cultural, educational, and athletic activities for year-round enjoyment. There are clubs for those interested in art, bridge, camping, ceramics, chess, coin and stamp collecting, ballroom and square dancing, fishing, flying, gardening, handicrafts, jazz, motorcycling, model airplanes, photography, poetry, public speaking, rifles and pistols, scuba diving, shortwave radio, singing, skiing, sports cars, and traveling. Sports include badminton, basketball, bowling, golf, football, horseshoes, soccer, softball, tennis, and volleyball. Other activities and services include dances, library facilities, an emergency loan fund, and recreation equipment for loan. NSA employees can also enjoy the facilities of a 20-acre recreation site with ball fields, picnic tables, and grills.

Equal Employment Opportunity

NSA supports the goals of Equal Employment Opportunity. There is a continuing program to insure that no employee is hindered in his or her career development because of race, sex, religion, or ethnic heritage. The full-time EEO Officers who guide this program oversee such basic actions as job placement, job structuring, promotions, career development, and Agency-related training. In addition, all complaints based on discrimination are treated promptly, fairly, and impartially.

DETAILS ABOUT THE TEST

When and How to Apply

To take the Professional Qualification Test, an admission ticket or other authorization is required. The ticket is obtained by filling out the Registration Form that is enclosed with the preaddressed

8

Registration
Form
for the
PQT

To release form
tear off this tab.

REGISTRATION FORM FOR THE PROFESSIONAL QUALIFICATION TEST
OF THE NATIONAL SECURITY AGENCY,
FORT GEO. G. MEADE, MARYLAND

TYPE OR PRINT ALL THE INFORMATION EXCEPT YOUR SIGNATURE.

1. LAST NAME   FIRST NAME   MIDDLE INITIAL

2. ADDRESS (TO WHICH YOUR TICKET OF ADMISSION WILL BE SENT)   **3.** TELEPHONE

AREA CODE

CITY   STATE   ZIP CODE

4. PERMANENT ADDRESS AND TELEPHONE NUMBER (if different from items 2 & 3)   **5.** TELEPHONE

AREA CODE

CITY   STATE   ZIP CODE

6. SEX

M   F

7. BIRTH DATE

MONTH   DAY   YEAR

8. SOCIAL SECURITY NUMBER

Select a test center from the list in the bulletin and enter the name, state, and center number below.

9.

TEST CENTER NAME   STATE

10.

TEST CENTER NUMBER

11. Check this box if you will be attending school during the winter and/or spring of 1988 . . . .

12. Check this box **only** if you prefer the **Spanish** edition of the PQT . . . .

SPANISH

This completed Registration Form must be received by ETS in Oakland, California, on or before October 9, 1987, for the October 24, 1987, administration.

13. SIGNATURE (required)

X

reverse side.

This is a Registration Form for the Professional Qualification Test of the National Security Agency, Fort Geo. G. Meade, Maryland. Successful examinees will be considered for professional positions at NSA.

The test will be given at 8:30 a.m., Saturday, October 24, 1987, at the colleges and universities specified in this bulletin. If you are a student at one of these institutions, you will, of course, register to take the test at your own school. Otherwise, you should register to take the test at the school nearest you (see item 9 on the front of this form). The National Security Agency will inform you of your test results approximately 10 weeks after you take the test and, if you qualify, the place and date of interview.

To be eligible for NSA's Professional Qualification Test, you should be:

- a United States citizen

- a holder of a bachelor's or master's degree by February of 1989.

PRIVACY ACT NOTICE
NSA PROFESSIONAL QUALIFICATION TEST

This notice applies to personal information requested both at test registration and at the time of the test.

In accord with the Privacy Act of 1974, you are hereby notified that: (1) Public Laws 86-36 and 88-290 authorize the National Security Agency to receive and maintain personal data on applicants. (2) Registration information is required for the purpose of initial screening, assigning and controlling test center attendance, and statistical evaluation of overall program. Personal information obtained on the day you are tested relating to the kind of degree for which you are a candidate, the language courses you have taken, your grade-point average for all courses taken, and your place of birth is required to assess you in relation to Agency hiring requirements and compile statistical data on program results. (3) This information is provided to officials of NSA and its testing contractor. It will be used to select test centers, notify applicants, and prepare reports. It will be used by NSA to assess applicants and will serve to facilitate Agency activities directed at obtaining applicants who meet Agency requirements. (4) Your disclosure of the requested information is voluntary. An omission of an item in test registration may result in delayed authorization to attend the test or inability to be registered for the requested test center. Omission of information requested at the test center may preclude an accurate assessment of your qualifications.

The request for your social security number is authorized by Executive Order 9397. Submission of the social security number is mandatory. It will be used as your identifier in both registration and testing.

A copy of this notice is contained in the PQT bulletin for your retention.

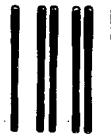*I certify that I have read and understand the above statement.*

_____
Signature

6603004 • U87P45 • Printed in U.S.A.

To release for
tear off this ta

Registration
Form
for the
PQT

Use this envelope to return your Registration Form.
perforation and the envelope will fall free.
To separate the envelope from the Bulletin, tear this tab along the

660-30

BUSINESS REPLY MAIL
FIRST CLASS   PERMIT NO. 1084   OAKLAND, CA

POSTAGE WILL BE PAID BY ADDRESSEE

Educational Testing Service
Professional Qualification Test
Box 23140
Oakland, California 94623-9921

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

To separate the envelope from the Bulletin, tear this tab along the perforation and the envelope will fall free.

Use this envelope to return your Registration Form.

DETACH AT PERFORATION

6603002 • XX77P41

Enclose in this envelope your Registration Form for the Professional Qualification Test of the National Security Agency, Fort Geo. G. Meade, Maryland. Successful examinees will be considered for professional positions at NSA.

The test will be given at 8:30 a.m., Saturday, October 24, 1987, at the colleges and universities specified in this bulletin. If you are a student at one of these institutions, you should register to take the test at your own school. Otherwise, you should register to take the test at the school nearest you (see item 9 on the front of the enclosed Registration Form).

The National Security Agency will inform you of your test results approximately ten (10) weeks after you take the test.

envelope provided with this bulletin. The examination will be given only once this year. (See the test-center list on page 15.)

There is a version of the test for people whose primary language is Spanish. Check the box at item 12 of the Registration Form if you choose to take this version of the PQT.

Complete the Registration Form enclosed with the preaddressed envelope and mail it as soon as possible. Registration Forms must be received by ETS in Oakland, California, no later than Friday, October 9, 1987, for the October 24 testing date.

After your Registration Form has been received and found in order, you will be sent an admission ticket that contains the exact address of the test center.

Time Schedule for the Test

8:30 a.m.	Report to test center
1:15 p.m. (approx.)	Close of session

The Professional Qualification Test is given in a single morning session. Arrive at the test center no later than 8:30 a.m. *You will be admitted only if you have your admission ticket and required identification.* A part of the session will be used to collect and check test books and allow for a rest period. The test starts at 9:00 a.m. *No one will be admitted to an examination room after the test has begun.*

Taking the Test

Although the test stresses accuracy more than speed, it is important for you to use your time as economically as possible. Work as steadily and as rapidly as you can without becoming careless. Answer the questions in order, but do not waste time pondering over questions that contain unusually difficult or unfamiliar material.

You are advised to avoid wild guessing, since wrong answers will lower scores more than unanswered questions. Do not waste time on questions that are too difficult. Go on to the other questions and come back to the difficult ones if time permits.

The test is designed so that the average person taking it will answer correctly only about half the questions, and no one is expected to get a perfect score. Your score will be compared with those of others who are taking the test. The National Security Agency will consider the total record of your college work, references, recommendations, and interviews in determining your eligibility — provided you have qualified on the test.

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You should take the following items to the test center: your admission ticket, official identification bearing your photograph and signature (e.g., driver's license, student identification card, passport), two No. 2 pencils, an eraser, and a watch. Scratch paper is not permitted. No books, calculators (including calculator watches), slide rules, food, beverages, or papers of any kind may be taken into the examination room; you are urged not to take them with you to the test center.

Be on time for the test. Under no circumstances will supervisors honor requests for a change in schedule. You will not be permitted to continue the test or any part of it beyond the established time limit.

You must turn in all test books and answer sheets at the close of the examination period. No test materials, documents, or memoranda of any kind are to be taken from the examination room.

Every effort is made to assure equally favorable conditions at all test centers, with freedom from noise and other disturbances. Visitors are excluded. You can help by refraining from disturbing others who are taking the test.

Examinees can be dismissed from the testing or have their scores canceled for creating a disturbance, giving or receiving help, working on one test during the time allotted for another, or using aids (e.g., books or calculators).

Educational Testing Service is obligated to report scores that accurately reflect the performance of the test taker. For this reason, ETS maintains test administration and test security standards designed to assure that all test takers are given the same opportunity to demonstrate their abilities and to prevent some test takers from gaining an unfair advantage over others because of testing irregularities or misconduct. ETS routinely reviews irregularities and test scores believed to be earned under unusual or nonstandard circumstances.

ETS reserves the right to cancel any test score if the test taker engages in misconduct (failure to comply with the supervisor's directions) or if there is a testing irregularity. Before test scores are canceled for misconduct, the test taker is notified and given an opportunity to provide additional information. When test scores are canceled because of irregularities, such as improper timing or defective materials, the test taker is given an opportunity to take the test again as soon as possible.

ETS also has the right to question any test score whose validity is in doubt because the score may have been obtained unfairly. ETS first undertakes a confidential review of the circumstances giving rise to the questions about score validity. Then if there is sufficient

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cause to question the score, ETS will refer the matter to the National Security Agency, which will make the final decision on whether or not the score is to be canceled.

To Avoid Errors or Delay in Reporting Scores

(1) Always sign your name in the same manner on the Registration Form, answer sheet, and in any correspondence. Do not write "James T. Jones, Jr." at one time and "J. T. Jones" at another. Such inconsistency makes correct identification of papers difficult.

(2) Bring your social security card or an accurate copy of your social security number to the testing session.

(3) Write legibly at all times.

(4) During the test, you will be required to grid your name and identification number on your answer sheet. You will be given explicit instructions during the test about this procedure. It is extremely important that you follow these instructions. If the information is not gridded correctly, your score may not be correctly reported. A sample of the area on your answer sheet in which you will be asked to copy and grid your identification number is given at the right. As you can see from the sample, there are four large spaces at the top in which your identification number must be copied — one digit to a space — from left to right. After you have copied your number, go down the column under each space, find the circle containing the corresponding digit, and fill in that circle. Note that zeros are to be treated the same way as any other digit.

SAMPLE GRID

The name grid is completed in a similar fashion. Print your name in the spaces at the top of the alphabet columns, one letter to a space, from left to right. Be sure your last name, first name, and middle initial are printed in the specific area designated for that part of your name. Print only as many letters as there are spaces available in that section. After you have printed your name, go down the column and fill in the circle containing the corresponding letter. Note that each of the blank circles (the first

11

row) *must be gridded* if there is no letter shown in the space above it. Below is a sample showing how the name Alexander G. Fielding would be gridded.

SAMPLE NAME GRID

NAME (Print)

Last										First							MI
F	I	E	L	D	I	N	G			A	L	E	X	A	N	D	G

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How Your Test Scores Will Be Used

Your scores will be used by the National Security Agency to supplement other criteria for determining your qualifications for employment. College records, honors or awards received, extra-curricular activities, recommendations, and interviews will all be taken into consideration.

Only the National Security Agency will receive a report of your scores on the Professional Qualification test. You will be informed of your test results directly by the National Security Agency. Test score information will not be released to your school, other institutions, or other government agencies. This examination may not be used as qualification for competitive positions under the Federal Civil Service.

Employment Interviews

The National Security Agency will inform you by mail of your test results approximately 10 weeks after the test date. If you qualify on the Professional Qualification Test, you will be advised how to arrange for an interview. To prepare for this interview, you should be thoroughly familiar with the contents of this bulletin.

IMPORTANT DATES

Close of registration . . . . October 9, 1987

Administration of test . . . . October 24, 1987

DESCRIPTION OF THE PQT SUBTESTS

1.	English Usage	Selecting the grammatically correct response
2.	Interactions	Interpreting correctly the relationships among various elements in a situation in order to answer questions about those relationships
3.	Directions	Selecting the best way to express instructions for performing a task that involves a simple principle
4.	Digit Identification	Determining a designated missing digit of an arithmetic computation in which asterisks have been substituted for many digits
5.	Artificial Language	Learning vocabulary and grammar rules of a new language and answering questions pertaining to translation
6.	Number Series	Determining the principle on which a number series is based, and indicating what the next number in the series would be
7.	Electrical and Mechanical Information	Identifying pictures of tools and electrical or mechanical gadgets that are ordinarily used together
8.	Matrices	Identifying or reconstructing a letter or number pattern in order to designate the missing entry or original pattern
9.	Judgment	Selecting the best course of action for dealing with an administrative problem
10.	Mathematics Evaluation	Solving problems in arithmetic, algebra, logarithms, and geometry

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TEST CENTERS

The Professional Qualification Test will be administered at the institutions listed below. Testing facilities at these centers are open to all properly registered examinees regardless of race, color, sex, creed, or national origin. Type or print on your Registration Form the name and code number of the school where you wish to take the test.

ALABAMA
1005 Auburn, Auburn University
1003 Huntsville, Alabama A&M University

CALIFORNIA
4833 Berkeley, University of California

CONNECTICUT
3915 Storrs, University of Connecticut

DISTRICT OF COLUMBIA
5246 Washington, George Washington
        University
5297 Washington, Howard University

FLORIDA
5812 Gainesville, University of Florida
5219 Tallahassee, Florida State University

GEORGIA
5415 Atlanta, Morehouse College
5813 Athens, University of Georgia

ILLINOIS
1832 Chicago, University of Chicago
1836 Urbana/Champaign, University of Illinois

INDIANA
1324 Bloomington, Indiana Univeristy

KANSAS
6871 Lawrence, University of Kansas

LOUISIANA
6711 New Orleans, Southern University in
        New Orleans

MAINE
3916 Orono, University of Maine

MARYLAND
5416 Baltimore, Morgan State University
5835 Baltimore, University of Maryland-
        Baltimore Co.
5814 College Park, University of Maryland
5403 Salisbury, Salisbury State University
5404 Towson, Towson State University

MASSACHUSETTS
3917 Amherst, University of Massachusetts
3083 Boston, Boston College
3434 Cambridge, Harvard University/
        Radcliffe College

MICHIGAN
1839 Ann Arbor, University of Michigan
1465 East Lansing, Michigan State University

MINNESOTA
6874 Minneapolis, University of Minnesota

MONTANA
4488 Bozeman, Montana State University

NEW JERSEY
2765 New Brunswick, Rutgers University

NEW MEXICO
4531 Las Cruces, New Mexico State University

NEW YORK
2562 New York, New York University
2823 Syracuse, Syracuse University

NORTH CAROLINA
5816 Chapel Hill, University of North Carolina
5495 Durham, North Carolina Central
        University

OHIO
1829 Akron, University of Akron
1592 Columbus, Ohio State University

PENNSYLVANIA
2906 Philadelphia, Temple University
2927 Pittsburgh, University of Pittsburgh
2660 University Park, Penn State University

PUERTO RICO
0912 Mayaguez, University of Puerto Rico-
        Mayaguez

RHODE ISLAND
3919 Kingston, University of Rhode Island

SOUTH CAROLINA
5818 Columbia, University of South Carolina
5618 Orangeburg, South Carolina State College

TENNESSEE
1843 Knoxville, University of Tennessee
1871 Nashville, Vanderbilt University

TEXAS
6882 Austin, University of Texas

UTAH
4019 Provo, Brigham Young University

VIRGINIA
5820 Charlottesville, University of Virginia
5398 Fredericksburg, Mary Washington
        College
5864 Norfolk, Norfolk State University
5115 Williamsburg, College of William and
        Mary

WASHINGTON
4854 Seattle, University of Washington

WEST VIRGINIA
5904 Morgantown, West Virginia University

PRIVACY ACT NOTICE

NSA PROFESSIONAL QUALIFICATION TEST

This notice applies to personal information requested both at test registration and at the time of the test.

In accord with the Privacy Act of 1974,. you are hereby notified that: (1) Public Laws 86–36 and 88–290 authorize the National Security Agency to receive and maintain personal data on applicants. (2) Registration information is required for the purpose of initial screening, assigning and controlling test center attendance, and statistical evaluation of overall program. Personal information obtained on the date you are tested relating to the kind of degree for which you are a candidate, the language courses you have taken, your grade-point average for all courses taken, and your place of birth is required to assess you in relation to Agency hiring requirements and compile statistical data on program results. (3) This information is provided to officials of NSA and its testing contractor. It will be used to select test centers, notify applicants, and prepare reports. It will be used by NSA to assess applicants and will serve to facilitate Agency activities directed at obtaining applicants who meet Agency requirements. (4) Your disclosure of the requested information is voluntary. An omission of an item in test registration may result in delayed authorization to attend the test or inability to be registered for the requested test center. Omission of information requested at the test center may preclude an accurate assessment of your qualifications.

The request for your social security number is authorized by Executive Order 9397. Submission of the social security number is mandatory. It will be used as your identifier in both registration and testing.

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ENGINEERS ... COMPUTER SCIENTISTS ... CERTAIN LINGUISTS ... GRADUATE LEVEL MATHEMATICIANS

While not required to take the Professional Qualification Test. you are strongly encouraged to investigate careers at NSA.

Mathematicians (Masters and Ph.D.) will apply their academic backgrounds to a variety of sophisticated cryptologic problems while continuing their intellectual growth. Assignments include providing mathematical solutions to communications problems, conducting long-range mathematical research in communications and computing, and evaluating new techniques for communications security.

Engineers will find work that is performed nowhere else — devices and systems that are in advance of any outside the Agency are constantly being developed. As an Agency engineer, you will carry out research, design, development, testing, and evaluation of sophisticated, large-scale crypto-communications and EDP systems. You may also participate in related studies of electromagnetic propagation, upper-atmosphere phenomena, and solid-state devices, using the latest equipment within NSA's fully instrumented laboratories.

Computer Scientists participate in systems analysis and systems programming related to advanced scientific and operational applications. Software design and development are included, as well as support in hardware design, development, and modification.

Linguists — People proficient in a Slavic, Near Eastern, or Asian language may apply their skill immediately to transcription, translation, or analytic reporting projects. A degree in the language is preferred but is not mandatory. Individuals whose language skills, developed through nonacademic exposure, are equal to those of a bachelor's degree-level candidate may receive full consideration.

Your Placement Office can provide further information about NSA, including our next interview date on campus, or you may write to: College Recruitment Program, National Security Agency, Attn: M322, Fort George G. Meade, Maryland 20755-6000.
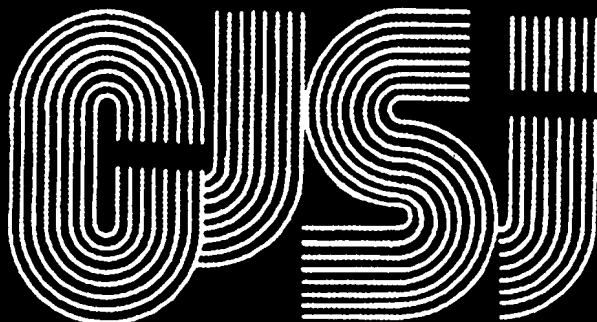
To obtain additional copies of this bulletin,
contact your Placement Office or write to:
College Recruitment Program
National Security Agency
Attn: M322, (PQT)
Fort George G. Meade, Maryland 20755-6000

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CISI

The Computer and Information Sciences Institute

THE NATIONAL SECURITY AGENCY
FT. MEADE, MARYLAND 20755

A NOTE TO THE NEW EMPLOYEE

Career opportunities in Computer Science at the National Security Agency (NSA) are as exciting and varied as the dynamic field of Computer and Information Science itself. From systems analysis of large computer operating systems and data base management systems to hands-on experience with powerful personal computers, from the latest in computer architecture to state-of-the-art networks, from microprocessor and computer security research to designing sophisticated application systems, from system acquisition management to operations and maintenance engineering, from the most advanced computer technology to its application on vital, challenging problems, the opportunities for expanding your computer knowledge and experience at NSA are almost unlimited.

One prime example of the Agency's professional environment was the establishment of the Computer and Information Sciences Institute (CISI) in 1968. The purpose of CISI as stated in its by-laws was to promote professional growth and outstanding accomplishment in the computer and information sciences throughout the United States Cryptologic Community. This booklet will introduce you to the many facets of CISI.

CHOOSE YOUR OWN
COMPUTER ADVENTURE
WITH CISI

Membership in CISI is your passport to a wealth of special activities created with you, the computer professional, in mind. With so many options, it's just like a real-life choose-your-own-adventure experience.

If absorbing the latest on the state-of-the-art from well-known experts sounds appealing, GOTO page 4.

How about trading software and experiences on personal computers? If YES GOTO page 3.

If you'd like to take a personal computer home with you for a tryout, then GOTO page 7.

Care to devote a week to sharing ideas and information among computer professionals? If YES GOTO page 5.

These are just a few of the opportunities for career enrichment that await you. Read on to discover the right CISI adventure for you.

SPECIAL INTEREST GROUPS

Special Interest Groups (SIGS) have been an important part of CISI since its formation. With the rapid growth of all aspects of computer science, SIGS at NSA have flourished. All it takes to establish a SIG is a group of NSA'ers who are interested in a specific computer or information science topic and approval of the CISI Council.

At present there are five active Special Interest Groups:
> SIG/MICROCOMPUTER
> SIG/HUMAN FACTORS
> SIG/COMPUTER SECURITY
> SIG/SOFTWARE ENGINEERING
> SIG/ADA
> Other areas that have sponsored SIGS or are being considered for new SIGS include office automation, telecommunications, graphics, and information processing.

Many of the SIGS hold monthly activities to pursue their interest. The SIG/MICROCOMPUTER publishes its own newsletter giving the latest information on personal computers. SIG/MICROCOMPUTER has spawned several "SUBSIGS" for people with special interests in specific brands of personal computers. There are active SIG/MICROCOMPUTER SUBSIGS devoted to the APPLE, ATARI, IBM, TEXAS INSTRUMENTS, COMMODORE, RADIO SHACK, and other popular home computers.

THE CISI MONTHLY MEETINGS

The Computer and Information Sciences Institute sponsors a variety of informative and thought-provoking monthly presentations. The featured speakers have included many well-known authorities in the computer field such as Captain Grace Hopper, USN Computer pioneer and COBOL inventor; Robert Ledley, inventor of the full-body C.A.T. scanner; Bob Kahn of APPANET fame; Charles Rose design automation and network expert; Victor Basili, authority on programming semantics; and Ed Yourdon, the guru of structured programming and design techniques. Other sessions are presented by a distinguished group of NSA experts in Computer and related areas. Topics have ranged from "Super Computers" to "Computers in Your Future"; from "The Impact of NSA on the Computer Industry" to office automation on Capitol Hill; from artificial intelligence to computer networks and communications. The monthly meetings often fill the NSA auditorium.

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23/30	24/31	25	26	27	28	29

UNITED STATES GOVERNMENT   JULY

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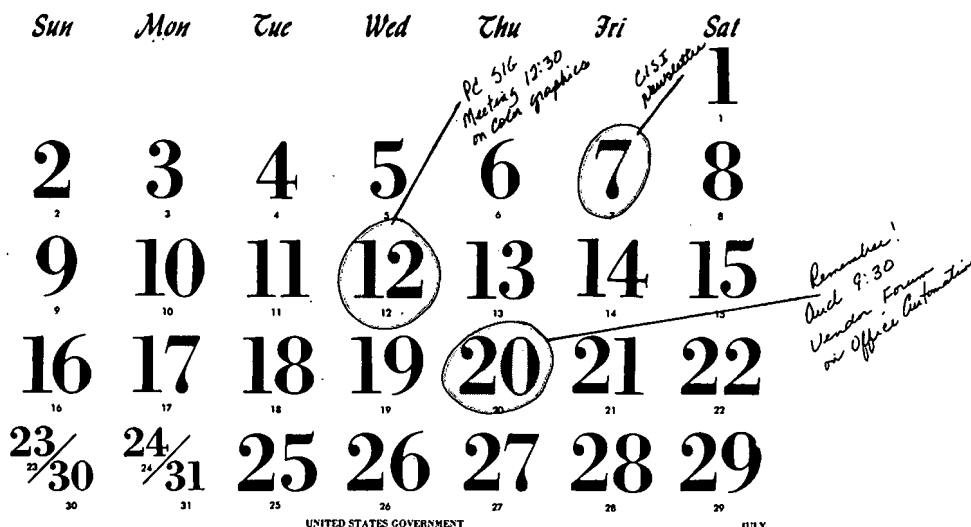
THE CISI SPRING CONFERENCE
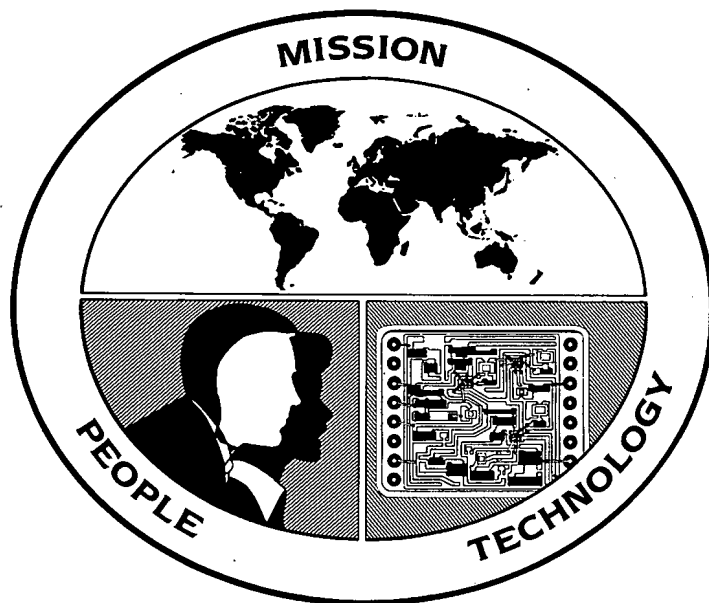
One of the primary goals of CISI has been to provide opportunities for individual professional growth and to foster professional communication. To further these goals, CISI sponsors an annual Spring Conference that competes favorably with national computer events of this kind. Workshops, seminars, talks by leaders in the computer science field, demonstrations, panel discussions, and tours are all part of a week full of activities designed with NSA's computer professionals in mind. With keynote speakers like Barry Boehm and Charles Lecht, it's no wonder that the CISI Spring Conference has become one of the Agency's most popular events. Computer users and system analysts agree that it's a great way for sharing information and new ideas.

SPECIAL EVENTS

In addition to the Spring Confer-
ence, CISI sponsors a number of
other special events. An annual essay
contest is held to encourage in-
creased use of the written medium.
Monetary awards are presented to
winning papers, and a special issue
of the NSA Technical Journal is
published with selected submissions.
To promote the sharing of software,
CISI also conducts an annual soft-
ware contest.
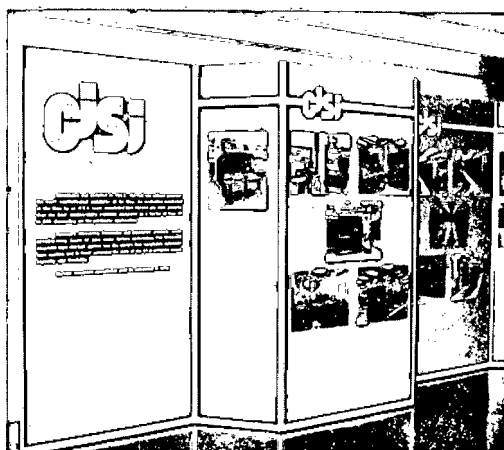
The Computer and Information Sci-
ences Institute also recognizes out-
standing NSA accomplishment in the
computer field by its yearly presen-
tation of the prestigious President's
Award for Excellence.

During the CISI Tenth Anniversary
Celebration, special tours and dis-
plays of computer facilities and
equipment were arranged for CISI
members and other interested NSA
employees.

CISI CART AND CARTARI
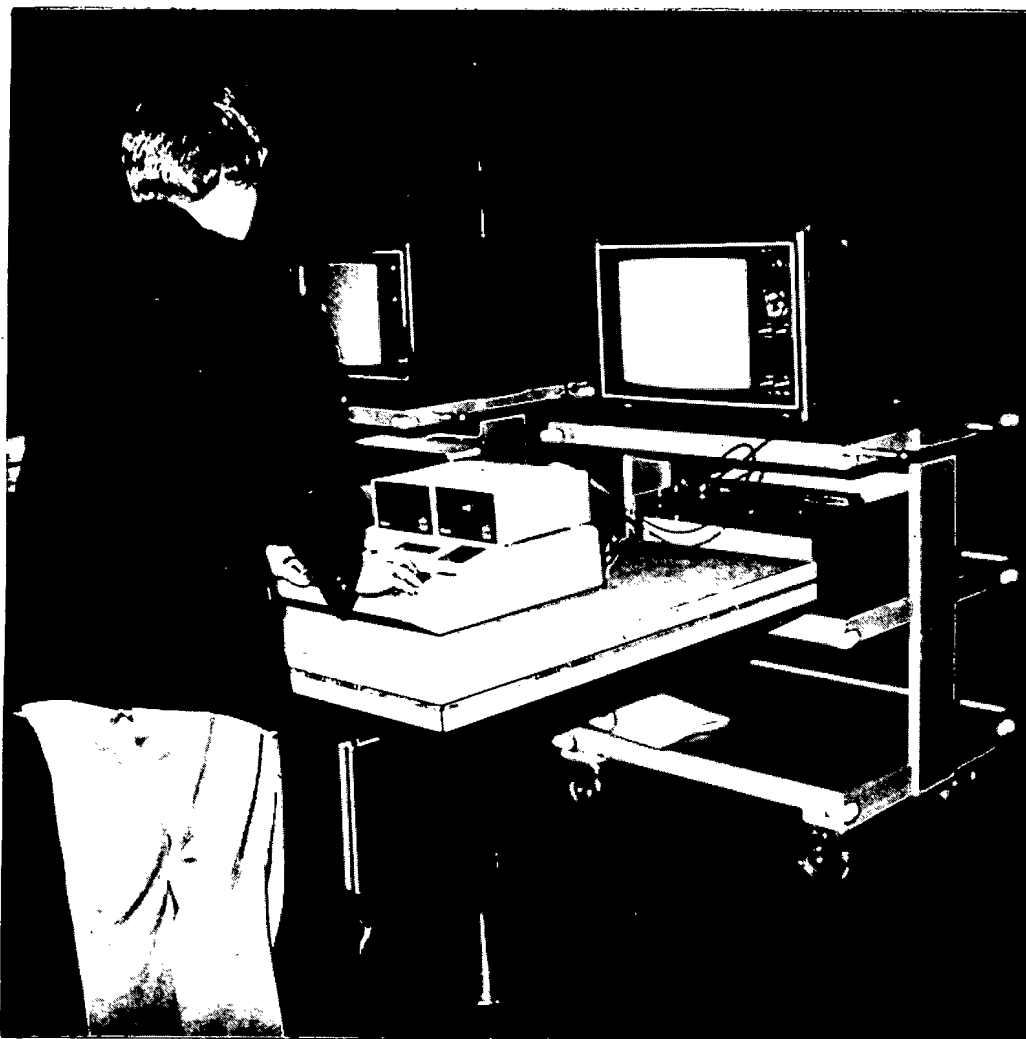
Have you thought about getting your own home computer? Well, CISI has an APPLE and a MacIntosh, and would be glad to lend them to you for a few days so you can give either one or both a try. The CISI personal computers come with software so you can try applications, programming, and even games right on your own T.V. Purchased with CISI funds, the computers are maintained and managed by a committee of CISI members. The home systems have been so popular that the Council has authorized purchase of additional hardware for members' use.

THE CISI NEWSLETTER

Every month CISI publishes a newsletter announcing coming events and auditorium presentations. Reviews of new books and comments on previous CISI programs are also regular features. The Newsletter is an established forum for sharing information about computer related activities scheduled both at NSA and around the local area.

FOR THE COMPUTER PROFESSIONAL

CISI, in addition to its regular meetings and special activities, sponsors a monthly bibliography of computer books and periodicals from the NSA technical and main library. The NSA libraries have one of the most up-to-date, informative collections of computer publications available in the mid-Atlantic region.

NSA, through its National Cryptologic School (NCS), offers numerous computer courses in state-of-the-art technology and advanced techniques. Many of these courses are college accredited. The NCS also conducts special seminars by well-known consultants and lecturers in the computer and information sciences. Television courses from the University of Maryland are also offered during and after working hours. These courses allow NSA employees to receive undergraduate- and graduate-level credit while expanding their knowledge in the field.

As part of their job assignments, NSA computer professionals have opportunities to exchange technical information with their counterparts from other government agencies and the private sector through computer conferences and special training courses. Publication and research in Computer Science are encouraged at NSA.

IN SUMMARY

The National Security Agency provides an exciting and challenging climate for the computer professional, and the Computer and Information Sciences Institute is an integral part of this dynamic environment. National Security Agency employees desiring more information about CISI should contact the membership chairman listed on the insert page of this booklet.

Prospective employees interested in more information on employment opportunities, should contact:

The National Security Agency
Ft. Meade, Maryland 20755
Attn: M32

NATIONAL SECURITY AGENCY
CENTRAL SECURITY SERVICE
FORT GEORGE G. MEADE, MARYLAND 20755

The Computer and Information Sciences
Institute (CISI) was established in 1968 to
promote professional growth and outstanding
accomplishment in the computer and informa-
tion sciences throughout the United States
Cryptologic Community.
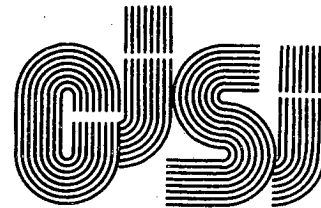
CISI publishes a monthly newsletter. Its monthly meetings
often feature recognized authorities speaking in NSA's
auditorium. The spring conference offers a week of speakers,
workshops, seminars, demonstrations, panel discussions, and
tours. Topics have ranged from "Super Computers" to
"Computers in Your Future"; from "The Impact of NSA on the
Computer Industry" to "Office Automation on Capital Hill";
from "Artifical Intelligence" to "Computer Networks and
Communications".

A CISI committee maintains and manages an APPLE and an
ATARI-800. Members may borrow them for a few days at a time
for personal use at home.

CISI currently supports four Special Interest Groups (SIGs).

SIG/SOFTWARE ENGINEERING is developing techniques and
principles in the areas of planning and rapid prototyping
for high quality software.

SIG/HUMAN FACTORS publishes a quarterly newsletter
appraising members of recent "human factors" developments
and is often asked to advise agency elements on human
engineering and person-computer interaction questions.

SIG/COMPUTER SECURITY is developing standards for
certification in both hardware and software.

SIG/MICROCOMPUTER presents monthly lectures on topics of
interest to microcomputer users. It publishes its own
newsletter and hosts a number of special SUB-SIGs for
the following personal computers:
APPLE II,
ATARI,
Commodore-Pet,
TI99-4A,
TRS-80,
6809/color computer.

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NATIONAL SECURITY AGENCY
CENTRAL SECURITY SERVICE
FORT GEORGE G. MEADE, MARYLAND 20755—6000

NSA MATHEMATICAL SABBATICALS

The National Security Agency has begun a sabbatical program for academic mathematicians who are U.S. citizens. The program will give visitors an opportunity to work for one of the largest employers of American mathematicians and to participate in a number of challenging crypto-mathematical projects.

Cryptanalysis requires background, perspective and experience that cannot be acquired overnight; history shows, however, that visiting mathematicians are quick learners and make significant contributions in a short time.

Positions are from September 1988 through June 1989, with either, or both, adjacent summer periods optional. There is also an option of extending the sabbatical an additional year. The program is open to those on official sabbatical as well as on unpaid leave.

Experience has shown that the best ideas come from the best mathematicians. Consequently, achievement in mathematics is the primary criterion for selection. NSA will supplement visiting mathematicians' university stipends to at least equal their regular monthly salary. There may also be an allowance for moving expenses or housing.

Applications must be received by November 2, 1987, and finalists will be notified by mail shortly after November 9, 1987. Finalists will visit NSA some time between December 1, 1987 and January 10, 1988, to participate in two days of testing, including polygraph examinations, psychological tests and interviews, as well as an interview with a personnel representative. During these two days, finalists will be interviewed by senior mathematicians and will be given the opportunity to make a presentation on their recent research.

Final selections will be made on February 15, 1988, but will be conditional on the applicant's qualifying for a full security clearance.

To apply, submit a completed U.S. Government application form (SF-171, available in campus placement offices), a curriculum vita, including a complete list of publications, and other information you think appropriate to:

Director
NSA Mathematical Sciences Program
National Security Agency
ATTN: RMA
Fort George G. Meade, Maryland 20755-6000
(301) 859-6438

STAT

Mathematics and NSA: A Long Term Partnership

NATIONAL SECURITY AGENCY
CENTRAL SECURITY SERVICE
FORT GEORGE G. MEADE, MARYLAND 20755-6000

BENEFIT SUMMARY

PAID TIME OFF

10 paid holidays per year.
 4 hours of sick leave are earned every 2 weeks (13 workdays/yr) and
   may be accumulated or used beginning after the second week of
   employment.
 4 hours of vacation leave are earned every 2 weeks (13 workdays/yr).
   After 3 years you earn 6 hours bi-weekly (20 workdays/yr). After
   15 years you earn 8 hours bi-weekly (26 workdays/yr). The leave
   may be accumulated or used beginning after the second week of
   employment.

CONTINUING EDUCATION

   You must be a full-time employee with at least a C+ college avg.

UNDERGRADUATE SCHOLARSHIP (competitive): You study full time.
   NSA pays salary, tuition, and lab fees for all or part of your
   senior year course work in a local college or university in a
   program of study relevant to your current job.

GRADUATE FELLOWSHIP (competitive): You study full time.
   NSA pays salary, tuition, and lab fees for one year of post-graduate
   study at select schools in a program of study directly related
   to your current job.

ADVANCED STUDIES: You study part time.
   NSA pays salary, tuition, and lab fees for up to 4 semesters of
   upper-undergraduate or graduate level courses. You may take off
   up to 20 hours per week to attend classes and study. This program
   is designed to provide accelerated job-related training to engineers,
   chemists, mathematicians, computer and physical scientists.

AFTER-HOURS COLLEGE: You work full time.
   NSA pays tuition and lab fees for 1 or 2 courses per semester.
   Courses must be directly job-related and may be either graduate
   or undergraduate level.

IN HOUSE COLLEGE PROGRAM: You work full time.
   Same as "After-Hours" above but the courses are taught at NSA for
   the employee's convenience.

UNIVERSITY/COLLEGE CORRESPONDENCE and INDEPENDENT STUDY:
   Assistance is available when job-related courses are taken for credit.

FEDERAL EMPLOYEES' RETIREMENT SYSTEM

The Federal Employees' Retirement System (FERS) includes three tiers of benefits: social security; a basic pension; and an optional tax-deferred thrift/savings plan patterned after corporate models. Retirement withholdings under FERS are 7.15% for social security and 1.3% for the basic pension.

Under the thrift plan, there will be open seasons twice a year in which employees may start or change contribution rates and/or investment options. New employees must wait for the second open season after employment to participate. The Government automatically contributes 1% of pay for each employee covered by FERS. An employee may contribute up to 10% of pay with Government matching on the first 5%.

GROUP LIFE INSURANCE (optional)

Basic coverage is available for approximately $2,000 above your annual salary. NSA pays approximately 35% of the premium. Coverage is automatically doubled at no extra cost for employees younger than 35 years. Additional options are available to increase the coverage.

HEALTH INSURANCE PLANS (optional)

Most employees qualify for and enroll in one of over two dozen popular plans. These include standard personal plans like Blue Cross/Blue Shield as well as comprehensive Health Maintenance Organizations "HMO". NSA pays approximately 60% of the premium. 1986 bi-weekly premiums range between $3.13 and $29.19 for single option and between $7.42 and $61.44 for the family option.

RECREATION PROGRAMS

NSA has clubs available to people interested in art, battlegaming, bible study, black expressions, bridge, ceramics, coin/stamp collecting, flying, gardening, 'GO', golf, handicrafts, magic, model airplanes, photography, public speaking, rifles and pistols, shortwave radio, singing, skiing, Spanish, sports cars, traveling, WIN Women in NSA), and yachting. Sports include basketball, golf, soccer, softball, and tennis. Other activities and services include dances, library facilities, an emergency loan fund, and recreation equipment for loan. NSA employees can also enjoy the facilities of a 20 acre recreation site with ball fields, picnic tables, and grills.

PAID RELOCATION

Individuals hired into some skills are eligible for repayment of reasonable relocation expenses.

National Security Agency

Description of Organization: The Agency is charged with missions that are vital to our nation's security—producing foreign signals intelligence information, safeguarding U.S. communications systems, and providing computer security for the federal government

Headquarters Location: Fort Meade, Maryland

Academic Fields of Recruitment Interest: Slavic, Middle Eastern, and Asian languages; other liberal arts, business, and physical science majors

Major Entry-Level Opportunities for New Graduates: Translation, transcription, analysis, and reporting; cryptology; intelligence analysis; management

BACKGROUND AND OPERATIONS

The National Security Agency was established in 1952 as a Department of Defense agency to produce intelligence information and safeguard our government's communications and computer activities. NSA is charged with collecting, analyzing, and assessing foreign signals to provide the federal government with critical intelligence information. Its second major function is communications security, which involves the protection of diplomatic, military, and other official communications channels from exploitation. In cooperation with industry, NSA is also working to establish standards for computer security for use throughout the government.

In order to carry out these vital missions, NSA makes use of the most sophisticated technologies, often years in advance of their commercial use. For example, NSA's ongoing effort to make our government's telecommunications secure requires the development of standardized cryptographic chips that can be designed into emerging telecommunications systems. This is just one of many tasks at NSA that involves work on the frontiers of technology.

Cryptography, the development of code and cipher systems, is the most unusual field at NSA. With the advent of new, increasingly sophisticated communications systems, cryptography has grown dramatically over the years. Scientifically devised, tested, and selected cryptographic systems are used to ensure the maximum degree of security for the transmission of military, diplomatic, and other sensitive information.

Because of the unique nature of its work, NSA must set its own job definitions, conduct its own aptitude testing, and recruit its new employees directly. Professional and entry-level employees are recruited from all over the country, especially from college campuses and industry.

NSA headquarters at Fort George G. Meade, Maryland, is the focus of its operations, research, and support functions. This location is midway between two exciting urban areas: Baltimore, Maryland, and Washington, D.C. Baltimore's Inner Harbor—with its dazzling collection of shops and restaurants, the National Aquarium, and a variety of sports events—is only a half hour away. Washington, D.C., is just as convenient and offers boutique shopping and restaurants in Georgetown, famous monuments, and free museums like the National Gallery of Art and the Air and Space Museum, as well as performances at the John F. Kennedy Center for the Performing Arts.

NSA is also the ideal location for access to the beach resorts of the Atlantic Coast and to the Allegheny mountains. Almost any type of leisure activity—from backpacking and skiing to sunbathing and sailing—is an easy drive away. NSA is also located within easy commuting distance of urban, suburban, and country living, with houses and apartments available in a broad price range.

FUTURE DIRECTIONS

NSA seeks career-oriented employees who are intrigued by a challenge, who look forward to contributing significantly to the security of their country, and who possess a high degree of imagination, initiative, and intellectual curiosity.

Many of the challenges that confront NSA researchers provide rare opportunities to explore the most advanced theories and techniques. In the ongoing search for better and more efficient tools, NSA has enlisted the computer as an invaluable aid. Linguists increasingly use computerized dictionaries and glossaries. Analysts can query an ever-expanding database on political, military, and economic data to help analyze current situations.

The constantly increasing demands on the Agency ensure that its employees will have increasing opportunities for individual achievement and professional growth. In addition, employees at NSA enjoy extremely stable job security due to the consistently high priority given the Agency's contribution to the nation's defense.

EMPLOYMENT OPPORTUNITIES

ENTRY LEVEL

The National Security Agency hires a substantial number of college graduates each year in a wide variety of career fields. Employment possibilities usually exist for the following graduates.

Slavic, Middle Eastern, or Asian Language Majors. Students who have majored in one of these language areas will find a unique and challenging way to use their education and background. They will be able to constantly improve their linguistic skills and apply their knowledge of culture and politics to the analysis of current intelligence information. Linguists at NSA are involved in the living language, and their work is directly related to the real world and to the protection of our nation's security. Specific duties include translating technical materials into English; transcribing and/or summarizing spoken materials; and compiling linguistic aids such as glossaries, handbooks, and the results of language analysis. Other assignments could include preparing grammars or courses for poorly documented languages, teaching foreign languages, or working in peripheral fields such as computer applications to linguistic problems. Individual assignments are varied and may be highly specialized, involving in-depth research. Fluency in the spoken language is generally not required, but familiarity with modern idiomatic and colloquial speech is essential. Excellent English language skills are also necessary.

All NSA linguists are given the opportunity to continually expand their skills. After initial determination of proficiency, new employees may receive instruction at the intermediate or advanced level. Agency courses are specially designed to raise the linguist's competence to the level required for assigned duties. Instruction is usually given at the Agency's National Cryptologic School, although special courses may be taken at the Defense Language Institute in California, the Foreign Service Institute, related government agency schools, and nearby universities. Other training opportunities, both short-term and long-term, are available in many languages. Basic courses in intelligence analysis, computer concepts, communications theory, and report writing are also available. Courses in area studies and other work-related fields are provided as required.

Many NSA linguists are multilingual. On occasion, Agency requirements will necessitate intensive training in another foreign language, which generally involves full-time study for one year. Participants in these programs are selected on the basis of aptitude, language proficiency test scores, and interest in such training.

Liberal Arts, Business, and Physical Science Majors. A limited number of internships aimed at providing for a smooth transition

from campus to NSA's major career areas are available to those who successfully compete in the Professional Qualification Test (PQT). This test is given annually in the fall at selected college campuses. For more information regarding the PQT, students should contact their placement office or NSA directly. Successful applicants are trained in such fields as intelligence research, traffic analysis, rare foreign languages, cryptography, communications security, and signals research and analysis.

FOR EXPERIENCED PERSONNEL

Although most of NSA's hiring of professionals is done through the college recruitment program, there is a continuing need for experienced people proficient in Slavic, Middle Eastern, and Asian languages. Interested candidates should submit a detailed résumé, including a salary history, or form SF-171 to the address at the bottom of the next page column.

FOR FOREIGN NATIONALS

All applicants for employment at NSA, as well as members of their immediate families (parents, siblings, spouse, and children), must be U.S. citizens.

TRAINING

NSA is committed to the career development of its employees. All new employees receive a combination of formal and on-the-job training to provide a smooth entrance to the NSA work force. Numerous people—including career development panel members, supervisors, training coordinators, and personnel representatives—are available for career counseling and training information throughout an employee's career.

NSA also encourages membership in, and participation in conferences and symposia of, professional organizations throughout the country.

The National Cryptologic School is the Agency's on-site training facility. It offers a broad range of classes—language, technical and management, with both traditional and self-paced instruction—necessary for the development of the individual. There are also varied opportunities for graduate study. Part-time study is available with full tuition support at any of the twelve nearby universities and colleges, including the University of Maryland, Johns Hopkins, and Georgetown. Employees may also be eligible for full-time graduate study, as well as other long-term training programs, with full tuition and salary support.

THE ORGANIZATION AS EMPLOYER

Starting salaries at NSA are competitive with those in private industry and are based on qualifications.

Employees are eligible to participate in an excellent group life insurance plan and may choose from a variety of health benefit plans. Much of the cost of these programs is paid by NSA. There are 10 paid holidays a year, and paid vacation leave is based on length of service. For the first 3 years of federal service (including military service), employees earn 13 days of vacation each year; for 4 to 15 years of federal service, they earn 20 days of vacation each year; and after 15 years of service, employees are entitled to 26 days of vacation each year. Regardless of the length of service, employees earn 13 days of sick leave each year. Sick leave covers absences for illness, injury, or hospitalization and can be accumulated without any limitation on amount, thus ensuring a measure of security in the event of a long illness.

Leisure-time activities are organized to suit every taste by the NSA Recreation, Employee, and Welfare Group. New employees often find that these athletic leagues and cultural and special interest clubs ease the transition to a new area and new job.

OVERSEAS ASSIGNMENTS

NSA has a limited number of positions outside the continental United States. Interested NSA employees are invited to apply for these positions, which typically last two or three years.

SUMMER AND CO-OP PROGRAMS

The National Security Agency presents opportunities to "earn while you learn" through the Cooperative Education Program and the Summer Employment Program. Work assignments are available in Slavic, Middle Eastern, and Asian languages.

As co-ops at NSA, students gain valuable experience while combining academic study with actual practice working on a variety of rotating assignments related to their academic discipline, abilities, and interests. Specific co-op duties include translation, transcription, reporting, and analysis. The learning experience extends beyond the technical arena since co-op students from universities and colleges across the United States live and work together while in the program.

To be eligible for the NSA Co-op Program, applicants must be majors in a Slavic, Middle Eastern, or Asian language, maintain a 3.0 grade point average (4.0 scale), and demonstrate competence on a language proficiency test. Applicants must also be able to work a minimum of 12 months prior to graduation, alternating periods of work with periods of full-time study. U.S. citizenship is required.

Salaries for co-op students are competitive and are commensurate with class standing. Benefits include health and life insurance plans, paid vacations, sick leave, and holidays. Round-trip transportation costs from the school to the workplace are paid by the Agency. Tuition assistance is available and housing assistance is also provided. A Cooperative Education Association provides peer guidance, transportation aid, and general support services for its participants.

Interested students should contact the Cooperative Education Office at their school; they should apply to the NSA Co-op Program at least eight months before they would like to start.

There are a limited number of summer positions available to students majoring in Slavic, Middle Eastern, or Asian languages. Participants in the NSA Summer Employment Program work the summer following their junior year in assignments similar to those mentioned above. Applicants must be U.S. citizens and possess a 3.0 grade point average on a 4.0 scale. Applications should be sent to the NSA Summer Employment Coordinator at the address listed below by November 15 for employment the following summer.

APPLICATION AND INFORMATION

The vital nature of the Agency's work requires extensive procedures before an offer of employment can be made. These include personal interviews, a background investigation, and a medical examination. For these reasons, it is important that applicants contact NSA at least four months before graduating from college or before leaving their present position. Students should check with their placement office to arrange for an interview with the NSA representative visiting their campus. If an interview cannot be scheduled, they should write to the following address.

NSA is firmly committed to affirmative action policies for members of minority groups, women, veterans, and the handicapped.

Direct inquiries to:

National Security Agency
Attention: M322 (AAP)
Fort George G. Meade, Maryland 20755-6000

National Security Agency

Description of Organization: The Agency is charged with missions that are vital to the nation's security—producing foreign signals intelligence information, safeguarding U.S. communications systems, and providing computer security for the federal government

Headquarters Location: Fort Meade, Maryland

Academic Fields of Recruitment Interest: Electrical, electronics, and computer engineering; electronics engineering technology; computer science, mathematics; physical sciences

Major Entry-Level Opportunities for New Graduates: Research and development, communications systems engineering, computer engineering, programming and systems analysis, mathematical research, applied mathematics

BACKGROUND AND OPERATIONS

The National Security Agency, established in 1952, is charged with collecting, analyzing, and assessing foreign signals to provide the federal government with critical intelligence information. Its second major function is communications security, which involves the protection of diplomatic, military, and other official communications channels from exploitation. In cooperation with industry, NSA is also working to establish standards for computer security for government use.

In order to carry out these vital missions, NSA makes use of the most sophisticated technologies, often years in advance of their commercial use. For example, NSA's ongoing effort to make our government's telecommunications secure requires the development of standardized cryptographic chips that can be designed into emerging telecommunications systems.

Cryptography, the development of code and cipher systems, is the most unusual field at NSA. Scientifically devised, tested, and selected cryptographic systems are used to ensure the maximum degree of security for the transmission of military, diplomatic, and other sensitive information.

Because of the unique nature of its work, NSA must set its own job definitions, conduct its own aptitude testing, and recruit its new employees directly. Professional and entry-level employees are recruited from all over the country, especially from college campuses and industry.

NSA headquarters at Fort George G. Meade, Maryland, is the focus of its operations, research, and support functions. This location is midway between two exciting urban areas: Baltimore, Maryland, and Washington, D.C. NSA is also in an ideal location for access to Atlantic beach resorts and to the Allegheny mountains. Almost any type of leisure activity, from skiing to sailing, is available a short drive away. NSA is also located within easy commuting distance of urban, surburban, and country living.

FUTURE DIRECTIONS

NSA seeks career-oriented employees who are intrigued by a challenge, who look forward to contributing significantly to the security of their country, and who possess a high degree of imagination, initiative, and intellectual curiosity.

Many of the challenges that confront NSA researchers provide rare opportunities to explore the most advanced scientific theories and techniques. The constantly increasing demands on the agency ensure that its mathematicians, scientists, and engineers will continue to have ever greater opportunities for individual achievement and professional growth. In addition, employees at NSA enjoy extremely stable job security due to the consistently high priority given the Agency's contribution to the nation's defense.

EMPLOYMENT OPPORTUNITIES

ENTRY LEVEL

The National Security Agency hires a substantial number of college graduates each year in a wide variety of career fields. Employment possibilities usually exist for the following graduates.

Computer Engineers, Electrical/Electronics Engineers, and Electronics Engineering Technologists. The demanding goals of NSA present very challenging opportunities in assignments like the design of special-purpose computers, antennas, and radar systems; pattern recognition; telemetry analysis; and the design, development, testing, and evaluation of electronic communications systems. R&D engineers at NSA enjoy a rare opportunity to perform advanced laboratory assignments while maintaining close contact with outside industry. Projects are usually carried out by groups of two or three junior engineers working under the direction of a senior engineer. Lab work ranges from theoretical problem solving to the creation of prototype production in circuit-level design, hardware and software engineering, system integration, and communications system development.

Systems engineers at NSA are involved in all phases of a project. Entering at the initial design and development stage, they follow experimental equipment through fabrication, acceptance testing, and production of an acceptable model by the contractor. Systems engineers perform evaluative tasks relative to reliability, compatibility with existing systems, and environmental acceptability.

For the employee, this functional and technological diversity means the opportunity to explore a variety of challenges, the opportunity to contribute—and learn—in a variety of fields. After newly hired engineers have completed an initial assignment in their field of interest, they are given projects to systematically increase their technical breadth and responsibility for project management.

Computer Scientists. Applications programming, the design and implementation of software systems such as database management systems, real-time programming, networking and distributed processing systems, computer security, graphics— these are some of the exciting areas of activity at NSA. Newly hired computer scientists soon discover that NSA's data-processing and computer center, one of the largest in the world, offers a variety of challenging assignments. Its diversity of equipment—from microprocessors to mainframes, representing virtually every commercial producer and many custom-built devices—offers excellent opportunities for major advances in the computer arts. NSA careers in computing involve mixtures of such disciplines and technologies as system design, programming languages, operating systems, compilers, applications analysis and communications, and retrieval systems.

Mathematicians. Mathematicians at NSA find challenges that use their abilities to the fullest extent. Assignments in cryptology fall into three broad areas: consulting with analysts on current communications problems, giving technical assistance to the communications systems specialists, and conducting long-range research in communications and computing. Mathematicians at NSA may be involved in such areas of particular interest as probability theory, statistics, Fourier analysis, modern algebra, Galois theory, matrix theory, and stochastic processes. Virtually every mathematical discipline finds some application at NSA—primarily in cryptography and cryptanalysis, but also in engineering, computer security, and communications traffic analysis.

Physical Science Majors. A limited number of internships designed to provide the transition from campus to NSA's major

career areas are available to bachelor's-level physical science majors who successfully compete in the Professional Qualifications Test, which is given each fall at selected college campuses. For information regarding the PQT, students should contact their placement office or NSA directly. Successful applicants are trained in such fields as computer systems, communications security, signals research/analysis, and cryptography.

FOR EXPERIENCED PERSONNEL

Although most of NSA's hiring of professionals is done through the college recruitment program, there is a continuing need for experienced people in computer and electronics engineering, computer science, and mathematics. Interested candidates should submit a detailed résumé, including a salary history, or form SF-171 to the address at the bottom of the page.

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NSA is committed to the career development of its employees. All new employees receive a combination of formal and on-the-job training to provide a smooth entrance to the NSA work force. Numerous people—including career development panel members, supervisors, training coordinators, and personnel representatives—are available for career counseling and training information throughout an employee's career.

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Starting salaries at NSA are competitive with private industry and are based on qualifications.

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To be eligible for the NSA Co-op Program, applicants must be U.S. citizens, be enrolled in the Cooperative Education Program at their college or university, and maintain a 3.0 grade point average on a 4.0 scale. Applicants must also be able to work a total of twelve months prior to graduation, alternating periods of work with periods of full-time study.

Assignments in electronics engineering may include work in design and development, testing, and evaluation of electronics engineering communication systems. These multidisciplinary assignments extend to such rapidly advancing areas as optics, lasers, acoustics, and microprocessors. Preferred majors are computer, electronics, and electrical engineering. Computer science majors may become involved in networking, programming, and the design and implementation of software systems, management information systems, and distributed processing systems. Assignments in the field of signals analysis may involve the identification and classification of electromagnetic emissions and radar systems and the study of telemetry, beacon signals, and trajectory data. Preferred majors are electrical, electronics, or computer engineering and physics or other physical sciences.

Salaries for co-op students are competitive and are commensurate with class standing. Benefits include health and life insurance plans, paid vacations, sick leave, and holidays. Round-trip transportation costs (between school and workplace) are paid by the Agency. Tuition assistance is available and housing assistance is also provided. A Cooperative Education Association provides peer guidance, transportation aid, and general support services for its participants. Housing assistance is also provided.

Interested students should contact the cooperative education office at their school; they should apply to the Co-op Program at least eight months before they would like to start.

There are a limited number of summer positions available to students majoring in the academic disciplines listed above. Participants in the NSA Summer Employment Program work the summer following their junior year in assignments similar to those mentioned above. Applicants must be U.S. citizens and have a 3.0 grade point average (4.0 scale). Applications should be sent to the NSA Summer Employment Coordinator at the address listed below by November 15 for employment the following summer.

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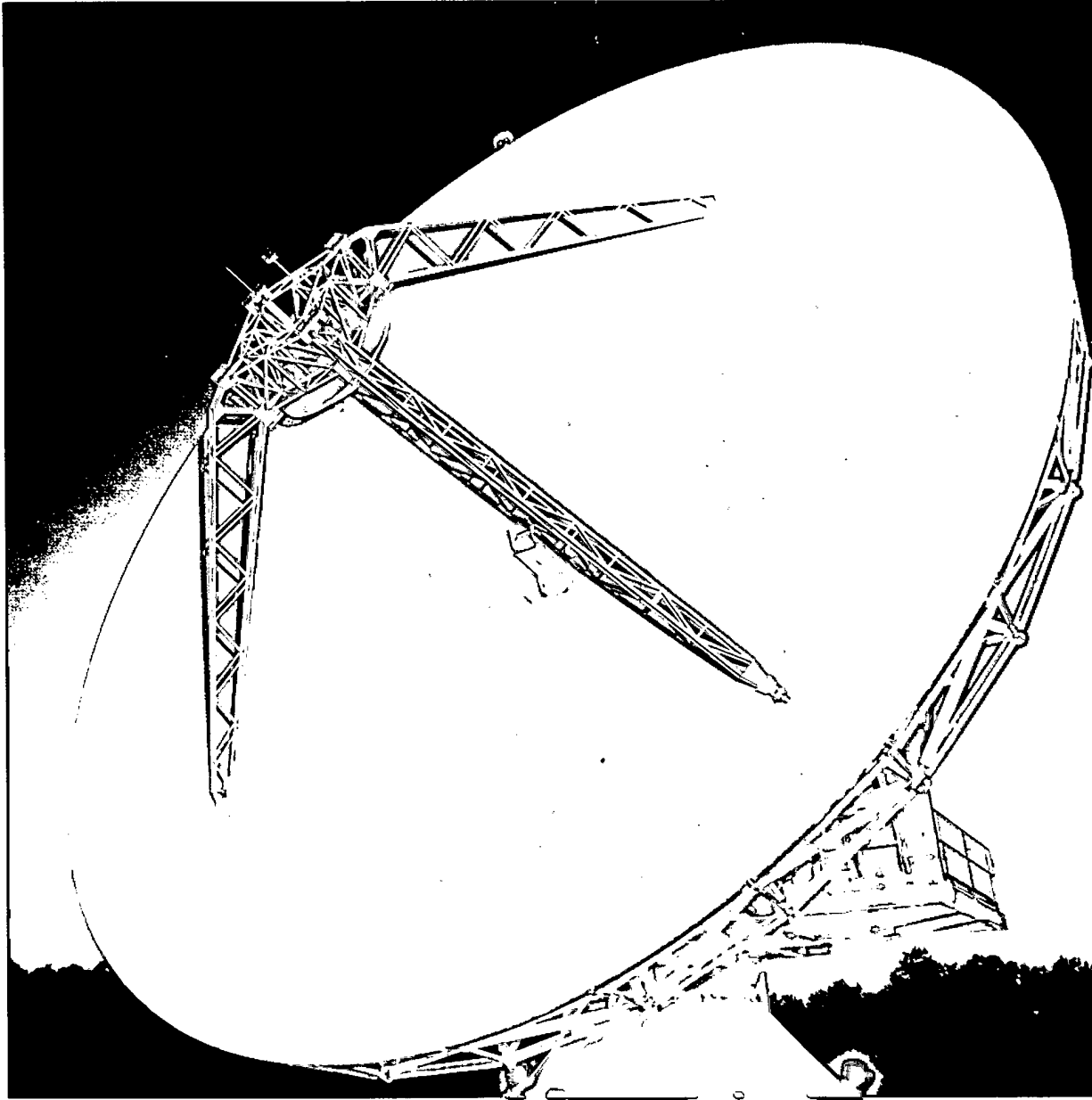
NSA is firmly committed to affirmative action policies for members of minority groups, women, veterans, and the handicapped.

Direct Inquiries to:

National Security Agency
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Fort George G. Meade, Maryland 20755-6000

10.8

A Unique Professional Environment
THE NATIONAL SECURITY AGENCY

An unmatched challenge for engineers, computer scientists, language specialists and mathematicians

The Art of Intelligence

Nations have always sought to uncover the intentions and anticipate the actions of other nations by learning their secrets. What began in ancient times as a purely military necessity had become, by the Renaissance, a fully developed capability to gather intelligence in many European states. Queen Elizabeth I made and dissolved alliances based on the reports of her minister, Sir Francis Walsingham, and Cardinal Richelieu consolidated the power of the French monarchy by using his intelligence network.

An essential issue in intelligence has always been communications. Armies and governments attempt to prevent their adversaries from understanding their communications and, at the same time, try to pierce the secrecy of an adversary's messages. From simple passwords and semaphores, tactical military communications had evolved to the level of the cipher disk, at right, by the time of the Civil War. The inner disk can be rotated to juxtapose the two alphabets in any one of 26 positions, and the position can be changed with each letter as the user encodes the message. Compact and highly effective, the cipher disk was still being issued to field officers in World War One.

But American military and diplomatic communications were far from secure in 1916, when a young cipher clerk at the State Department, Herbert O. Yardley, showed his superiors a coded message from President Wilson to his representative in Germany. Yardley had decoded it in less than two hours. He convinced the government to form a cryptologic organization that upgraded secure communications during and after the war. In 1941, its successor organization knew of Japanese intentions just prior to the December 7th attack on Pearl Harbor, but could not get a warning message to Hawaii in time to thwart the attack.

The National Security Agency was established by President Truman in 1952. The organization furthers the art of intelligence by developing our cryptologic and high-technology communications capabilities in an atmosphere of intensity and high achievement.
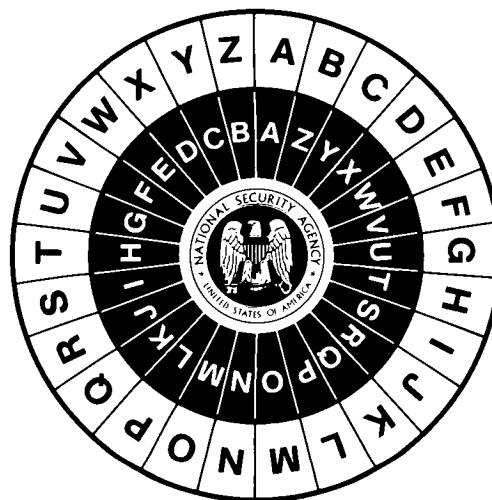
On the cover, a giant earth station antenna receives satellite transmissions.

High Technology in the National Interest

An electrical engineer completes testing of an advanced device developed to enhance secure voice communication between the State Department and embassies abroad. A computer scientist supervises final integration of a new system that provides sophisticated processing for immense volumes of data. A mathematician watches a complex formula take shape, the culmination of months of work applying concepts from the theoretical fringes of modern algebra. Language specialists piece together fragmentary reports from around the world, knowing their contributions will inform policy-makers at the highest level of government.

These people are doing important, demanding and exciting work. Whatever their academic backgrounds, they're involved in professional challenges they could probably find with only one organization—the National Security Agency.

Our Mission. The National Security Agency is charged with three of the most important and sensitive activities in the U.S. intelligence community. Our three tasks complement one another, with a common thread of reliance on very advanced technologies and dependence on the dedication and high intellectual caliber of our people.

The National Security Agency:
—Intercepts, collects and analyzes foreign electromagnetic signals of all types, many of them protected by codes, ciphers and complex electronic countermeasures, to produce *intelligence* information for appropriate users within the government.
—Is responsible for *communications security* for the entire government, providing the means for protecting all diplomatic, military and other governmental communication from possible exploitation by foreign intelligence organizations.
—Is responsible for establishing *computer security* standards for use throughout the government, guarding against unauthorized access, examination and manipulation.

In a tumultuous world arena, NSA people are making crucial contributions to international peace and stability by ensuring an informed, alert and secure environment for American policymaking.

NSA's key role is to be the chief practitioner of foreign signals intelligence within the U.S. intelligence community. We are not involved with face-to-face intelligence and counter-intelligence activities as is the Central Intelligence Agency, nor do we interpret visual intelligence. We focus on interpretation of three broad types of signals: communications—for example, telephone, telegraph or teleprinter messages; electronic, non-communications signals such as radar, navigational aids and homing beacons; and telemetry, the signals normally associated with space vehicles

1

High Technology in the National Interest

or missiles and that principally measure physical quantities and variations among them.

NSA is a high-technology organization, working on the very frontiers of communications and data processing. The expertise and technologies we develop also enable us to provide the government with systems that deny foreign powers knowledge of our own capabilities and intentions through interception of our communications. We are the nation's cryptologic organization, adept at making—and breaking—codes and ciphers. Finally, we are one of the most important centers of foreign language analysis within the government.

Our Place on the Intelligence Team. U.S. intelligence efforts are a joint undertaking coordinated by the Director of Central Intelligence, who is a member of the National Security Council, the group advising the President on all domestic, international and military policies that affect national security. The Director of Central Intelligence heads the Central Intelligence Agency (CIA) and oversees a number of other organizations including NSA. The National Security Agency, while not a military organization, is one of several elements of the intelligence community administered by the Department of Defense. Others include the Defense Intelligence Agency and the intelligence units of the various armed forces. Several other departments of the Executive Branch—the Treasury, Agriculture and State Departments—openly collect intelligence information relevant to their special areas. Finally, the Federal Bureau of Investigation is charged with neutralizing foreign intelligence efforts within the United States. A chart on the inside back cover of this booklet gives a more complete picture of the intelligence community.
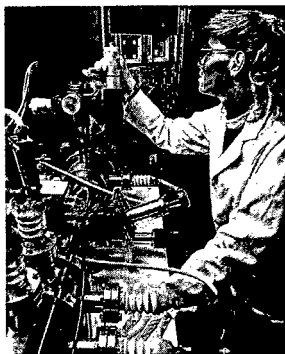
An Unmatched Challenge for New Professionals. The following pages describe what are truly unique professional environments for engineers, computer scientists, language specialists and mathematicians, as well as for other recent graduates who can demonstrate selected aptitudes and proficiencies. We offer the opportunity to develop your skills in an intense, leading-edge atmosphere; in an inviting and affordable geographic area; with the many advantages of top-level government employment; and with an organization committed to the intellectual and professional growth of its people. With all these advantages comes something even more important—a sense of purpose that transcends the day-to-day, that provides the opportunity both to achieve and to serve.

2
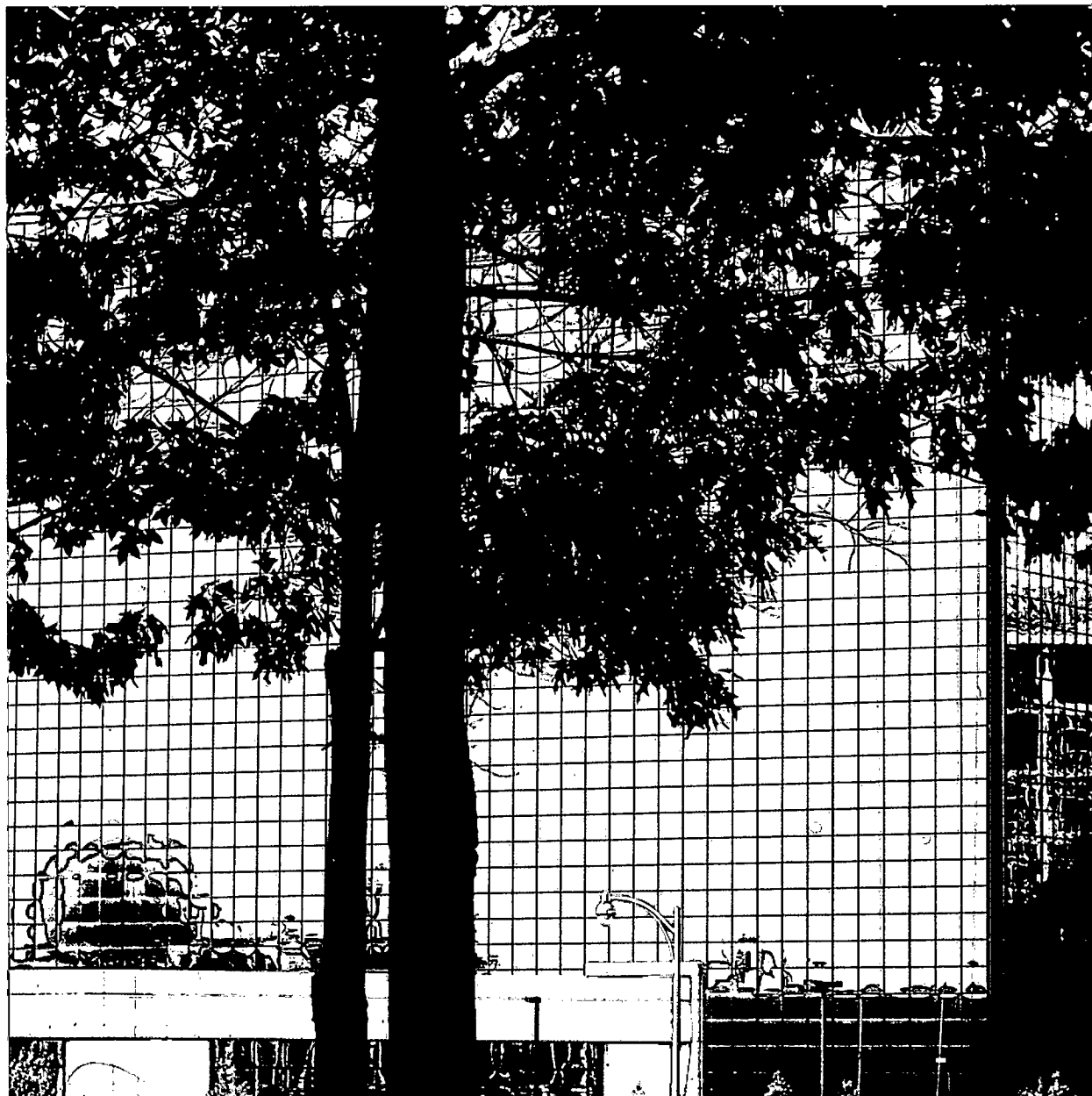
Above: *NSA is headquartered in a campus-like setting in suburban Maryland.*

Opposite: *NSA researchers have developed this focused ion beam lithography system that can produce patterns with dimensions of less than 1/10th the wavelength of light on silicon wafers.*

"Most of you labor long and productively with little expectation of public recognition. I came here today to thank you on behalf of a grateful nation."
—The Hon. Hubert H. Humphrey, in an address to NSA employees.

3

Engineering
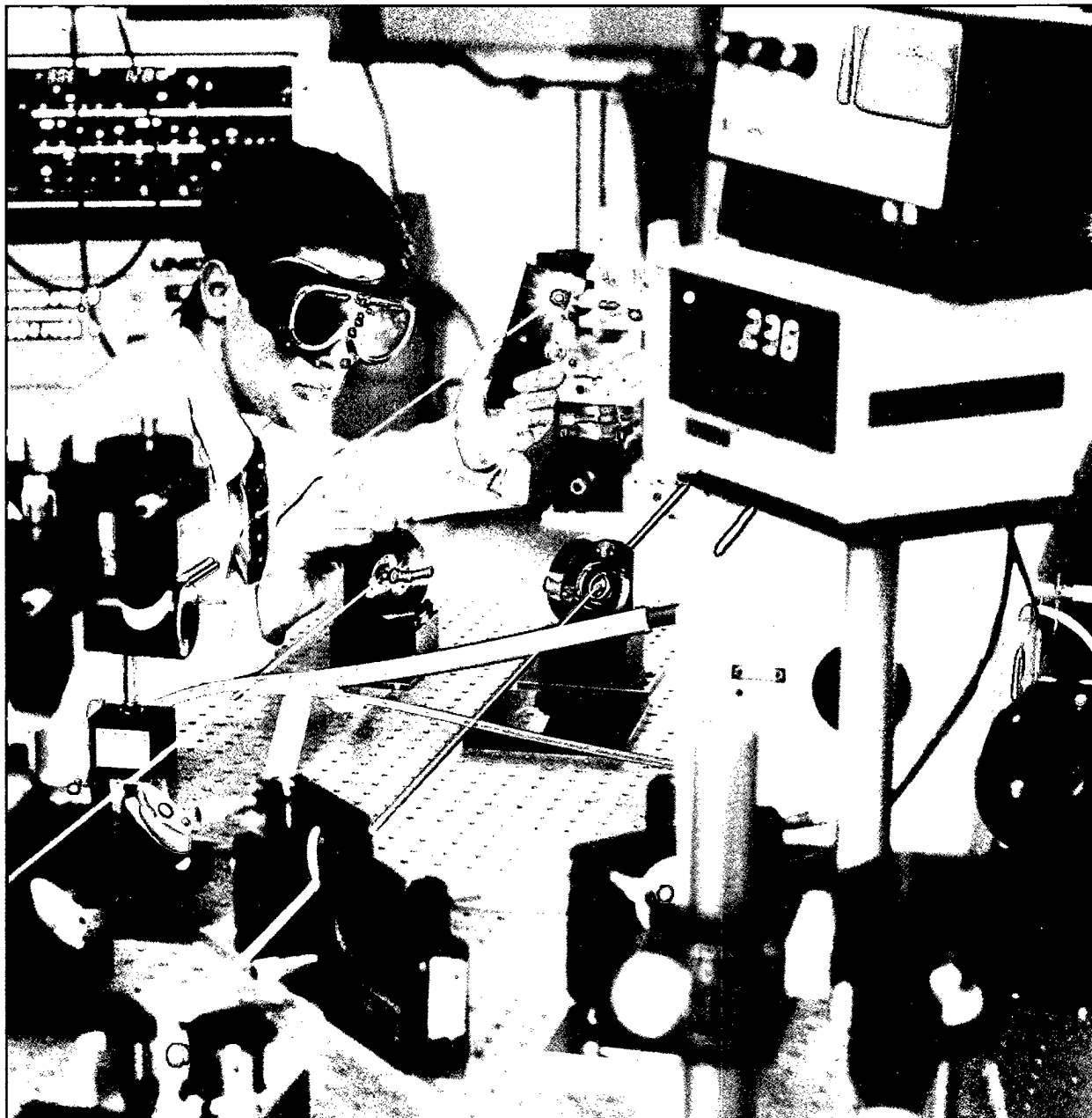
"NSA has support facilities any company or private lab would envy. Whatever your area, you'll find the latest equipment, library resources and technical assistance."
BSEE, Purdue University

Above: *Laser experiments such as this help maintain NSA's leadership in optical technologies.*

Opposite left: *Circuitry is designed and manufactured by NSA to meet its own special needs.*

Opposite right: *Sophisticated CAD systems assist NSA design engineers.*

4

Breadth and advanced technologies are key words that describe engineering at the National Security Agency. Since our founding three decades ago, NSA people have often driven the development of the central engineering disciplines of the era: computers, microelectronics, communications. In some areas we have maintained positions estimated at 20 years in advance of commercial development. In others, the benefits of our research have translated into well-known products and techniques. Our early interest in cryptanalytic research made us one of the inventors of the modern computer. Our pioneering efforts to develop flexible storage capabilities led to the tape cassette. Stop-action, slow motion and instant replay stemmed directly from our innovation in the management of recorded information. Our groundbreaking development of integrated circuits—the agency alone once accounted for 50 percent of the IC market—gave birth to a continuing tradition of leadership in semiconductor technology. More recently, we have spurred advances in microprocessor software.
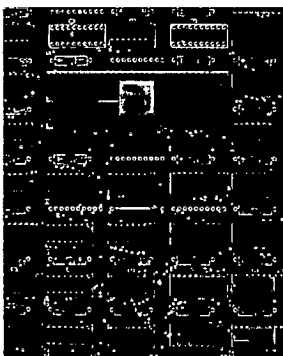
Engineers at NSA typically stay with a project from its earliest stages until final implementation, meaning that a professional may be involved in design, computer simulation, experimentation, benchwork, prototype development and testing, manufacturing and possible field work. Our engineering professionals can also move freely among a wide variety of organizations and assignments within the agency, from research and development to operations, from contract supervision to a theoretical, "think-tank" setting. Our philosophy is to encourage career development, helping you build on your talents and interests rather than limiting you to areas of proven performance.

What We Seek. We look for graduates with degrees in electronic engineering, electronic engineering technology, computer engineering and systems engineering. Engineering graduates with a high degree of computer literacy are the largest single category of recent graduates who join the agency as engineers. Students with advanced degrees in any of the modern communications and information management technologies can find excellent career opportunities with us.

Among the characteristics we value highly are your ability to make sound decisions and your flexibility. You'll have to be someone who can work well with other professionals—scientists and mathematicians as well as fellow engineers.

What We Offer. Because of our advanced environment, we recognize that most beginning engineers will require a special blend of training and responsibility if they are to develop quickly. We place you among knowledgeable, experienced people on a small team. Typically, you begin by working on a piece of a larger problem. As you become more adept, you gain greater degrees of individual responsibility—often quite rapidly. Recently, first-year engineers have completed such projects as the development of a hand-held encryption device and a new secure communications modem. The early career is a critical time for new engineers, and we see

5

Engineering

to it that challenging problems and association with talented people combine to give you every opportunity for rapid professional growth.

Continuing education opportunities are a strong component of technical excellence at NSA. Our in-house courses and seminars are supplemented by tuition-reimbursed attendance at such area universities as Maryland, Johns Hopkins, George Washington, Howard, Georgetown, Catholic and American. Graduate fellowships at full salary are available on a competitive basis to outstanding candidates.

Tomorrow's Technologies. NSA is vitally interested in developing the technologies that are keeping our nation a world leader in scientific and technical achievement. Among our areas of concentration are:

—*LSI and VLSI circuit design.* Many of our systems must operate under conditions that test present technical capabilities to the limit. Speed, power, size, reliability—all are factors that we must design into our own circuits, many of which we also manufacture. We use highly advanced CAD systems to provide logic simulation and diagnostic test routines as well as design assistance.

—*Microprocessor applications.* Microprocessor laboratories support widespread use of the devices. Complex multi-processing systems are constantly being developed for use in larger systems and equipment.

—*Large system development.* NSA designs, simulates, programs, tests and debugs systems for a number of uses.

Some of the largest, most complex data handling systems in the world are in operation at the agency. These often involve interaction of real-time inputs and multiple data bases, and integration of different types of computers, microprocessor units, graphic terminals and other peripherals.

—*Advanced computer technology.* NSA must search continuously for opportunities to increase the power and storage capacities of even the most advanced production computers. Among our present interests are massively parallel digital processing architectures, special purpose signal processors, optical logic, bubble memory, laser recording, analog optical computing technology and knowledge-based system development.

—*Communications.* Better bandwidth utilization, fiber optics, speech and image encoders, multiplexing, software demodulators and a host of other communications technologies form one of our most fundamental concerns.

Above: *NSA manufactures many of its own integrated circuits.*

Opposite Left: *Banks of multiplexing equipment underscore NSA's commitment to advanced communications technologies.*

Opposite right: *Microprocessor software development has many applications at the agency.*

"This is a very open-minded, progressive atmosphere, very conducive to research and development. The pool of knowledge is unbelievable."
BS/MS EE, University of Maryland

7

Computer Science

"*As to equipment, the agency seems to have at least one of everything in use today. And there seem to be thousands of possible jobs, all under one roof.*"
BS Computer Science, Western Kentucky University

Above: *NSA's computer operations comprise one of the largest and most sophisticated data processing systems in the world.*

Opposite: *NSA computer specialists use state-of-the-art equipment.*

8

██

The National Security Agency has one of the largest computer facilities in the world.

If the next four pages of this booklet were blank, you would already know what makes us an unparalleled professional environment for computer science specialists. Measured in acres, NSA's computer complex is highly diversified, with commercial equipment from all major vendors and a number of specially-designed-and-built systems. Advanced computer applications are fundamental to our mission, and in our organization there are assignments that cover virtually every aspect of the computer science profession, from system management to applications programming, from complex systems development tasks to operations and computer security. You might well find yourself working in areas such as applications programming, CAD/CAM graphics, operating systems, data communications or data storage retrieval systems. In an industry that—too often—seeks to narrow your perspectives, NSA offers unequalled diversity.

Much of the present-day commercial computer industry was developed totally or largely by NSA: the first timesharing system, the first solid state computer and magnetic tape access technology. Today, we participate strongly in the national effort to develop supercomputers—part of a proud agency record in technological achievement.

A Remarkable Breadth of Applications.
Most beginning professionals with computer science degrees join us as programmers in a variety of working modes— as part of a team attacking a problem; as project workers responsible for a part of a larger mosaic under a project leader; or as individual contributors, making use of special knowledge or skills they may have obtained in school or in previous experience.

The wide range of applications for your computer skills might include programming in an area such as cryptanalysis, a discipline that did as much as any other to give rise to the modern computer; engineering support, covering everything from simulation and structural analysis to project management; signals, including analog control; and scientific programming.

We rely on computers in the agency's vast network to manipulate huge volumes of data and to facilitate rapid analysis of information and fully informed decision making. Among the systems and information management issues you might address are:

—*Office automation and executive support systems*, giving managers and analysts desktop access to a full range of computing power
—*Information resource management*, ensuring that our huge storage capacity provides the background that places events in context and unlocks essential meanings
—*Operating systems*, shaping computing capabilities to the agency's special needs
—*Data base management systems*, providing instantaneous access to important data and smoothing system functioning under a variety of conditions and to meet a variety of user needs
—*Real-time interfaces*, because so much of our work is extremely time-sensitive
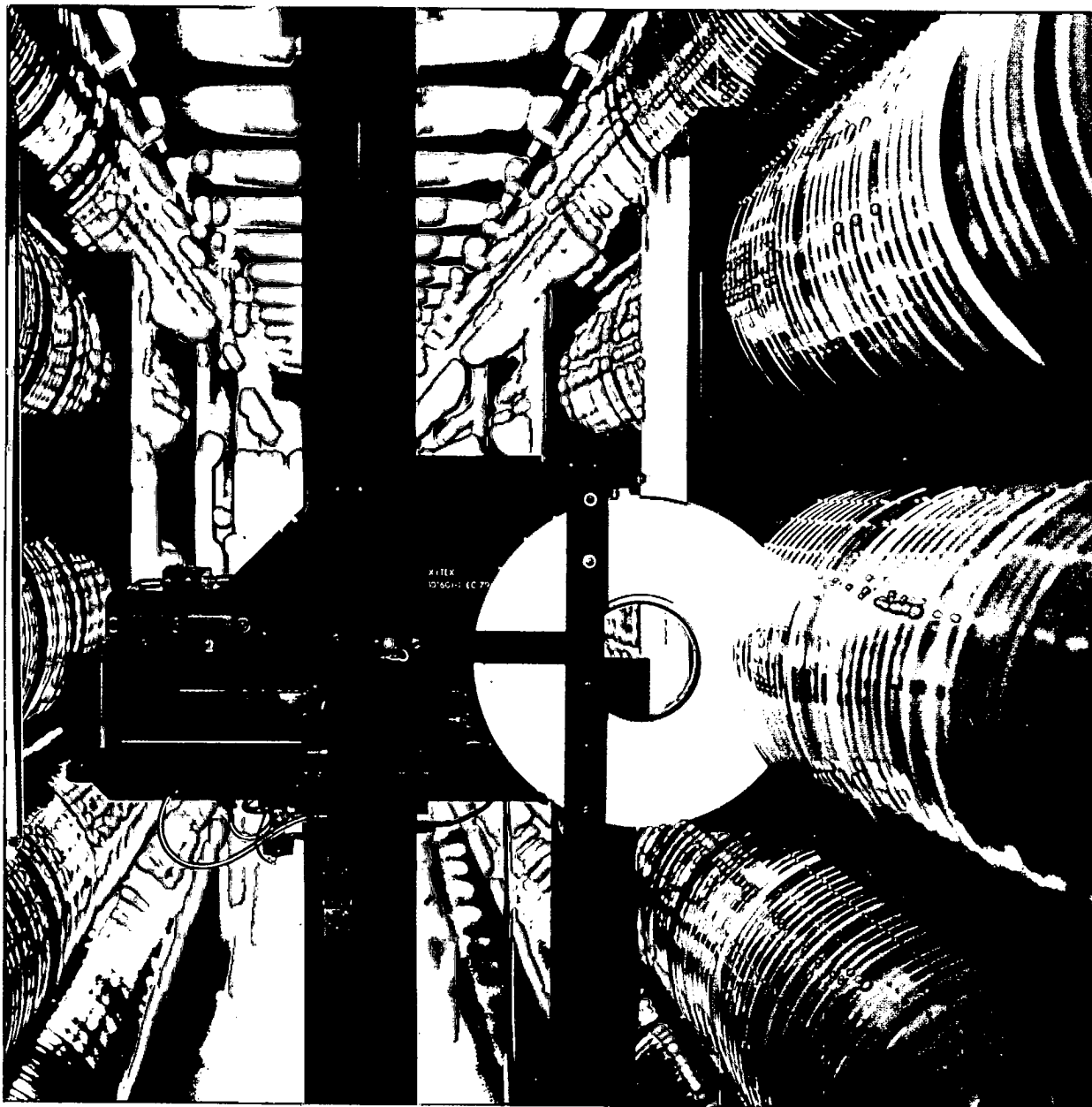
Computer Science

—*Communications*: data networking and systems architecture, a worldwide concern with us, often involving sophisticated security measures

—*Computer graphics*, both for our own research and development efforts and as an analytical tool in support of our intelligence mission

—*Computer security*, both within NSA and as the designated computer security specialist for the U.S. government.

A Wide Variety of Equipment and Technology. From microprocessors to the latest supercomputer, from analog control devices to personal computers, the range of equipment in use at the agency today is a virtual catalogue of contemporary data processing and information management technology. The heavy availability of personal computers has led to the establishment of our Personal Computer Information Center, and more and more non-professional users are becoming computer-literate. From the Unix™ operating system, resident on many minicomputers, to the systems our software specialists custom-design for the largest supercomputers, we speak most languages, create most of our own operating systems, and write software for everything from data base management to artificial intelligence. Because we focus on processing data in large volumes and on solving problems by exhausting the possible solutions, we employ laser printers that can produce 22,000 lines per minute, and massive supercomputers that can manipulate enormous amounts of material at speeds that boggle the mind.

Our most important assets are the creativity and resourcefulness of our computer science professionals. To them we offer an unparalleled environment for professional development. Our intern program guarantees, for selected new employees, job variety and appropriate skill-level training. We encourage professional growth through our Computer and Information Sciences Institute.

Above: *An automated tape library at our headquarters facility.*

Opposite: *Our computer professionals can bring a wide range of experience to bear on complex issues.*

"If you've spent four years developing skills as a computer scientist, why not put them to work in the largest computer complex in the world?"
BS Computer Science, Cornell University

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We're Frequently Asked...

NSA is not a run-of-the-mill employer. Because of our national security responsibilities, we are frequently asked questions that go beyond what new professionals typically want to know when considering employment opportunities. Below are some of the concerns that often surface:

Q. Is NSA a military or a law-enforcement organization?
A. Neither. Our work is overseen and funded by the Department of Defense, and approximately 20 percent of the people who work with us are on active military duty, but we are predominantly a civilian organization. Our employees are not subject to military codes or discipline. We have no law-enforcement mission.

Q. Are NSA employees in danger because of their occupation?
A. No. NSA's mission is analytical and technological. We do not engage in activities that involve dangerous action by individuals. Our people must be security-minded, but they are not exposed to risks to their personal safety or well-being.

Q. Will my achievements at NSA be recognized outside the agency?
A. People suited for classified work are a special breed who demand little outside recognition and weigh against it the opportunity to participate in events at the center of world affairs. When you join the agency, and in periodic briefings as you progress, we work with you to instill the mental habits that help you maintain security, both on the job and during your leisure time. It is certainly true that we expect our people to refrain from discussing the details of their work with even their immediate families.

Q. Will I be able to use the knowledge I gain if I move to commercial employment?
A. There is no simple answer to this question, nor would there be if you were moving from one private company to another. People have certainly gone on to make important contributions in private industry using skills they developed at NSA. Actual technology transfer to private industry would, of course, depend on the national security implications.

Q. Will I work with people from outside the agency, and interact with professional colleagues from other settings?
A. Quite possibly. Many of our engineers and scientists work closely with vendors and contractors. Publication of nonclassified papers and participation in professional societies is encouraged.

Q. What's the typical NSA employee like?
A. Despite what you may read in the media, there is no such thing as the "typical" NSA employee. Our employees are as diverse a group of individuals as any on earth. Many are quite brilliant, some even a little eccentric. They come from every conceivable background and share only a basic faith in America as a free, pluralistic nation and a strong dedication to the rightness of their mission. If there is a special environment at NSA, it is because these people are especially proud of their achievements.

Q. Will I be subject to mandatory moves,

or be required to leave my family for long periods?

Ⓐ Relocation will figure less importantly in your NSA career than in many private industries. Our locations in Maryland employ by far the majority of our professionals. You can be assured of a stable and rewarding family and community life. The majority of our people spend their entire careers in the same geographic location. If travel is your interest, your NSA career can afford the opportunity; but career development and promotion do not depend on periodic relocations, as they frequently do in the private sector.

Ⓠ ***I've heard that government compensation compares unfavorably with private industry.***

Ⓐ NSA salaries and benefits are quite competitive. When you consider NSA's total compensation and benefits package—including liberal vacations, outstanding continuing education, and superior insurance plans—we begin to emerge as a very attractive option.

Ⓠ ***Will I need a security clearance in order to work for NSA?***

Ⓐ Yes, you will. The entire employment process is described in the last section of this booklet, and you should read it carefully, because our practices differ substantially from those of many other employers. An important difference is that the security background check can require many months to complete, meaning you should apply to NSA well in advance of your availability date.

Ⓠ ***Will I know what my job will be before I decide to join the agency?***

Ⓐ Few employers can give you complete job information before you begin. We will try to be as specific as possible when we discuss opportunities with you. It is important to remember that our people can move quite readily from job to job and that we have only one major location—in suburban Maryland—eliminating uncertainty about where you will live.

Ⓠ ***Does NSA have any unusual ground rules for employment?***

Ⓐ You and all of your immediate family must be U.S. citizens. Your personal travel to certain countries will be restricted while you are with the agency and may be for some years after you retire or leave, depending on your level of exposure to classified material.

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Language

The analysis and interpretation of intelligence data from around the world requires a high level of skill and professionalism from language specialists. We must determine what material in a foreign language means, whether it has intelligence significance and how it fits into a larger picture of developing events. We deal with highly idiomatic language and technical vocabularies, which at times may be only partly intelligible. Often, we must work from what we know to deduce what we do not know— always with an open mind and a willingness to accept the unexpected.

If you are proficient in a modern Slavic, Near Eastern or Asian language, NSA can provide career challenges that make full use of your language skills. You will be using the language constantly, exploring its nuances in depth. You may even find yourself learning a new language, because our interest often focuses on rarely-taught, and even undocumented, languages.

What Our Work is Like. Language specialists work in many different organizations at NSA and under a variety of conditions. You might find yourself gisting or making quick analyses of material as it is received. Or you might be the specialist who completes the first full transcription or translation of an item of interest, perhaps assisted by a computerized dictionary and other automated aids. As you grow in skill and in familiarity with your subject matter, you will specialize, taking on a role that involves more frequent research and writing responsibilities. You might qualify for field assignments abroad or for in-country language training to sharpen your skills. You could work on projects with engineers and computer scientists to advance our information-processing systems— already the most sophisticated in the world, and created primarily to assist you.

What You Need to Succeed. Proficiency in your language may not always include fluency in speech, but you may need to develop quickly a sense of the spoken language in all its idiomatic and colloquial complexity. You will need the patience to perform careful, even painstaking transcription or translation, checking your findings with various reference sources and with your colleagues to avoid inaccuracies. You will certainly need analytical skills, and the kind of mind that takes pleasure in difficult problems and sees them through to solution.

An Unusual Opportunity. Few careers, even in academia, put your language skills to more steady and demanding use. Our work is not simple transcription or translation, but linguistic and textual analysis of urgency and high refinement. You develop an understanding of the cultures in which your language is spoken and may be present as history is being made.

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Above: *NSA language specialists often deal with information of great urgency and sensitivity.*

Opposite: *Language specialists include both native speakers and non-native scholars.*

"I'm really using the language I majored in. Opportunities to do that are rare— and I can't imagine being more challenged to learn."
AB Language, Middlebury College

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Mathematics

"One thing needs to be said about the work here for mathematicians: It's fascinating. I truly can't wait to get to work every day."
MS Mathematics, University of Pennsylvania

Above: *Mathematicians frequently work together, testing hypotheses and developing innovative solutions.*

Opposite: *Challenging problems can require exhaustive research and many months of effort to solve.*

Throughout history, mathematics and cryptology have gone hand-in-hand. Today, the interfacing of the computer with state-of-the-art technologies has made the field of secure communications increasingly complicated and has put a premium on interdisciplinary cooperation—among scientists, engineers, mathematicians and computer specialists—in order to meet a mounting challenge to protect our national interest. Mathematicians at NSA use advanced concepts to solve cryptologic problems and to help develop and evaluate code and cipher systems. The unique nature of our cryptologic mission gives vitally important practical applications to mathematical concepts usually considered purely theoretical.

The Nature of Our Work. Algebra, probability and statistics have long been used in cryptology, and we continue to analyze data for causal significance using discrete and continuous multivariate analysis and hypothesis testing. The coming of the computer increased our involvement with numerical analysis, linear algebra, Boolean algebra and mathematical logic. Telecommunications systems development has brought increased interest in coding and information theory, graph theory for network analysis and systems design topics such as optimal control of computer-communications networks. Other areas of interest include estimation theory, Kalman filtering, systems dynamics modeling and astrodynamics.

Mathematics plays an important part in the development of the secure communications systems that NSA creates for the U.S. government. Digital network operations require combinatorial mathematics, for example, and modern modems involve mathematical programming and control system mathematics. In developing secure communications, mathematicians design the algorithms to be used in encryption. As cryptanalysts, other mathematicians "attack" systems under development, probing for vulnerabilities.

Our Environment. Mathematicians at NSA usually work in small groups assembled to address specific problems. Projects undertaken by these teams may require only several months or can require many years. A mathematician may sometimes prefer to work on more than one problem at a time, or to pursue a variety of types of work simultaneously—pure research, cryptologic projects and systems development, for example. Computer support and library facilities are among the best available.

Learning is an ongoing process for NSA mathematicians. It can include studies at our own National Cryptologic School, part-time course work at nearby colleges and universities, and year-long graduate fellowships. We encourage our mathematicians to stay abreast of current developments, to publish unclassified research and to play active roles in scholarly and professional associations.

For Other Graduates

Majors in engineering, computer science, Slavic, Near Eastern and Asian languages and graduate students in mathematics are judged qualified by success in their studies to seek employment at the National Security Agency. But graduates from many other fields may be eligible for NSA careers. To help determine eligibility, we administer the Professional Qualification Test at a number of test centers located on college campuses around the country. There is no fee for the test, and taking it obliges you in no way to continue your application.

What the Test Is Like. The Professional Qualification Test is a multifaceted test designed to measure aptitudes and abilities that correlate highly with success in professional careers at NSA. In addition to basic language and math skills, the test assesses analytic reasoning and judgment—including aptitude for the kinds of thinking often used by our professionals to discern interrelationships or networks, or to fill in missing data in series or other patterns. A booklet with sample test questions is available at your college placement office or by writing NSA at the address at the back of this booklet.

What Fields Does the Test Qualify You to Enter? Every year, certain students who take the test demonstrate aptitude for the career areas discussed earlier in this brochure: computer systems, language and communications security. More frequently, students who enter NSA through the test will find themselves in such specialties as:

—*Cryptography.* Developing and analyzing code and cipher systems is an apti-

tude shown by many different types of individuals from a wide variety of backgrounds. This is a field that requires high powers of concentration and patience as well as a nimble mind. A person who enjoys puzzles, bridge or chess may well become an excellent cryptographer.

—*Intelligence research.* As do certain language specialists, intelligence researchers help assimilate and interpret information, and shape it for end users.

—*Traffic analysis.* These analysts concentrate on the "externals" of a given transmission, determining intelligence information by observing patterns and types of transmission, etc.

—*Signals analysis.* These professionals identify and classify communications signals, study physical signal characteristics and analyze telemetry.

—*Administration and management.* Like most large organizations, NSA has administrative departments such as logistics, resource management, personnel, security, and others, all requiring the skills of business, accounting, personnel management and other disciplines.

Above: *Intelligence analysts work as a team in a moment of international crisis.*

Opposite: *Computer literacy is an important asset whatever your NSA assignment.*

"There's no single NSA 'type.' We come from all sorts of backgrounds and from all over the country. The diversity makes it a stimulating place to work."
AB Political Science, Dartmouth College

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A Unique Environment for Professional Growth

"You can have a very dynamic career at NSA because you're always being encouraged to learn new things and to put your training to use in new assignments."
BA Psychology, Ohio State

Above: *Few organizations, public or private, provide the opportunities NSA affords for continuing education.*

Opposite: *Yearly performance appraisal meetings are only part of our program to keep your career challenging and productive.*

NSA offers a superior environment for your career development, one that combines the challenge of government service with compensation, benefits and job security that compare quite favorably with the private sector.

Compensation. NSA competes with industry for top people who possess sought-after skills. Our salary levels differ from those of many government agencies in order to help us attract and retain the very best professionals. We pay much of the cost of excellent health benefit plans, and contribute to your group life insurance.

Time Off the Job. In addition to holidays, your paid vacation allowance is thirteen days in the first year of employment and has risen to twenty days by the fourth year. You also earn thirteen days per year of sick leave, and it accumulates from year to year, providing security against long illnesses.

Flexible Hours. Many of our facilities operate with flexible hours allowing you to better accommodate your activities outside work.

Continuing Education. Approved, job-related coursework is subject to tuition reimbursement by NSA, and our area abounds in quality universities including Johns Hopkins, the University of Maryland, Georgetown, George Washington University and many others. Year-long graduate fellowships with full salary and full tuition payment are available on a competitive basis. Certain employees may also receive 20 paid hours off per week to complete advanced studies in sciences, mathematics and engineering. Our in-house educational facilities include the National Cryptologic School, which offers advanced courses in science and technology, languages and cryptologic topics to NSA and other government employees. The educational program is supplemented with special in-house and guest seminars, short courses and many other opportunities.

Performance Evaluation. Formal yearly evaluation of your performance by you and your supervisor gives you a continuing sense of your own achievements and of opportunities for improvement. Your salary growth is strongly tied to performance, and exceptional performance early in your career will be recognized by accelerated advancement.

Professionalization. Continuing growth is the objective of the NSA professionalization program, under which you work with career panels established for most disciplines at the agency to accumulate educational and work experiences that will prepare you for certification— and promotion to high positions within NSA.

A Dual Track. Many technically oriented employees want to know whether they must accept management responsibilities in order to advance their careers. At NSA, senior positions exist along both the technical and managerial "tracks." It is entirely possible to have a purely technical career without penalizing your salary grade.

A Great Place to Live and Work

Our location places us in some
of the most historic and live-
able areas in the nation.

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A look at the map tells the story: NSA is located in an ideal place to live, in the midst of outstanding cultural, entertainment, recreational and historical areas. Our principal locations are close to the scenic parkway that connects Washington and Baltimore. Both cities are approximately one-half hour away.

A Choice of Lifestyles. NSA employees live on the Colonial-era streets of Annapolis and Georgetown; in the new, planned community of Columbia, Maryland; in fast-paced urban areas such as Baltimore's Inner Harbor; in rural settings adjacent to working farms; and along the shores of Chesapeake Bay. Because we're located outside of high-density population centers, our people can easily avoid the high housing costs associated with Washington.

Recreation. Thousands of people come to our part of the world every year on vacation. For us, the attractions are there year-round: sailing and power-boating on Chesapeake Bay, often considered the finest water recreation area in the nation; hiking, camping and skiing in Maryland's western mountains or the Blue Ridge Mountains of Virginia; swimming and sunning on ocean beaches.

Culture and History. Washington, with its imposing monuments and government buildings, is also home to the Kennedy Center for the Performing Arts, with Broadway musicals, concerts, ballet and other events; the Smithsonian's family of museums, ranging from natural science to space exploration; the National Gallery and other art museums; and the Library of Congress. Our region is rich in history, with battlefields of the Revolution and Civil War, Jamestown and Williamsburg, Baltimore's Fort McHenry, the Naval Academy and Maryland's state capitol building at Annapolis.

Entertainment. There's no lack of entertainment in this region. For nightlife, consider Baltimore's flashy Harborplace (it drew more visitors than Disneyland last year) or Washington's well-known Georgetown section. Professional sports teams include the Washington Redskins, Bullets, Capitals, and the Baltimore Orioles. Nearby racetracks include Pimlico, home of the Preakness.

Accepting the NSA Challenge

Our advanced technical environment . . . the large volume and scope of our mission . . . our vital contribution to the national security— any one of these factors alone would explain why careers with NSA should be thought of as beyond the ordinary, with more than their share of challenges. To succeed with us, you must be highly skilled and willing to maintain a fast pace in learning. You must be patient, thorough and flexible. You must be someone of extraordinary judgment, character and discretion.

How to Join NSA. Most professionals join us early in their careers. The most common ways to begin with us include:

—*Our co-op program.* NSA works with a number of colleges and universities to sponsor co-op students in science, engineering, computer science and math, and certain foreign languages. Rotational assignments and meaningful work experience highlight co-op opportunities, and co-op participation is recognized when you apply for permanent employment.

—*As a direct hire.* Most graduates who join us follow the usual college interview and application process and enter to fill a specific vacancy. Several disciplines at NSA have intern programs for outstanding candidates who would like exposure to a number of agency activities before settling on a first permanent assignment.

How We Select New People. Because of our national security mission, our criteria for choosing new professionals are established by law and must be closely followed. After your campus interview, we may invite you to visit our Maryland headquarters to participate in several days of interviewing and testing at our expense. A battery of psychological tests with a follow-up interview, a physical examination and a polygraph are all part of this testing experience.

If your candidacy appears promising, we must then conduct a thorough background investigation. This process can require many months to be completed, and it means you should express initial interest in NSA *well in advance of the date you will be available for employment.*

For further Information. NSA conducts interviews on college and university campuses across the nation. For further information, get in touch with your placement office or write:
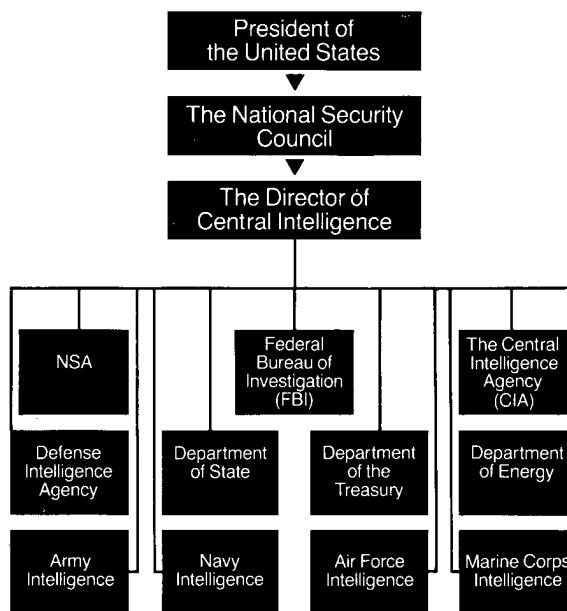
College Recruitment Program
National Security Agency
Attn: Office of Employment (M322)
Fort George G. Meade, Maryland 20755
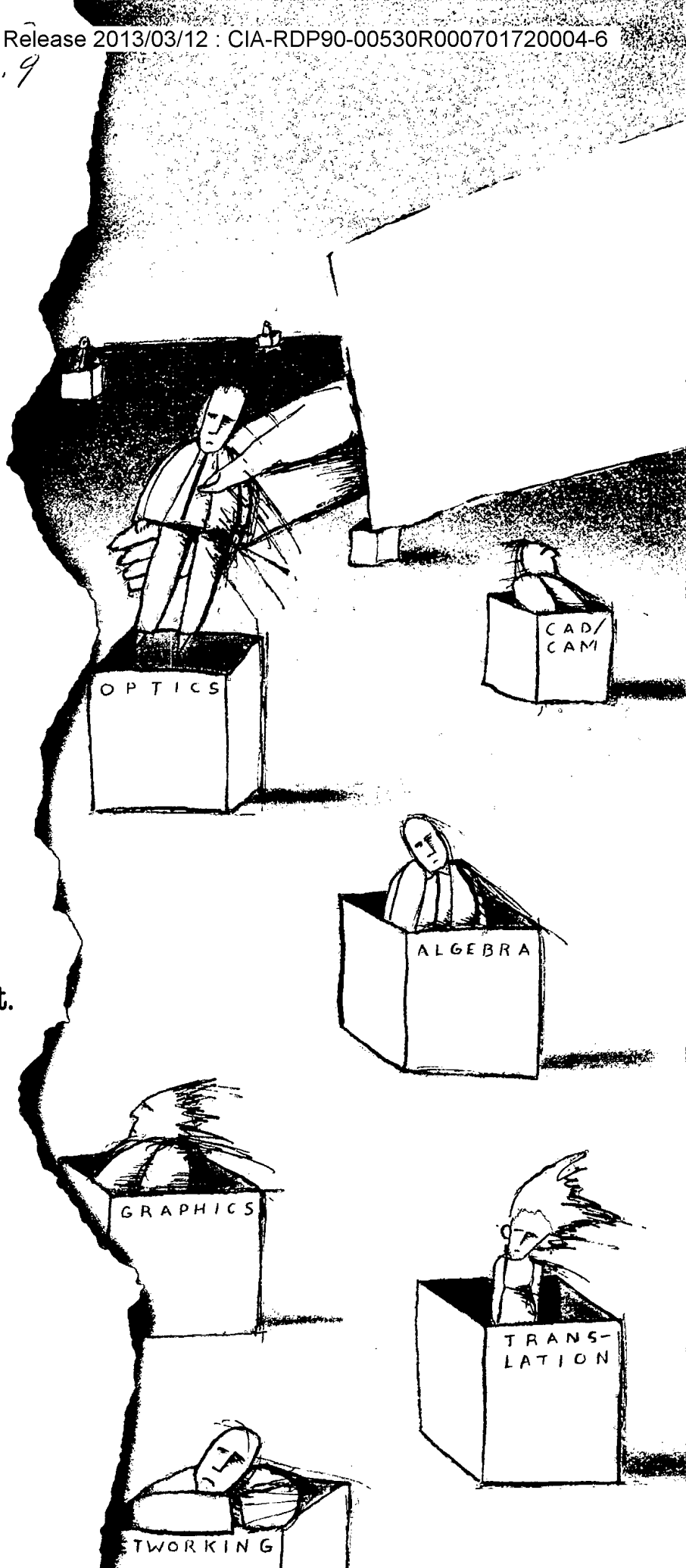
NSA is an equal opportunity employer

The Intelligence Community

The chart below shows the principal elements of the U.S. intelligence community. *The National Security Council* is a high-level advisory group that meets with the President to determine positions on urgent questions of foreign and domestic policy. *The Director of Central Intelligence* represents the entire intelligence community on the National Security Council and has responsibility for coordinating the national intelligence effort. Various *executive-branch departments* use intelligence as part of their policy-making process. *The Federal Bureau of Investigation,* the only law enforcement agency in the intelligence community, combats foreign intelligence efforts within the U.S. *The Central Intelligence Agency* is an independent organization with the primary responsibility for clandestine collection of foreign intelligence and for counter-intelligence efforts abroad. Among the agencies overseen by the *Department of Defense* are *NSA* and the *Defense Intelligence Agency,* which provides military intelligence and is coordinator for all armed forces intelligence activities including the assignment of defense attaches to U.S. embassies.

President of
the United States
▼
The National Security
Council
▼
The Director of
Central Intelligence

NSA	Federal Bureau of Investigation (FBI)		The Central Intelligence Agency (CIA)
Defense Intelligence Agency	Department of State	Department of the Treasury	Department of Energy
Army Intelligence	Navy Intelligence	Air Force Intelligence	Marine Corps Intelligence

National
Security
Agency

10. 9

MYTH:

At NSA, you must choose one
specialty and then stick with it.

National
Security
Agency

NATIONAL SECURITY AGENCY
Attn: M323 (AAV)
Fort Meade, Maryland 20755-6000

COMPANY BACKGROUND

The National Security Agency makes a vital contribution to an informed and secure environment for our nation's policy-making. NSA, which was established in 1952 by presidential directive, is the Department of Defense agency responsible for collecting, analyzing and assessing foreign signals, safeguarding our government's vital communications, and establishing standards for computer security for use throughout the federal government. These missions require the use of the most advanced technologies, often years before their commercial use. For example, many of our systems must operate under conditions that test present LSI and VLSI circuits to the limit. Analysts use sophisticated computers to screen an ever-increasing volume of foreign communications for the intelligence information to provide U.S. leaders with the most accurate international picture possible.

ENTRY-LEVEL POSITIONS

NSA hires a large number of college graduates each year in these career fields.

ELECTRONIC AND COMPUTER ENGINEERING. Entry-level Engineers at NSA have the opportunity to try different areas and to work with different technologies—diversity that simply doesn't exist in many other organizations. Engineering responsibilities extend from pure and applied research, design, development, and testing, to project management and systems analysis. NSA is involved in state-of-the-art projects in communications systems, computer security and networking, microprocessor applications, software engineering, and optics.

COMPUTER SCIENCE. From microprocessors to the latest supercomputer, NSA's computer facility has equipment from every major commercial producer as well as many specially designed and built devices. NSA's computer complex is one of the largest in the world—providing the right hardware for the myriad tasks related to signals analysis, communications, and computer security. NSA offers Computer Scientists such varied areas as applications programming, computer security, and graphics, as well as the design and implementation of software systems such as database management systems, real-time systems, networking, and distributed processing systems.

MATHEMATICS. NSA offers Mathematicians ongoing challenges in cryptology in three broad areas: consulting with analysts on current communications problems; giving technical assistance to communications systems specialists; and conducting long-range research in communications and computing. NSA's cryptologic goals—the protection of official U.S. communications and the analysis of foreign signals—give practical applications to virtually every mathematical discipline.

FOREIGN LANGUAGES. Students who have majored in Slavic and other East European, Middle-Eastern, or Asian languages will find that NSA provides intensive training and unusual experience with the living language. Analysts use their linguistic skills as well as cultural and political knowledge in the analysis of current intelligence information.

OTHER MAJORS. For graduates with degrees in other subject areas, there are limited employment opportunities in career fields unique to NSA. To be considered, you must qualify on NSA's Professional Qualification Test (PQT) which is given each fall on selected college campuses. Liberal arts, business, social science, and physical science majors who qualify on the PQT may be trained in such fields as cryptography, intelligence research, signals analysis, foreign language, and management. Please consult your Placement Office to see if the PQT will be given in your area.

BENEFITS

Because NSA's missions are vital to the security of our nation, we continually seek the highest quality of individuals to join our dedicated team. To attract and retain such people, NSA maintains a highly competitive salary structure and a liberal benefit plan, including 10 paid holidays each year, a vacation of 13 work days beginning the first year of employment, and a number of life and health insurance options.

In addition, NSA is committed to the career development of every employee. A smooth transition from school to work is assured through a combination of formal and on-the-job training. Our training facility—the National Cryptologic School—offers a wide variety of courses including managerial and technical skills. Should you wish to continue your formal education, NSA employees are eligible for tuition reimbursement at such nearby institutions as the University of Maryland, Johns Hopkins, Georgetown, George Washington, American, Howard, and Catholic Universities.

TYPICAL CAREER PATHS

At NSA, we encourage you to expand your career options—not limit them. Many senior NSA employees have had several "careers"—all within the Agency. Whether the career path you choose is technical or managerial, you'll find the chance for early responsibility and continuing challenge throughout your career. Assignments in other areas of the U.S. and overseas are available to interested NSA employees.

FACILITIES AND LIVING CONDITIONS

NSA's headquarters complex includes state-of-the-art engineering laboratories, literally acres of computer hardware, and extensive research facilities. Located midway between Baltimore, Md., and Washington, D.C., NSA is a short drive from the cultural, historic, and sports attractions of our nation's capital. Baltimore's ethnic neighborhoods, restored Inner Harbor, and professional sports events await just minutes to the north. Weekend activities abound—NSA is within easy driving distance of the beach resorts of Maryland, Delaware and Virginia, as well as the Chesapeake Bay and the Allegheny Mountains. NSA headquarters is also within easy commuting distance of urban, suburban, and rural housing, with apartments and houses available in a wide price range.

**Mathematicians, Electronic Engineers,
Computer Scientists, Linguists**

FACT:

NSA encourages you to diversify.

Many myths have arisen about careers at the National Security Agency. The <u>facts</u>, however, are these:

• NSA has broad and challenging opportunities for MATHEMATICIANS, ELECTRONIC ENGINEERS, COMPUTER SCIENTISTS, and FOREIGN LANGUAGE SPECIALISTS (particularly Slavic and other East European, Middle Eastern, and Asian languages).

• NSA opportunities allow you to <u>diversify</u> your experience. You can move around within the agency and try different disciplines—we'll even train you for each transition.

• NSA plays a key role in protecting our national security. We process foreign intelligence information. . . safeguard our government's communications. . . and secure our nation's computer systems.

• NSA work involves leading edge research and the latest technology. Our computer complex is among the largest in the world. Our work in communications sets the pace for the industry.

• NSA salaries <u>are</u> competitive.

• NSA offers much more than job security. Benefits include paid vacation and holidays, insurance options and tuition reimbursement. In addition, our employees enjoy the attractive lifestyle of the Baltimore-Washington area.

• NSA performs work that is critical to our nation's security. It is work you'll be proud to do.

For more facts, or to apply, send your resume today.

NSA. The opportunities are no secret.

An Equal Opportunity Employer.
U.S. citizenship required for applicant and immediate family members.
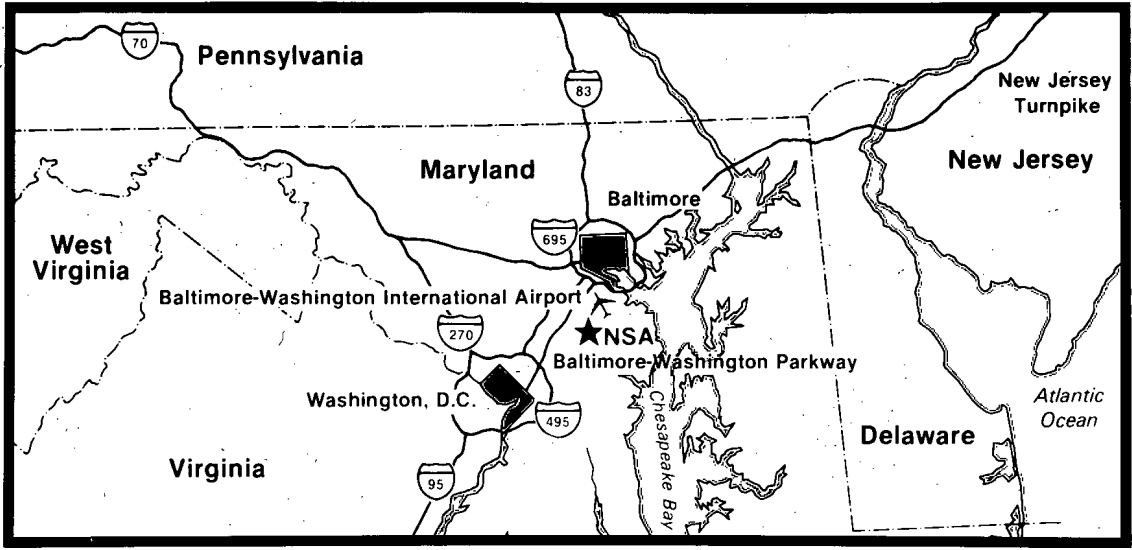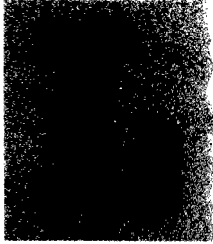
National
Security
Agency

**Answer your Career
Questions With
Intelligence.**

Enroll In the
National Security Agency's
Co-op Program.

Make The Nation's Intelligence Community Your Classroom.

ike most college students, you've probably asked yourself questions such as: "How does what I'm studying apply to the 'real world'?" "What kind of work will I be doing after graduation?" Or even, "Is what I'm majoring in what I really want to do?"

Actual work experience would help you answer these questions. One way to get this kind of experience—while you're still in college—is through the National Security Agency's Cooperative Education Program.

You probably haven't heard much about the National Security Agency (NSA), but we are a vital part of the nation's intelligence community. NSA's mission is three-fold: to analyze foreign signals, provide communications security for our government, and establish computer security for federal systems.

While much of NSA's work is necessarily secret, the Co-op Program provides a way for you to be a part of it. By enrolling in the program, you will alternate semesters of study at school with work experiences (tours) at NSA.

If your major is Electrical or Computer Engineering, Computer Science or certain foreign languages (Slavic, Near Eastern or Asian), an NSA co-op tour is a rare opportunity to gain practical and challenging experience in your field. It's also an opportunity to take part in work that is so important it's a matter of national security.

Explore A World Of Unheard Of Possibilities.
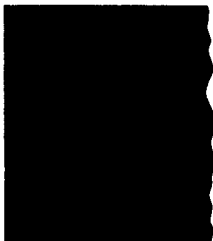
ational Security Agency's Co-op Program will give you the experience you need to evaluate your course of study and make sound career decisions. Beyond this, it will open up a new world of possibilities.

In addition to seeing the subjects you're studying come to life, you'll be exposed to exciting applications. In the technical areas, this could include such things as electro-optics, graphics and super computers that you haven't even imagined.

Students majoring in languages will find a very different way to utilize this background and will be able to improve on their linguistic skills while keeping abreast of world activities.

Because of the unique work that NSA does, you'll find an impressive variety of opportunities and assignments from which to select. If your interest lies in the realm of high technology, few organizations offer you such a wide range of options.

To help you get the widest exposure to opportunities in your field, NSA offers you a different work experience every tour. What's more, you help to select the areas in which you'll be involved.

The work that NSA does is exciting. An important part of it is protecting our nation's vital communications systems. The applications extend to satellite communications, telecommunications, and radio—in short, the entire radio frequency (RF) spectrum of electromagnetic waves.

We are not permitted to tell you all the exciting possibilities that await you here at NSA. But as an NSA co-op, you'll be in a good position to explore them.

NSA Puts The Most Advanced Technology Within Your Reach.

ational Security Agency's unique mission requires the continual development of very sophisticated and uncommon technologies, often years in advance of their use in commercial practice.

Working on the very frontiers of communications and information processing requires an enormous amount of highly sophisticated equipment. As an NSA co-op, you will find that you have constant access to all the equipment you need for hands-on applications.

To give you just one example, NSA is working on new devices to make the government's telecommunications secure. This effort, among other things, requires the development of standardized cryptographic chips which can be designed into emerging telecommunications systems. The task is an enormously challenging one—the kind you can always expect to find at NSA.

In addition to helping develop complex applications, you will be working—side-by-side—with the people who are creating significant advances in technology. Frankly, they are some of the most creative and brilliant minds in your field of study. You couldn't ask for better, or more challenging, teachers and colleagues.

"There's no doubt about it, NSA is on the leading edge of technology. And I feel I'm really a part of it."
—E.E. Major
Drexel University

Put What You're Studying To The Test.

A t NSA, you will have the chance to apply what you've been studying in the classroom to "real world" problems. Your capacity for problem-solving and creativity will be challenged, perhaps as never before.

At the core of NSA's Co-op Program is an important tutoring concept. This means that during every tour you will be assigned to work with a selected professional in your field.

The NSA Co-op Program is based on a series of progressive, planned and supervised experiences. Your work will become increasingly complex and involve greater amounts of responsibility with every tour.

From your first day on the job, you'll be involved in actual projects that relate to your field. This hands-on approach provides you with the surest way to learn. It also let's you learn at a rapid pace, with the reassurance of knowing that help is close at hand should you need it.

Co-op students will work with NSA professionals and other students in a team approach to specific tasks. You'll understand many of the practical applications of what you're studying in college. You may even discover a whole new field of specialization while working at NSA. Many of our co-ops have!

Depending on your interests, your assignments could include—

Electrical and Computer Engineering. The building of special purpose computers, antennas, and radar systems. Pattern recognition, telemetry analysis, the design, development, testing and evaluation of electronic communications systems. These multi-disciplinary assignments extend to such rapidly advancing areas as optics, lasers, image simulation, acoustics, microprocessors, CAD/CAM, VLSI design, and analog and digital electronics.

Computer Science. Applications programming, the design and implementation of software systems such as data base management systems, real-time systems, networking and distributed processing systems. Other developing areas include computer security and graphics.

Languages. We are looking only for majors in a Slavic, Near Eastern or Asian language. You'll be transcribing, translating, analyzing or reporting on material that involves matters of utmost concern to the security of the United States of America.

There is no better or more interesting way to really learn the nuances of the language you are studying than to work as an NSA co-op.

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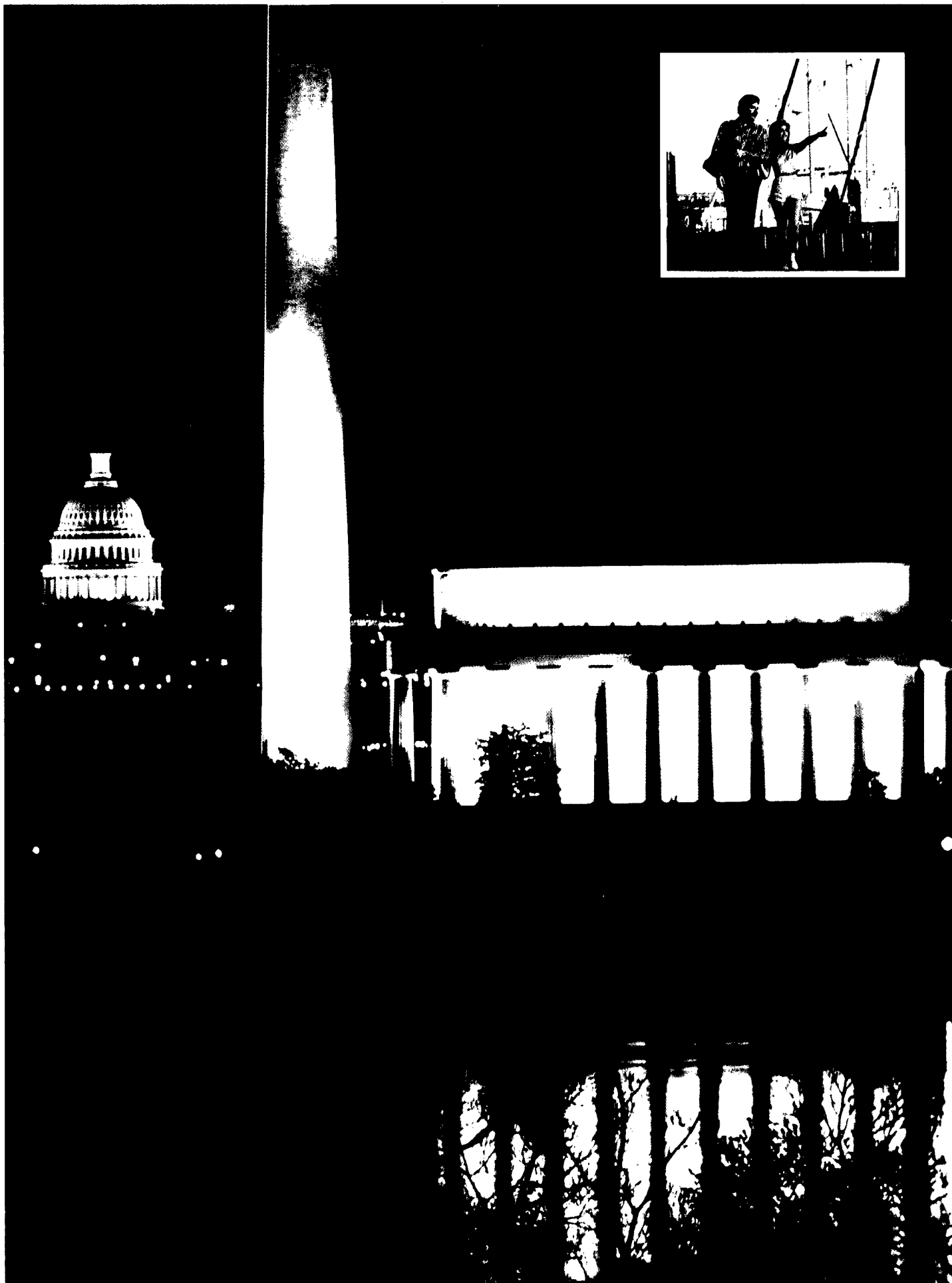
You'll Feel Right At Home Here.

As an NSA co-op, you'll have no problem fitting right in. One reason is that many NSA employees were co-ops themselves. They know what it's like and are eager to show you the ropes.

Another reason you'll feel right at home is the Friendship Co-op Association. Through it, you'll meet many students from across the country, whose background and interests are similar to your own. That means you can count on having a large group of friends from the minute you arrive!

The Co-op Association can also arrange housing for you. The co-op housing is much like what you've enjoyed at school—complete with roommates to share your experiences.

The Co-op Association also has regular monthly meetings to present special seminars, hear guest lecturers, and plan group activities.

As an NSA co-op, you'll be working and living in one of the most exciting areas of the country—midway between the port city of Baltimore and the nation's capital, Washington, D.C.

In Baltimore, you can visit Harbor Place, a dazzling collection of shops and fine restaurants. Or you can tour the National Aquarium, take in a Broadway play, or root for the Baltimore Orioles, Stars or the Blast.

Washington, D.C. is just as exciting! On top of seeing the monuments and historic sites, you can explore the many galleries and museums, enjoy the symphony at the Kennedy Center, or go shopping in historic Georgetown. And for sports fans, there's the Redskins, hockey with the Capitals and basketball with the Bullets.

This ideal location also puts you between the Atlantic coast beaches and the Allegheny mountains. That means you can do anything from backpacking and skiing, to sunbathing and sailing.

NSA's Co-op Program Offers You More Advantages.

The most important thing you'll get out of your co-op experience is a real sense of direction, not to mention a real head-start on your career. That puts you years ahead of your classmates.

One co-op put it this way: "Thanks to the program, I can really see what I want to do with my major. And I won't have to waste a lot of time looking for a job after graduation."

But there are other benefits, too. Your co-op experience can add up to a higher starting salary on your first job, wherever it might be. This is certainly the case if you decide to join NSA after graduation. Most of our co-ops do!

As an NSA co-op, you'll be earning while you learn. In addition to your salary, you'll have all the benefits of being a full-time employee including: vacation and sick pay, membership in the group health and life insurance plans, the credit union and recreational programs. NSA also helps pay travel expenses between work and campus.

There are several fine colleges and universities in the area for graduate work, and NSA has a number of educational programs to assist you in enhancing your skills and knowledge. A limited amount of support is available for tuition assistance.

Get The Experience You Need, Starting Now.

National Security Agency's Co-op Program will give you the practical experience you need to make sound career decisions. If this is what you're looking for, you should consider enrolling as soon as possible.

The NSA Co-op Program requires a minimum of 52 weeks of work experience, on an alternating schedule, and many of our co-ops accumulate 18 months or more.

You can apply as early as the end of your freshman year in college, even though your co-op tour may not begin until after your sophomore year. The reason that you should apply early is the lengthy processing time required for all applications.

To qualify, your major should be Electrical or Computer Engineering, Computer Science or Slavic, Near Eastern or Asian Languages. You, and all members of your immediate family, must be U.S. citizens, and you should have a GPA of at least 3.0 (on a 4.0 scale).

Why not start finding the answers to your career questions **now**? We'd be glad to answer any questions you might have about the Co-op Program or you can contact your co-op coordinator. If you'd like, we can also send you an application form. Because requirements for co-op programs vary with each school, your application and transcripts must be submitted through your co-op coordinator on campus. For answers to additional questions, you may contact NSA by writing:

National Security Agency
Attn: M322 Co-Op
Fort Meade, MD 20755-6000

NATIONAL SECURITY AGENCY

TECHNICAL INTEREST SURVEY FOR ENGINEERS

NAME: _____   UNIVERSITY: _____

CAMPUS PHONE: _____   MAJOR GPA: _____

1. What is your major field of study?_____ OXX

2. Besides your major field, in which other fields do you have work experience or course work significantly surpassing that required for your degree?   (mark all that apply)

150 ___ ELECTRONIC ENGINEERING		160 ___ MATH	
151 ___ MECHANICAL ENGINEERING		161 ___ CHEMISTRY	
152 ___ INDUSTRIAL ENGINEERING		162 ___ PHYSICS	
153 ___ MATERIALS ENGINEERING		163 ___ COMPUTER SCIENCE	
154 ___ COMPUTER ENGINEERING		179 ___ OTHER (_____)	
155 ___ ELECTRICAL ENGINEERING (power)			

3. Place check marks beneath the percentages indicating the approximate amount of time you wish to spend in each of the following areas during your initial assignment. (Total should add to 100%).

	00%	25%	50%	75%	100%
DESK WORK	___ 110	___ 111	___ 112	___ 113	___ 114
SOFTWARE LAB	___ 120	___ 121	___ 122	___ 123	___ 124
HARDWARE LAB	___ 130	___ 131	___ 132	___ 133	___ 134
TRAVEL	___ 140	___ 141	___ 142	___ 143	___ 144

4. In which portion of the working spectrum would you like to spend your initial assignment? (mark two choices)

189 ___ ADVANCED OR PURE RESEARCH
190 ___ APPLIED RESEARCH
191 ___ ENGINEERING DESIGN AND DEVELOPMENT
192 ___ PROJECT MANAGEMENT
193 ___ PRODUCTION CONTROL AND MANAGEMENT
194 ___ QUALITY CONTROL AND ANALYSIS
195 ___ TESTING
196 ___ SYSTEM LIFE CYCLE COST ANALYSIS AND CONTROL
197 ___ CONTRACT MANAGEMENT
198 ___ SYSTEM ANALYSIS AND ACQUISITION PLANNING
199 ___ OTHER: (specify) _____

5. From the attached list, write the letters of the two general areas (A through K) which interest you the most (in order 1=highest):

      1 ____   2 ____

6. From the same list, write in order (1=highest) the numbers of the five specific areas (200 through 999) which interest you the most:

      1 ____   2 ____   3 ____   4 ____   5 ____

7. From the same list, write the letters and/or numbers of the five areas (A through K or 200 through 999) in which you are definitely NOT interested.

      1 ____   2 ____   3 ____   4 ____   5 ____

A. COMMUNICATIONS THEORY
- 200 DISCRETE TIME FILTERING
- 201 DIGITAL COMMUNICATIONS
- 202 DIGITAL SIGNAL PROCESSING
- 203 ANALOG SIGNAL PROCESSING
- 204 MODULATION TECHNIQUES
- 205 DETECTION THEORY
- 206 ERROR DETECTION AND CORRECTION
- 207 ERROR PREVENTION TECHNIQUES
- 208 MULTIPLEXING/SWITCHING THEORY
- 209 SYNCHRONIZATION TECHNIQUES
- 210 SPEECH ANALYSIS AND PROCESSING
- 211 SIGNAL BANDWIDTH COMPRESSION
- 212 INFORMATION THEORY
- 213 ANTI-JAM TECHNIQUES
- 214 LOW PROBABILITY OF INTERCEPT TECHNIQUES
- 219 OTHER(specify)_____

B. COMMUNICATIONS SYSTEMS (experimentation and applicati
- 300 PACKET SWITCHING NETWORKS
- 301 TELEPHONE SYSTEM DESIGN
- 302 SATELLITE SYSTEMS
- 303 WAVE PROPAGATION and TRANSMISSION LINES
- 304 ANTENNAS
- 305 HF COMMUNICATIONS
- 306 MICROWAVE COMMUNICATIONS
- 307 DIGITAL DATA NETWORKS
- 308 RADAR
- 319 OTHER(specify)_____

C. COMPUTER SYSTEMS
- 350 COMPUTER SYSTEM INTEGRATION (through hardware)
- 351 COMPUTER SYSTEM INTEGRATION (through software)
- 352 COMPUTER NETWORK DESIGN (local and distributed)
- 353 DISTRIBUTED PROCESSING
- 354 SPECIAL PURPOSE COMPUTERS and COMPUTER ARCHITECTURES
- 355 COMPUTER SECURITY (operating systems, data bases, etc.
- 356 COMPUTER INTERFACING (software, hardware)
- 357 ARRAY PROCESSORS and PARALLEL PROCESSING
- 358 ENHANCED PERSONAL COMPUTERS
- 369 OTHER(specify)_____

D. CIRCUIT LEVEL DESIGN
- 400 ELECTROMAGNETIC INTERFERENCE (EMI) DESIGN (TEMPEST)
- 401 RADIATION HARDENED TECHNOLOGY AND EMP DESIGN
- 402 SUBSYSTEM DESIGN
- 403 INTERFACE DESIGN
- 404 ANALOG DESIGN
- 405 MICROPROCESSOR APPLICATIONS
- 406 DIGITAL DESIGN
- 407 MODEM DESIGN (modulators and demodulators)
- 408 ANALOG-TO-DIGITAL INTERFACE
- 419 OTHER(specify)_____

E. DESIGN AND FABRICATION OF INTEGRATED CIRCUITS
- 500 DEVICE AND PROCESS DESIGN
- 501 SILICON FOUNDRY
- 502 LSI (LARGE SCALE INTEGRATED CIRCUIT) AND VLSI DESIGN
- 503 MICROPROCESSOR DESIGN
- 504 CELL FAMILY DEVELOPMENT
- 505 DEVICE DEVELOPMENT AND TESTING
- 506 FABRICATION RESEARCH
- 507 SEMICONDUCTOR PROCESS ENGINEERING
- 508 SEMICONDUCTOR TECHNOLOGY ENGINEERING
- 509 FAILURE ANALYSIS
- 519 OTHER(specify)_____

F. LOGISTICS SUPPORT
- 600 PLANT DESIGN AND OPERATION
- 601 PRODUCTION LINE DEVELOPMENT AND CONTROL
- 602 OPERATIONS RESEARCH
- 603 SYSTEMS MAINTENANCE
- 604 SYSTEM INSTALLATION
- 605 TECHNICAL WRITING AND DOCUMENTATION
- 606 COMPUTER AIDED INSTRUCTION/TRAINING
- 607 BUSINESS MANAGEMENT
- 608 COST ESTIMATING
- 619 OTHER(specify)_____

G. HARDWARE SUPPORT
- 630 SYSTEM LEVEL MECHANICAL LAYOUTS AND DESIGN
- 631 HUMAN ENGINEERING (ergonomics)
- 632 CHASSIS AND SINGLE UNIT DESIGN
- 633 ELECTRONIC PACKAGING
- 634 INSTRUMENTATION DESIGN AND INTEGRATION
- 635 AUTOMATIC TEST EQUIPMENT DESIGN AND INTEGRATION
- 636 HARDWARE INTEGRATION PLANNING
- 649 OTHER(specify)_____

H. SOFTWARE ENGINEERING AND SUPPORT
- 660 COMPILERS AND ASSEMBLERS
- 661 CAD/CAM DEVELOPMENT
- 662 DATABASE MANAGEMENT AND DESIGN
- 663 COMPUTER GRAPHICS DEVELOPMENT
- 664 DIAGNOSTIC SOFTWARE DEVELOPMENT AND IMPLEMENTATION
- 665 APPLICATIONS SOFTWARE DEVELOPMENT
- 666 HARDWARE SIMULATOR DEVELOPMENT
- 667 OPERATING SYSTEM DEVELOPMENT
- 668 SOFTWARE INTEGRATION PLANNING
- 679 OTHER(specify)_____

I. OPTICS
- 700 INTEGRATED OPTICS
- 701 OPTICAL PROCESSING
- 702 FIBER OPTIC SYSTEMS
- 703 ELECTRO OPTICS
- 704 CONVENTIONAL OPTICS SYSTEMS
- 705 LASER SYSTEMS
- 706 OPTICAL COMPUTING
- 707 OPTICAL RECORDING AND STORAGE
- 719 OTHER(specify)_____

J. MATH
- 800 CODING THEORY (linear, adaptive, etc.)
- 801 PROBABILITY THEORY
- 802 ALGEBRA
- 803 LINEAR ALGEBRA
- 804 STATISTICS
- 805 NUMBER THEORY
- 806 MATHEMATICAL LOGIC (boolean algebra)
- 819 OTHER(specify)_____

K. ADVANCED TECHNOLOGIES AND TECHNIQUES
- 900 SPREAD SPECTRUM
- 901 HIGH SPEED INTEGRATED CIRCUITS AND LOGIC
- 902 ARTIFICIAL INTELLIGENCE
- 903 CRYOGENICS AND JOSEPHSON JUNCTION TECHNOLOGY
- 904 CHARGE COUPLED DEVICES
- 905 RECORDING TECHNOLOGY
- 906 PATTERN RECOGNITION (optical, audio, and digital)
- 907 ACOUSTIC SIGNAL PROCESSNG
- 908 MILLIMETER WAVE TECHNIQUES
- 909 ADVANCED MAN TO MACHINE INTERFACES
- 910 HIGH RELIABILITY COMPONENTS
- 911 VERY LOW POWER CIRCUITRY
- 919 OTHER(specify)_____