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ORGANIZATIONAL STRUCTURE AND OPERATION OF DEFENSE/AEROSPACE INFORMATION CENTERS IN THE UNITED STATES OF AMERICA

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SUMMARY

This paper, prepared jointly by the Defense Technical Information Center (DTIC) and the National Aeronautics and Space Administration (NASA), addresses U.S. Government aerospace and defense information centers. Discrete sections of the paper describe DTIC and NASA in terms of their history, operational authority, information services provided, user community, sources of information collected, efforts under way to improve services, and external agreements regarding the exchange of documents and/or data bases. Contents show how DTIC and NASA provide aerospace/defense information services in support of U.S. research and development efforts. In a general introduction, the importance of scientific and technical information and the need for information centers to acquire, handle, and disseminate it are stressed. The paper concludes with observations that have been drawn from U.S. experience in operating these centers.

INTRODUCTION

During the late 1950s and early 1960s, the United States became increasingly concerned with the vital role played by science and technology, not only in the nation's economy and welfare, but also in national security. A subcommittee of the Senate Committee on Government Operations conducted a long, interrelated series of studies and hearings dealing with the management of scientific and technical information (STI). In 1961, they reported "precipitous R and D growth" but "no complete inventory . . . of the Federal Government's program in research and development . . . ." The late Hubert H. Humphrey, then a U.S. Senator and Chairman of the Subcommittee on Reorganization and International Organizations, opened the 1961 report with a straightforward statement that included the following:

> The initial aim of research and development is to generate helpful information. If good scientific work is done, but information does not flow promptly about it and from it, much of its value may be dissipated.
>
> Information is the crucial means to the end. The goal is progress in military and civilian scientific technology. The means is the circulation of facts about how this goal is being approached. Throughout the process, the management of information may crucially affect how fast and how well successive aims are reached.[1]

Mr. Humphrey played a major part in convincing federal agencies to institute STI programs to avoid overlap and duplication of federal research and development (R&D) programs.

In 1963, the President's Science Advisory Committee observed that communication is an essential part of research; if an agency sponsors research in support of the agency mission, it ought also to allocate resources to support the communication necessary for effective conduct of that research.[2] In 1965, a report produced for the Committee on Scientific and Technical Information (COSATI) restated this principle as follows: "the development of scientific knowledge depends on the communication of new theories and new experimental observations to others."[3] To accept this point of view was (and is) to recognize the essentiality of effective information management in S&T progress and in the efficient use of R&D resources.

During 1963 and 1964, the Department of Defense (DoD) and NASA made important advances in STI management. In 1965, the Committee on Government Operations reported gains by "the Federal Government's largest program of science and technology information" and cited cooperation between DoD and NASA as "the most important bilateral information effort in the Federal Government today."[4]

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The 1965 report generated from a COSATI study of national S&T document handling systems enelyzed plens end proposals that prscsded it.[3] According to that report, ths S&T informetion end documentetion problsm had ssveral componsnts.

S&T INFORMATION/DOCUMENTATION PROBLEMS

(1965 COSATI REPORT FINDINGS)

- Increesing numbers of users and ussr rsquirements.
- Increesing numbers of documents/information.
- Difficulties in the existing system (which consisted of many independent units)
- Non-epplicetion of new technologiss.
- Insufficient long-renge planning.

The study recognized "a need for the development of national policy rsgarding S&T information end documentation problems," arrived et the assumption that "information centers are a permanent part of eny nationel system(s) for handling scientific and technicel information," and recommended "a national document-hendling systsm in scisnce and technology."

More recently, government budget restraints heve prompted studies eimed at quantifying the value of information services. One such study was done by King Research, Inc., end involved en analysis of Depertment of Energy (DoE) deta base products and services.[5] The study celculeted thet $2.8 billion of savings could be ettributed to the sxistence of the DoE products end services. Besed upon DoE's R&D budget for FY 1981, that reseerch savings emounts to about a 68 percent increese in productivity. Studies liks this indicete that money epproprieted for technicel information services hes a large return.

PART A

DEFENSE TECHNICAL INFORMATION CENTER

I. HISTORY

The Defense Technicel Information Center (DTIC) wes established to support Defense-related reseerch, development, test, end evaluetion (RDT&E) ectivities. Its history can be traced beck to 1945 when ceptured technicel documents wsre acquired by the Air Documents Division of the Air Materiel Commend Intelligence Department. Two yeers leter the Central Air Documents Office wes formed.

In 1951, Secretery of Defense George C. Mershell combined Air Force end Nevy efforts to establish the Armed Services Technicel Information Agency (ASTIA) to serve ell three militery departments end their contrectors. By 1963 there were 700,000 titles in ASTIA's collection (with more than one million annuel requests for documents); at thet time, operetionel control for ASTIA wes tra sferred to the Defense Logistics Agency (DLA) under the policy guidance of the Office of the Director of Defense Research and Engineering (ODDR&E); end ASTIA beceme the Defense Documentation Center (DDC).

In 1979, DDC's name wes changed to DTIC to symbolize an expended mission thet includes providing direct informetion system end date bese support to the Office of the Under Secretery of Defense for Reseerch end Engineering (OUSDR&E) and to Principal Steff Assistents of the Office of the Secretery of Defense (OSD) in coordinating the overell Scientific end Technicel Information Program (STIP).

II. OPERATIONAL AUTHORITY

DTIC is under the operetionel control of the Director, Defense Logistics Agency, end under the policy guidance of OUSDR&E. In 1962 Dr. John S. Foster, then Director of Defense Reseerch & Engineering (DDR&E) (OSD), esteblished the position of Director of Technicel Informetion which was the focel point for detailed policy guidence to what was then DDC. This position is known today es the Director of Research and Technicel Information in ODUSDR&E.

On October 2, 1981, a DoD Directive on the subject of STIP was signed into effect (DoDD 5100.36).[6] This directive prescribes composition and policy of the STIP; defines a program for carrying out OSD's responsibility for the STI function; and outlines DTIC's mission, responsibilities, and functions.

DTIC FUNCTIONS

- Centralized DoD Document Services
- Centralized DoD Data Base Services
- DoD Information Analysis Center Support
- DoD Technical Library Support
- Application of Advanced Information Science and Technology
- Related STI Support Services

DoD directives[7-11] require that each R&D project and work effort be documented in a standardized format including relevant information such as objective, approach, and conclusion.

DOD DIRECTIVES/INSTRUCTIONS

- DoD Directive 5100.36, Defense Scientific and Technical Information Program
- DoD Instruction 7720.13, Research and Technology Work Unit Information System
- DoD Instruction 7720.16, Research and Development Planning Summary (DD Form 1634) for Research and Development Program Planning Review
- DoD Instruction 5100.66, Establishment of Policy for, and Administration of, Independent Research and Development Programs (IR&D)

III. INFORMATION SERVICES PROVIDED

DTIC provides its registered users with a wide range of products and services from the following four major data bases it maintains for DoD.

DTIC'S MAJOR DATA BASES

- R&D Program Planning (R&DPP)
- R&T Work Unit Information System (R&T WUIS)
- Independent Research and Development (IR&D)
- Technical Reports (TR)

The R&DPP data base contains program planning management information at the project and task level.

SAMPLE R&DPP DATA ELEMENTS

Program Element/Project/Task Area Number
Title
Responsible DoD Organization (Name and Address)
    Responsible Individual
    Telephone Number
Objective and Approach
Plans
Programs and Accomplishments

The Work Unit Information System date base is a collection of technically oriented summaries that describe research and technology projects currently in progress at the work unit level. Information includes the what, where, when, how, at what costs, by whom, and under what sponsorship research is being performed.

SAMPLE WUIS DATA ELEMENTS

Title
Performing Organization
Principal Investigator
Descriptors
Program Element/Project Number/Task Number
Objective

The IR&D date bese contains descriptions of the technicel progrems being performed by DoD contractors thet ere not wholly funded by DoD but thet are considered proprietery informetion end exempt from disclosure under the Freedom of Information Act.[12]

SAMPLE IR&D DATA ELEMENTS

Project Number/Title
Organizetion
Problem
Objective
Approech
Progress

The TR deta bese is e collection of bibliogrephic citetions to formelly documented scientific end technicel results of Defense-sponsored reseerch, development, test, end eveluetion. These reports ere essigned en AD (eccessioned document) number for ennouncement, retrievel, end request purposes end ere cetegorized by subject into a two-level errengement consisting of 22 mejor subject fields end 188 releted subject groups. DoD wes instrumentel in the COSATI development of field and group codes. These provide the besis for subject grouping of reports for ennouncement end distribution purposes.[13, 14]

SAMPLE TR DATA ELEMENTS

Report Number
Title
Author
Performing Orgenizetion Neme end Address
Distribution Stetement
Key Words
Abstrect

Figure 1 shows the number of records in DTIC's four dete beses. Figure 2 shows input figures for these dete beses for the pest 6 fiscel yeers. Totel input into the systems hes increesed by 17% during thet period.

There ere three besic weys to access these dete beses.

PRODUCTS AND SERVICES

- Demend
- Autometic
- Defense RDT&E On-Line System (DROLS)

DEMAND SERVICES

DTIC fills requests for technicel reports in both peper copy end microform on demend. (See Figure 3, TR Hardcopy end TR Microform.) Demand bibliogrephies which list technicel reports releted to e specific subject ere elso conducted et the user's request. To prepere these bibs e computer seerch is mede of the TR data bese end reports thet fit peremeters of the seerch ere listed with control numbers, ebstrects, end other descriptive dete. (See Figure 4, Custom Bibs.)*

Menegement informetion reports ere similerly provided on demend but the seerch involves one or more of the three menegement dete beses (WUIS, R&DPP, end IR&D). (See Figure 5, Custom Bibs.)*

Reference services include the essistence DTIC provides users end others in identifying documents end in loceting e source for documents thet DTIC does not heve.

AUTOMATIC SERVICES

Registered DTIC users receive DTIC's TR ennouncement publicetion, the Technicel Abstrect Bulletin (TAB), eutometicelly. Published every 2 weeks, TAB lists new classified end unclessified/limited scientific end technicel reports eccessioned by DTIC during the processing cycle. Reports ere grouped into the subject fields end groups mentioned ee ier. TAB is eveileble in peper copy, in microfiche, or on megnetic tepe. Beceuse of the neture of defense progrems end the reports these progrems generete, distribution of TAB is limited.[15, 16]

TAB Indexes are issued with TAB to essist in identifying eccessions of perticuler interest. There are seven TAB Indexes erranged by the following: Corporete Author-Monitoring Agency, Subject, Title, Personal Author, Contrect Number, Report Number, end

* On Figures 4 end 5, "Remote Betch" reflects ceses where users generete e bib on line but request thet it be printed et DTIC end meiled to them. The "Direct Responses" cetegory represents those instences in which the user's needs ere setisfied completely by the printout genereted on line et the user's site.

RECORDS IN DTIC DATA BASES

AS OF 31 MARCH 82

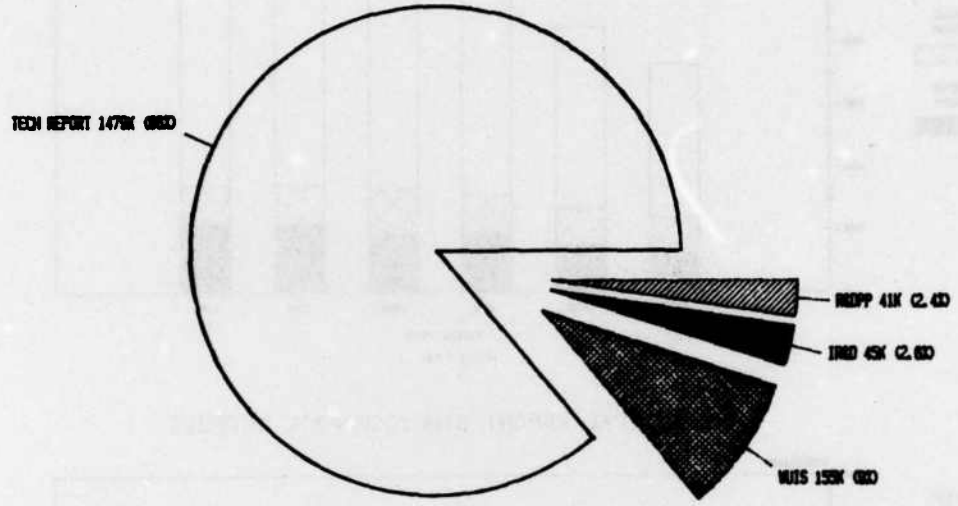

Fig. 1

INPUT TO DTIC DATA BASES

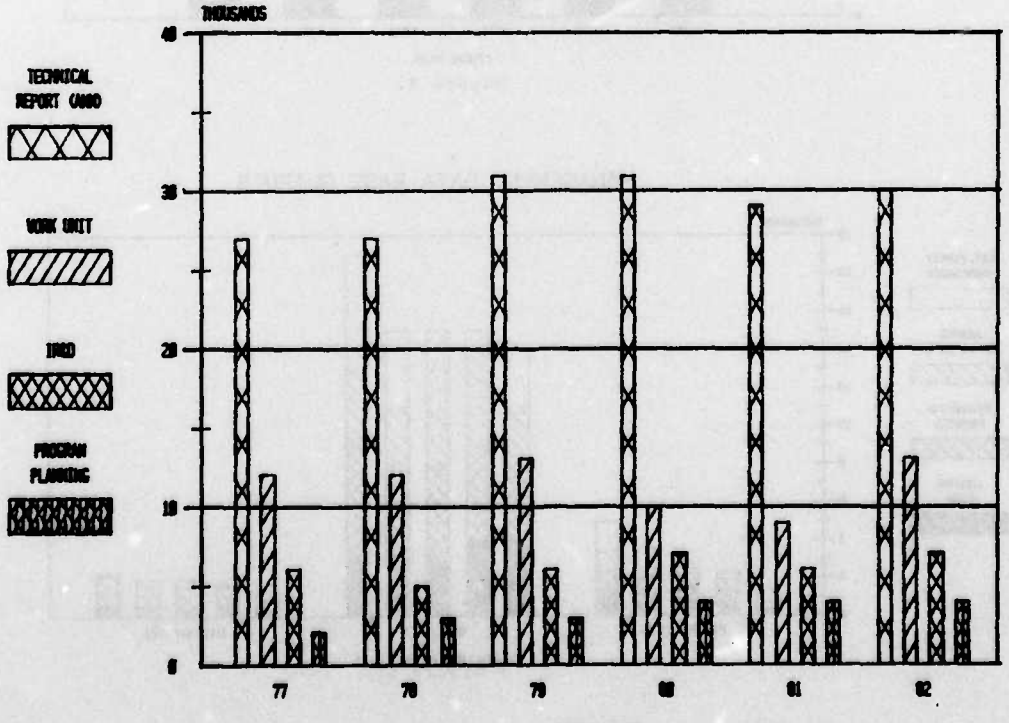

Fig. 2

TECHNICAL REPORTS DISTRIBUTED

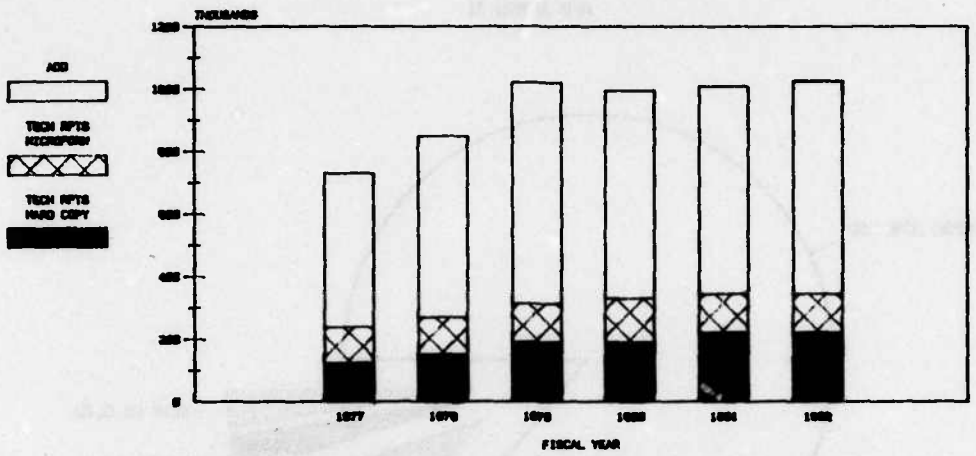

Figure 3.

TECHNICAL REPORT BIBLIOGRAPHIC OUTPUTS

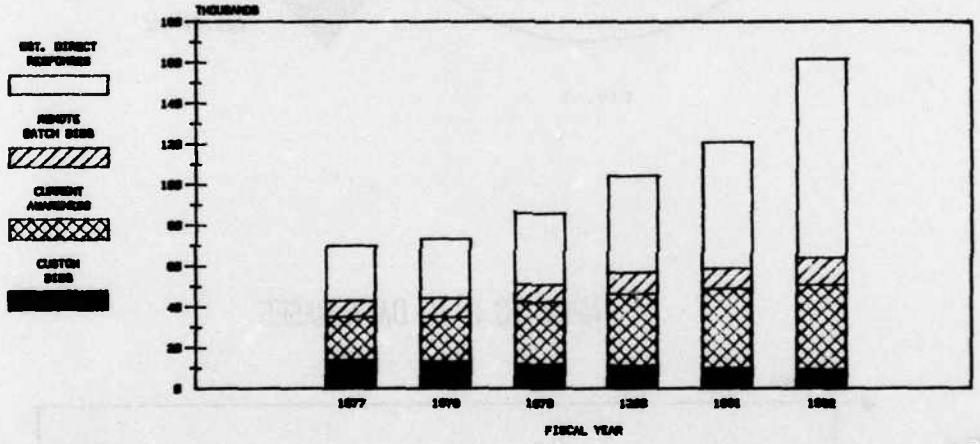

Figure 4.

MANAGEMENT DATA BASE OUTPUTS

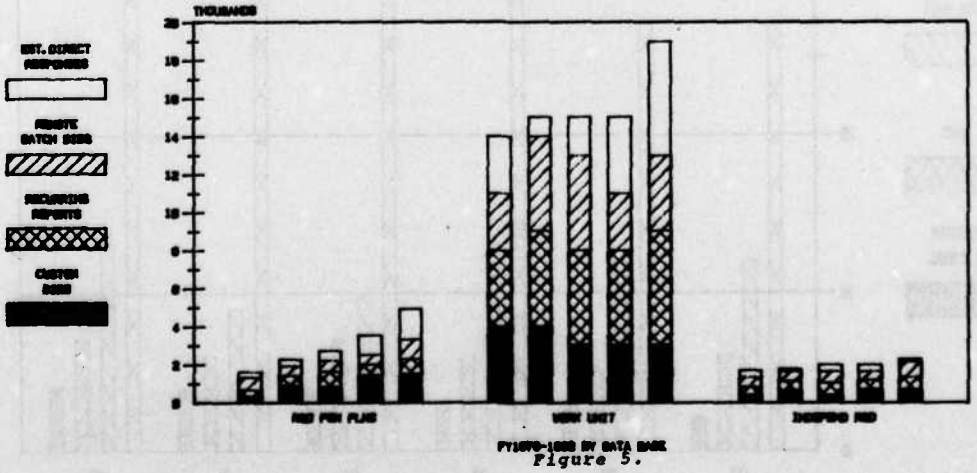

Figure 5.

Ralaasa Authority. Each raport antry liete the AD numbar and the subject fiald/group whara tha complata announcamant appears in TAB.

Evary 2 waaka the Automatic Documant Dietribution (ADD) Program providas microfiche copias of nawly accessioned technical raporte to program participants by comparing a subject interest profile they have astablishad with racantly acquirad reports. (Sea Figura 3, ADD.) The charge per raport providad is ona-third the demand cost.

DTIC'a Current Awareness Bibliography (CAB) Program also usas a subject intarast profila to datarmine which documents accessionad during tha previous 2 waaks fall within tha scopa of a participant's recurring subject needa. A papar copy bibliography is ganerated automatically and sant fraa to DTIC registerad usars. Figura 4 shows the succass DTIC has had incraasing thasa automatic, and lass costly to generata, products.

Racurring managament information system reports are compiled monthly, quartarly, semiannually, or annually from the Work Unit, Program Planning and Indepandant Research and Developmant Data Bases. Formats for tha automatically issued, profila-basad raports are designad by tha recipient organizations. Saarch profiles are kapt on a maater fila which is updated monthly to make changes or modify the profiles for individual raports. Figure 5 shows the numbers of Recurring Reports generatad by data base for tha last 5 fiscal yaars.

DROLS

The DROLS network links ramota tarminals scattered from coast to coast to DTIC's cantral computer in Alaxandria, Virginia. Typically, tarminal sitas consist of a cathode ray tube (CRT) data entry and display unit and a paga printer. A magnatic tape cassatta system is also availabla for use with the terminal. Users quary tha eystam by typing commands and appropriata data on a kayboard associated with the CRT. Usars may switch from one data basa to anothar in pursuit of information; thay may activate the paga printer to print out a paper copy of the CRT display, or they may racord information on a tape cassette syetam for later review and printing.

Remote terminals offer users immediate access to relevant information. They can order bibliographies, management data reports, and technical reports diractly from thair terminals. Currant and proposad terminal stations include tha Deputy Under Secretary of Defensa Research and Enginearing (Research and Advanced Technology); Army, Navy, and Air Force facilities; Information Analysis Centars (IACs); other federal govarnmant organizations; DoD contractors; and ragional service facilities for ragistared DTIC usars in Los Angalas, California, Washington, D.C., and Boston, Massachusatts.

DROLS TERMINAL SITES

Army	100
Navy	48
Air Forca	40
DoD/DoD Agancies	13
Foraign Govarnmanta	1
Information Analysis Cantars	10
DTIC In-houee	56
Other Government Agancias	22
DoD Contractore	226
TOTAL	516

Originally, accaee to DROLS was via leasad, dadicatad linas only, for both classifiad and unclaseifiad tarminals. All tarminals wara raquirad to ba UNIVAC aquipmant. Savaral yaars ago a "dial-up" capability bacama availabla for unclassifiad usars that parmits the uea of a variety of terminals to accass DROLS and to pay only for actual "hook-up" time. Figure 6 ahows the dramatic increasa in DROLS usars that tha dial-up capability has permittad.

RDT&E ON-LINE SYSTEM GROWTH

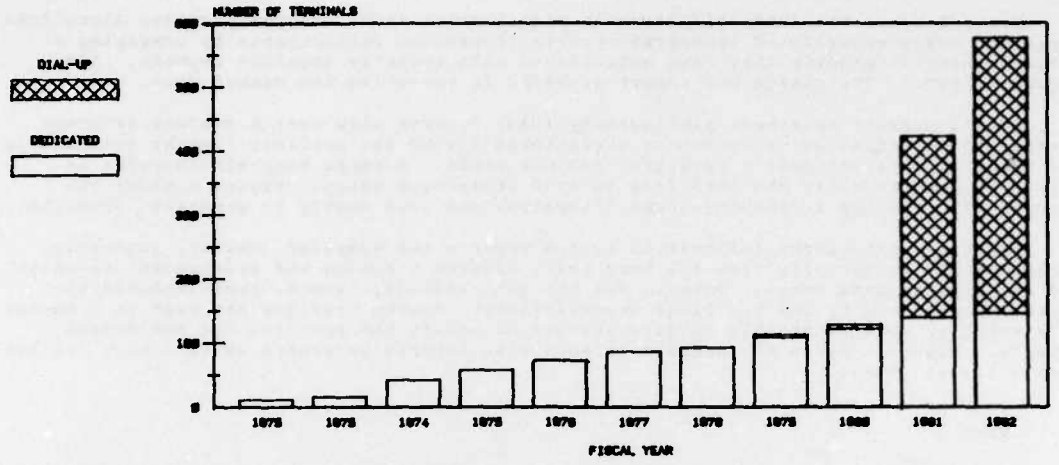

Fig. 6

IV. COMMUNITY OF USERS

Research and development activities within the United States government and their associated contractors, subcontractors, and grantees with current government contracts are eligible to receive most of the information from the DoD data bases located at DTIC. Research and development organizations without current contracts may become eligible for service under various potential contractors programs if sponsored by a military service. Certain collections at DTIC contain proprietary data or information compiled for the specific purpose of DoD management decisions which are made available to Defense components only.[15, 16]

USER COMMUNITY

DoD AND DoD CONTRACTORS

OTHER GOVERNMENT AGENCIES

LIMITED SERVICE TO PUBLIC

About 2950 organizations are now registered for DTIC services. Most are in-house DoD or DoD contractors. Some are from other government agencies and their contractors.

REGISTRATION

Registration for DTIC's services involves the completion of two forms.

REGISTRATION FOR STI SERVICES SAMPLE DATA ELEMENTS

Part I -	Requester Application	Organization Name Address Prime Contract/Grant or Program Number/ Expiration Date Security Classification Required
Part II -	Prime Contractor Approval (If Part I is a Subcontractor)	Organization Name Address Subcontract Number/Expiration Date
Part III -	Certification and Approval	Organization Name Address Name/Title of Approving Official

In addition, contractors complete a facility clearance register.

FACILITY CLEARANCE REGISTER SAMPLE DATA ELEMENTS

Pert I - For Contrector	Neme of Facility Address to Which Clessified Meterial Will Be Forwarded. Neme/Title of Requester
Pert II - For Cognizant Security Office	Verificetion Thet Facility Listed in Part I Is Cleered To Receive end Store DoD Clessified Material Up To end Including (Classificetion) Name of Cognizent Security Office Address Name/Title/Signeture of Certifying Official

REFERENCE/PUBLIC SERVICES

Each year DTIC responds to e lerge number of letters from individuels from industrial, research, educationel, end stete end local government organizations asking for information concerning the eveilability of technicel reports to the general public. Seerches of the DTIC collections and other sources ere performed; the requester is edvised if the particuler reports ere eveileble, end how and from whom copies mey be obteined.

When e DoD-sponsored report is not evaileble to the public, DTIC forwerds a copy of the requested report with the originel request to the militery controlling office to determine if the distribution limitetion cen be waived. If DTIC receives euthority for public releese, the report is provided to the Netionel Technicel Information Service (NTIS), Department of Commerce. (Through e contrectuel agreement with DTIC, NTIS provides the public copies of DoD R&D reports thet ere unclessified/unlimited. More then helf of DTIC's technicel reports become available to the general public via this route.) If selective release to the individuel requester is epproved, the controlling office will furnish the document unless meny requests for the same document ere involved. If releese is not epproved, the military controlling office so notifies the requester. As time permits, DTIC refers requesters to other useful sources as well.

NTIS ennounces the Defense reports, elong with reports generetes by R&D ectivities of other government departments, in its publicetion, Government Reports Announcements end its Indexes, end offers the reports for public sele.

FOREIGN REQUESTERS

DTIC does not serve foreign requesters.[10] Release may be erranged only through the foreign releese orgenizations of the respective militery services. DTIC does, however, provide essistence to requesters through correspondence end telephone contacts with foreign embassies.

When en inquiry is received from e foreign requester (government, industry, reseerch or educetionel institution, or en individuel), DTIC identifies the information or document requested and determines its eveilebility end the source from which it mey be obteined. Availebility informetion is sent with the originel inquiry to the eppropriete embassy.

LEGAL QUESTIONS

In connaction with litigetion, government ettorneys often contect DTIC to request information concerning announcements of specific reports to the general public end disposition of patent ownerships resulting from perticuler reseerch projects sponsored or cosponsored by DoD. DTIC mekes e seerch end provides epplicable report numbers, computer printouts, end catalog cards containing bibliogrephic dete. This service is subject to e cherge based on personnel costs.

RELEASE CONTROLS

DoD Directive 5200.20, Distribution Stetements on Technicel Documents,[10] provides thet ell tachnical documents generatad by DoD progrems end eligible for distribution outside DoD will be reviewed by tha controlling DoD office to determine their aveilebility. They ere merkad either es epproved for public releese (distribution unlimited) or es limited distribution. In the letter cese, requests from the generel public and foreign requasts must be referred to the controlling DoD office. This has no connection with sacurity classification.

V, SOURCES OF INFORMATION COLLECTED

Primery contributors ere individuels end organizetions within DoD and under contrect to DoD. Other contributors ere NATO member countries and certain U.S. Government agancies that have spacial agreements with DoD.

Dafansa laboratories end their contrectors are required to deposit information (both unclassifiad end classified, including secrat and restricted dete) into DTIC's deta besas for subsequent retrievel by eligible users.

R&D Planning Summaries (DD Forms 1634) are submitted annually and reflect the current situation on the date of preparation.[7] An R&D Planning Summary must be submitted for any new project included in the project listings supporting each budget submission. Revisions or changes are required only where a change in funding has had a significant impact on the technical content of the project or task area.

Data elements concerning research and technology efforts at the work unit level are reported on DD Forms 1498 (R&T Work Unit Summary) either on magnetic tape, on punched cards, or on the paper forms themselves.[8] Work unit data is submitted to DTIC within 15 working days after the local action which it reflects has occurred within performing organizations.

Legible paper copies of technical reports are required to be forwarded to DTIC on completion of specific phases of all projects. For example, reports may be prepared quarterly, annually, or when all research has been completed, in which case copies are forwarded to DTIC no later than at the time of primary distribution.[6]

DTIC uses source-prepared summaries (DD Forms 1473 - Report Documentation Page) as the basis for its processing, announcing, and cross-referencing to the work unit and program planning data banks.

VI. EFFORTS UNDER WAY TO IMPROVE SERVICES

DoD IAC SUPPORT

As part of its expanded role in DoD's science and technology program, DTIC has been assigned as the program manager for nine DoD contractor-operated Information Analysis Centers (IACs). (There are 10 other DoD-sponsored IACs.) This includes providing necessary support and services related to improved coordination, planning, and integration of DoD-funded IACs and effecting and supporting a comprehensive program to improve IAC visibility, effectiveness, and use of the IACs in support of DoD and federal scientific and technical programs. It also involves developing and providing systems and services to assist or supplement IAC operations or programs to effect and promote resource sharing, joint approaches to common objectives and problems, and information exchange among the IACs, DTIC, and other components of the STIP.

Information Analysis Centers (IACs) are authoritative focal points of expertise in the field of S&T in which a particular center operates. As such, their contributions to DoD and its contractors in solving technological problems and in planning advanced defense systems are substantial.

SAMPLE IAC FIELDS OF SPECIALIZATION

Reliability Analysis
Chemical Propulsion
Infrared Physics
Nondestructive Testing
Tactical Weapons Guidance and Control
Metal Matrix Composites
Metals and Ceramics
Thermophysical and Electronic Properties

An IAC conference organized by DTIC in December of 1981 provided an excellent forum for reviewing and analyzing the IAC program. Management and operations of IACs were explored and recommendations were made to ensure a dynamic, integrated information system.[17]

PRODUCTIVITY TRENDS/DEVELOPMENT EFFORTS

DTIC has always prided itself on maintaining an impressive productivity record. Figure 7 measures productivity in its most basic form, total accomplishments by total resources. Workloads shown are those being measured by DLA's Performance Evaluation Reporting System (PERS), and total obligational authority is measured in constant FY 73 dollars. While DTIC's workloads for the past 9 years have increased by 60 percent, funds available have been reduced by almost 30 percent in real terms.

DTIC TOTAL OBLIGATIONAL AUTHORITY

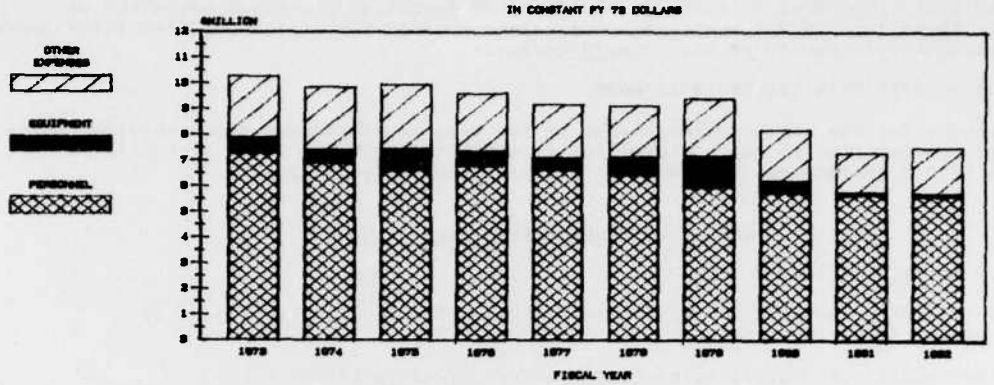

Fig. 7

Future plans call for DTIC to function as a DoD technical information development laboratory and to provide technical and management information support to R&D managers in the office of the Deputy Under Secretary of Defense, Research and Engineering.

MAJOR DEVELOPMENT PROJECTS

- Free Text Experiment
- Experimental DoD R&D Management Support Facility (DTIC ADPE Time Sharing Service)
- Expanded Retrieval Training Program for DROLS
- Data Base of Data Bases
- Multimedia Input Project

Free text searching has been used successfully by others and could provide more comprehensive search results at DTIC. It has been implemented in all three of our management data bases. The concept involves placing single terms or words extracted from the title and abstract portions of the data bases in the inverted file for retrieval purposes. We've recently begun free-text searching for the unclassified title in the TR data base. This is expected to improve the effectiveness and efficiency of the acquisitions, cataloging, and reference functions in DTIC. If the title search capability proves successful, future plans include expanding the free-text capability to include the abstract portion of the record.

We are continually adding data bases to DTIC's ADPE Time Sharing Service (DTSS). This service uses a UNIVAC 1108 computer, standard UNIVAC software, and proprietary software packages including a data management system developed by Battelle-Columbus Laboratories. Users of the service communicate by direct dial-up or by using a time-shared communications network.

DTSS provides a rapid means for DTIC to develop and support new unclassified information systems for DoD. In addition, it permits us to experiment with and develop scientific and technical information systems and services as well as internal support for DTIC operations.

Data bases either established or being developed on DTSS include: a Manpower and Training Research Information System (a data base to track research efforts in manpower and training), a tri-service manufacturing technology data base, the Research Case Assignment and Litigation Locator legal data base, a serials data base for DTIC's internal reference library, and a DoD Conferences and Symposia Data Base.

Given the prominent place DROLS occupies in DTIC's service spectrum, and given the significant increases in its users made possible through the unclassified dial-up capability, efforts are under way to develop supplemental DROLS training. The approach will likely be modular to accommodate both dedicated and dial-up sites, and it will be configured so as to be cost effective and to provide self-instruction training for instructors and data base users in the field.

Presently, DTIC is defining data elements to constitute a single, centralized, comprehensive record of both bibliographic and non-bibliographic scientific and technical data bases sponsored by DoD. This data base of data bases will provide a single-source reference point and will be made available through a paperbound directory and an interactive information storage and retrieval computer system updated annually.

To facilitate DTIC's obtaining R&D information, we have experiments under way that may permit us to be more flexible in the form and format of technical documents we accept. Three input media to be tested are camera-ready document copy, microfiche input, and combination documents of hard copy/microfiche.

SHARED BIBLIOGRAPHIC INPUT NETWORK

Support for the early dissemination of the results of science and technology efforts and the incorporation of this information into DTIC's system is being accomplished through DTIC's operational Shared Bibliographic Input Network (SBIN).

GOALS OF SHARED BIBLIOGRAPHIC INPUT

DoD On-line Catalog

Central Clearinghouse of Availability Information and/or Acquisition of Defense-sponsored Documents

Printouts of Individual Holdings of Libraries/Information Centers

Support for Local Storage of Restricted-Access Material Using the Same System

SBIN permits participants to input bibliographic records directly from their remote terminals at libraries and information centers. DTIC provides the centralized computer capability and shares with the remote sites the input of information to create an on-line Defense catalog and referral service.

VII. EXTERNAL ARRANGEMENTS

As a "closed system" for DoD, DTIC does not have the authority to enter into external arrangements.[18, 19]

One aspect of the DTIC mission, however, involves the primary distribution to designated recipients within the United States of technical reports obtained from the United Kingdom, Canada, and Australia, or from any other countries with whom similar bilateral agreements for routine exchange of R&D reports may be executed in the future.

Reports thus transmitted to DTIC for primary distribution are also processed into our system for subsequent secondary distribution to qualified DTIC users. Prior to making either primary or secondary distribution of classified reports, DTIC ascertains that the recipient's facility clearance is established at the necessary level.

PART B

NASA SCIENTIFIC AND TECHNICAL INFORMATION PROGRAM

HISTORICAL DEVELOPMENT

Tha National Aeronautics and Space Administration (NASA) was creeted by en ect of the U.S. Congress in 1958 following a national debate which centered on the deeirability of concentreting the American efforts in space in ona egency. The succsssful Russian leunching of Sputnik, tha world's first artificiel earth satellite, in October 1957, provided furthar impetus to this debata.

On October 1, 1958, NASA was astablished by the Netional Aeronautice and Space Act of 1958 es the succassor to the Netional Advisory Committaa for Aeronautics (NACA), which since 1915 had provided fundemental contributions to tha prograss of eeronautical science in the United Statee. Under terme of the Space Act, the property, facilities, and personnal of NACA were absorbed in the eetabliehment of the new Netionel Aaronautics and Space Administretion.

In eddition to the four national aeronautical fecilitiee and 8,000 employees provided by NACA, NASA absorbed within e year the Jet Propulsion Laboratory and its essets, the Project Vanguard personnel from the U.S. Navel Research Laboratory, and tha Development Operetions Divieion of the Army Ballistics Missile Agency, which was headed by the world-renowned rockat enginaer, Wernher von Braun. Other important organization centers were later created from the nucleus of transferred elemente or by the ecte of the U.S. Congreee.

ESTABLISHMENT OF THE TECHNICAL INFORMATION PROGRAM

The new NASA organization continued to use the eetablished NACA technical information proceeeing system which had been designed for internal NACA use. This syetem wae compoeed of e cerd cetalog collection of 1,800,000 cards, threa indax-announcement publicetions, and e collection of NACA and othar technicel reports. The index-announcement publications were the Technicel Publicetions Announcemente (TPA) which listed NACA, British and AGARD documents but contained no indexes, an "Acceesion List" for distribution to tha internal NACA family, which included the non-NACA documents that hed been ecquired and indexed for the NACA system, and finally, the "Indax to NACA Technicel Publicetione" which wee ieeued on an annual basis. Catalog cards wera prepared from tha "Accession List" and distributad to the NACA centers. Tha Index wes arranged according to a NACA classification scheme end contained a personal author index.

For two yaars NASA continued to use the information syetem begun by NACA. Howevar, with the repid expansion of the space program that wae occurring at that time, the limitetions of the NACA system es a way to handle tha axpected volume of information in e timely manner soon became apparent. Whereas NACA had done most of its rasearch work in its own leboretories and employed virtually no outeide contractore, NASA, while continuing to utilize its own laboretoriee, enticipated the employment of es many ee 400 prime contractors and 10,000 subcontractors. The reports to be produced undar these edvanced reeearch contrects would eeverely overload the NACA system.

In May 1960, the first lerge step to creete e compreheneive scientific and tachnicel information program in NASA to eccomplish whet the Space Act of 1958 required, namely, thet NASA "provide for the widest precticable and eppropriete disseminetion of information concerning its activitias and reeults thereof" wee made. An Office of Technicel Information and Educetion Programs wes established. Melvin S. Dey, Director of technical information at the former Atomic Energy Commiesion, wes hired ee Deputy Director of that offica. In 1962 Dey wee named ae the Director of the newly organized Office of Scientific and Technicel Information. The NASA STI Program developed five opereting "principles" which epplied to thie program then and continue, in updeted form, to epply today:

1. Locel accese for the ultimate consumer;
2. Centralization only when neceeeary;
3. Timeliness;
4. Cooperetion and collaboretion with exieting information eyetems;
5. Variety of producte end eervices for e veriety of ueer publics.

1. Under the firet principle, locel eccaes for the ultimate coneumer, the NASA Scientific and Tachnicel Information (STI) Program triee to provide the ecientist, the engineer, the laboratory worker, etc., with whatever information producte, tools, end servicae he needs locelly to do his job. He should not have to cell e Weehington or othar remote office for help excapt in unusual ceses. Tachnicel raporte, literature announcement and abetrect journels, microfiche of documents recently ecquired, eccess by locel terminals to the NASA data baee, end eelective document ennouncemant sarvices ere examplee of locel sarvices end tools.

2. Centrelizetion only when neceseery, the eecond principle is e corollary of the first. It emphesizas the leest centrelizetion in the information program thet is precticel, using centrel processing only as it ie demanded for efficiency, economy, or speed. Examples of centrelized ectivities are ecquieition, eveluation, duplicete checking, abstrecting, cataloging, indexing, end microfilming. Such work is performed at a central locetion under NASA Headquarters, et the NASA Scientific end Technicel Information Fecility. NASA field installetions and rsearch centers ers spared these tasks. One central computer eervices the information retrievel neede of ell NASA installations by permitting locel eccass to the NASA data base vie the NASA/RECON system. The hours of computer operation et the NASA Fecility ere so arranged that they overlep the hour of work et the various NASA Centers loceted in four different time zones.

3. Timelinass, tha third principle, is assential. Since the establishment of the NASA Scientific and Technical Information Facility, there has bean a requirement to processs and announce all reports obtained within four to six weeks after their recaipt. The microfiche of rsports and papers announced in tha abstract

journels, Scientific and Technicel Aerospace Reports (STAR) or International Aerospace Abstrects (IAA) are scheduled for delivery to the NASA Centers one week before the delivery of these journals. Literature searches requested from the NASA Facility are produced overnight and mailed within 48 hours. RECON commands from field-located terminels are enswered in two or three seconds. Timeliness gets new information into hands of the people who need it without deley so as to eliminete eny undesirable duplicetion and to incorporete es quickly es possible the thinking and results of others in their own or releted fields.

4. The fourth principle, cooperetion and collaboretion with existing information systems, is of criticel importance to the program's cost. NASA works closely with STI programs in other U.S. Government Agencies such es the Defense Technicel Information Center of the Department of Defense, the Technicel Information Service of the Department of Energy, and the National Technicel Information Service of the Depertment of Commerce. NASA wes among the first to provide end receive bibliogrephic information on magnetic tape to eliminete needless duplication.

NASA elso works closely with specielized professional information organizetions. Thus grew the division of labor between NASA and the Americen Institute of Aeronautics end Astroneutics (AIAA). Beginning in January 1963, with NASA contract support, AIAA hes provided in its Internetional Aerospace Abstrects (IAA) coverage in depth of the world's published litereture while the NASA program has concentreted in the Scientific end Technical Aerospace Reports (STAR) on similsr coverege of the world's report litersture. Both the NASA and AIAA journels utilize the same indexing system. Citations to each journel ere eveilable on the main NASA deta base. Publication of IAA on elternating semimonthly schedule with STAR and other arrangements have been made. A unique feeture of both journels for the early period was the inclusion of indexes in eech issue and the timely, i.e., quarterly, cumuletions of the indexes. The use of computer wes instrumental in producing these timely indexes and leter, through its on-line remote searching cepability, allowed the quarterly cumuletive indexes to become simply ennual indexes.

5. The lest principle promotes e variety of tools and services to suit e variety of user publics. Pleinly no one tool, no one product, no one service can possibly setisfy the information needs of ell users who are composed of libreriens, information scientists, physicel and biologicel scientists, engineers in a variety of disciplines, manegers, end university reseerchers, ell in various kinds of governmental, contractor and subcontractor organizetions.

THE NASA SCIENTIFIC AND TECHNICAL INFORMATION FACILITY

While the principle of decentralizetion is and hss been an integral part of the NASA information program, it was elso reslized that there are numerous functions that cen be performed most efficiently and economicelly in a centrel locetion. These functions included the ecquisition end processing of the world's eerospace report litereture. In 1961 NASA management decided to establish the NASA Scientific and Technicel Information Facility (STIF) in the Wsshington metropolitan area. To operate the Fecility, it was elso decided to contract with en information-system organizetion experienced in the abstrscting and indexing of scientific documents end utilization of edvanced information techniques and machines. The edvantage of contracting as opposed to setting up an in-house operation wes that it eccelereted the process of establishing the NASA Fecility by getting the immediete services of specialiste, working quarters, and standing equipment and machines and bypassing the delays which would ensue in justifying, recruiting, selecting, hiring, and training e large in-house steff. The burgeoning growth of the American spece program in 1960-1961 creeted an avelanche of technicel information which proved impossible to control under the old system edopted from the NACA deys but which required en immediete solution. It should be noted thst the decision to operate an information fecility on a contrect basis wes e major deperture from the then current prectices of other U.S. Government egencies.

In December 1961, Documentation, Inc., e Bethesde, Maryland, firm was selected competitively es the first contractor to operete the NASA information fecility. The NASA Scientific and Technicel Information Fecility itself wes established in January 1962 end became opsretionel in July 1962 on the premises of the contrector. By 1966 the space occupied by NASA STIF had become inedequate and so larger quarters were secured and leesed in College Perk, Meryland. Documentation, Inc. (Doc. Inc.) end Leesco Inc. continued es the contractor-operetor until 1968 when NASA conducted another competition and selected Informatics, Inc. as its contrector.

In 1975 the NASA STIF wes relocated to its present site in Linthicum Heights, Maryland, near the Baltimore-Wsshington Internationel Airport. Since 1980, the contrector of thet fecility has been the Planning Research Corporetion's Government Information Systems Company, McLean, Virginie. It employs epproximately 180 peopls including professionel searchers, technicel information specialists, librarians, computer experts, and various machine operetors.

While operations at the NASA Scientific and Technical Information Fecility are cerried out by contractor personnel, policy and close technical guidance ere provided by NASA's Scientific and Technicel Information Branch (STIB). This Branch has its own specielists responsibls for the major functionel arees of the NASA STIF, who ars in daily contact with ths Fecility managers to ensurs smooth operetions, solve emerging problems, and plan for future improvements. STIB's staff currently numbers 24.

OPERATIONAL AUTHORITY

In the National Aeronautics and Spacs Act of 1958, the U.S. Congrses mandated in Section 203 of that Act:

> The Administration, (i.s., NASA) in ordsr to carry out ths purpoes of thie Act, shall --
>
> 1. plan, direct, and conduct asronautical and epacs activities;
> 2. arrange for participation by the scientific community in planning ecisntific meaeurements

and observations to be made through use of seronautical and space vehicles, and conduct or arrange for the conduct of such measurements and observations; and

3. provide for the widest practicable and appropriete dissemination of information concerning its activities and the results thereof.

Thus Section 203 of the Space Act authorized the National Aeronautics and Space Administration in the field of scientific and technical information to establish and operate a NASA-wide program to ensure the fulfillment of information needs of all participants in NASA's research, development and technical programs, and to ensure ready access to NASA-generated scientific knowledge to non-NASA qualified users in the scientific, industrial, and educational communities.

NASA's Scientific and Technical Information Program goals provide for the design and development of an integrated, comprehensive system to ensure that NASA's work and its findings are reported both comprehensively and selectively; that all suitable information is provided to organizations and interests that can properly utilize it; that any of its scientific and technical information can be identified and made available in a meaningful form to specialized endeavors that in any way promote the national aeronautics and space programs; and that NASA programs receive full benefit of related technical information generated by the activities of others.

The program encompasses four principal work areas:

1. publications effort -- designed to provids both basic and supplementary interpretative publication of all information accruing directly from NASA's undertakings;
2. the acquisition and bibliographic control of all information resulting from, or necessary to support, the varied sfforts in ths aeronautical and space sciences, and the provision of NASA-wide reference services;
3. NASA participation in and support of scientific symposia and technical mestings; and
4. development activities in the field of scientific communication and documentation to promote the first three areas.

INFORMATION SERVICES AND PRODUCTS PROVIDED

Over the course of 20 years, the NASA scisntific and technical information program has dsveloped and refined information tools, products, and ssrvices which have proven beneficial.

1. STAR

Scientific and Technical Aerospace Reports (STAR) is the hallmark component of the comprehensive National Aeronautics and Space Administration information system covering aeronautics, space and supporting disciplines. STAR is the guids to thousands of current technical reports issued by organizations thoughout the world. Twice a month it publishes abstracts and indexes of current reports acquired by NASA and processed for inclusion in the NASA scientific and technical data base. STAR announces the following types of publications:

- o NASA, NASA contractor, and NASA grantee reports;
- o Reports issued by other U.S. Government agencies, domestic and foreign institutions, universities, and private firms;
- o Translations in report form;
- o NASA-Owned patent and patent applications;
- o Dissertations and theses.

STAR publication began in 1963. Nearly 500,000 citations have been published in STAR to January 1982. New citations are being added at the rate of 24,000 per year. STAR provides five indexes: subject, personal author, corporate source, contract number, and report/accession number. It is issued to NASA Center libraries and to other organizations registered with NASA. Subscriptions to STAR and copies of individual issues and its index are publicly available from the U.S. Government Printing Office.

2. IAA

International Aerospace Abstracts (IAA) is a semimonthly document announcement journal that provides abstracts and indexes of published documents in fields releted to serospace research and technology. NASA supports the preparstion of IAA which has been a publication of the American Institute of Aeronautics and Astronautics (AIAA) since 1961. IAA lists journal articles, conferance papers, books, and other forms of published literature that have been selected and processed by AIAA for incorporetion into the NASA deta base. IAA and STAR complement each other in the coverage of eerospace literature. As of January 1982, IAA had published epproximately 666,000 citations of the published aerospace litereture. At present about 37,000 citations are announced yearly. AIAA regularly scans hundreds of domestic and foreign journals known to be fertile sources of aerospace literature es well as publishers' lists and similar records of new publicetions. IAA essentielly contains the same indexes that ere in STAR. IAA and its cumuleted index are aveilable by subscription from the AIAA subscription office.

3. LSTAR

Limited Scientific snd Technical Aerospace Reports (LSTAR) is a quarterly document announcement journel thet provides abstracts and indexes of security-clessified and limited-distribution documents ecquired by the NASA Scientific and Technical Information Fecility. Speciel euthorisetion is required for access to the classified or limited-distribution documents found in LSTAR. Since 1972, about 4,000 citations have been announced in LSTAR which cites primarily reports of NASA-sponsored research and development. LSTAR includes five indexes: subject, personal euthor, corporete source, contract number, and report number. LSTAR is published in January, April, July, and October. To be eligible to request eecurity-classified documents announced in LSTAR, requesters must have been certified:

- To require eccess to security-clessified information in the performance of official U.S. Government-sponsored work; end
- To maintain edequate st-rage fecilities for security-classified information and documents.

Citetions in LSTAR do not conta'n clessified information.

4. Technicel Documenta

Technicel documents prepared by NASA, NASA contrector employees, and NASA grantees are collected by NASA's Scientific and Technicel Information Branch (STIB) for issuance es NASA formal reports. NASA formal reports are essigned by the staff of NASA's Technicel Publicetions Section to one of six aeries:

- NASA Speciel Publications which record acientific and technicel information from NASA programs, projects, and missions for presentation to readers of diverse technicel backgrounds. NASA Speciel Publicetions often ere concerned with subjects of substantiel potential public interest.
- NASA Reference Publicetions which ere compiletions of scientific and technicel data and information deemed to be of continuing reference velue in particular subject ereaa or disciplines.
- NASA Technicel Pepers which record the findings of significant work conducted by NASA scientific end technicel personnel. Technicel Pepers ere the egency's counterpart to peer-reviewed journal articles and ere subject to professionel review controlled by the originating NASA office.
- NASA Technicel Memorandums which record scientific end technicel findinga that do not warrent or cannot be given broad disaeminetion beceuse of security or restricted-reedership consideretion.
- NASA Contrector Reports which record scientific and technicel findings by NASA-sponsored reseerch and development releted efforts thet are considered desirable for releese by NASA.
- NASA Conference Publicetions which contain compiletions of scientific end technicel papers, abstracts, or transcripts arising from conferences, symposie, speciel lecture series, seminars, and other professionel meetings thet NASA elects to publish.

5. SCAN

Selected Current Aerospece Notices (SCAN) is a semimonthly current ewerenesa publicetion. It brings to the user's ettention those documents, selected from STAR and IAA, that ere rslevant to the user's particular information interests. SCAN covers the full spectrum of eerospace information, but it subdivides that spectrum into narrower subject groupings than are provided by the cetegory division of STAR and IAA. Approximately 200 separete SCAN topics ere evailable to choose from: eech one carefully tailored to fit the needs of specielized eerospece ectivities. The number and scope of SCAN topics are not fixed; new topics are edded es the need erises and some ere elimineted or redefined es user demand dictates. Semi-monthly SCAN service is aveilable to NASA employees, other U.S. Government egency personnel, contractors, grentees, and effilieted ecedemic personnel.

6. Continuing Bibliogrephies

NASA publishes continuing bibliogrephiea in certein fields. Each bibliogrephy assembles recsnt citations on e single aerospece topic of wide interest, selected from STAR or IAA. The bibliogrephiea currently being produced are:

Aeroneutical Engineering (NASA SP-7037)
Aerospace Medicine and Biology (NASA SP-7011)
Eerth Resources (NASA SP-7041)
Energy (NASA SP-7043)
Manegement (NASA SP-7500)
NASA Petent Abstracts (NASA SP-7039)

7. Querterly Listing of AGARD Reports

A listing of AGARD reports announced in STAR is prepared on e quarterly basis. Citations and abstrects in original format are contained in the liating. No indexes ere included. The listing wes published first in September 1967. This quarterly listing is eveilable to AGARD panel members.

8. AGARD Index of Publicetions

The AGARD Index of Publicetions contains abstrects and indexea to AGARD documents published and distributed during the period covered. The first issue of the index covered the period 1952-1970, while subsequent issues have covered three-year perioda.

9. NASA RECON

NASA RECON (Remote Console) is a computsrized, online, interective system for information reaearch and retrieval. It enables users et remote locetions to communicete directly with the hoat computer et the NASA Scientific and Technicel Information Facility, conteining the central scientific and technical information deta base. RECON displeys bibliographic information in weys that help to define user rstrievel needs with maximum precision, guides the user to relevant documents through the use of Booleen logic, and permits simultaneous access for othsr users throughout the United States.

The RECON data base contains bibliographic information on well over 2,000,000 reports, journel articles, and miscellaneous documents of worldwide origin and of special intsrest to the aerospece community. The major document seriss accessibls on RECON ars:

- Scientific and Technical Aerospace Reports (STAR)
- International Aerospace Abstrects (IAA)
- Limited Scisntific and Technicel Aerospacs Reports (LSTAR)
- Unannounced limited documents

- o NASA Research and Technology Objectives end Plans Summary (RTOPS)
- o NASA Reeearch and Development Contract Search File
- o Computer Program Abetracts (CPA)
- o NASA Tech Briefs
- o NASA Library Collection

The RECON system enablee the terminal user to displey file indsxes, choose desired index terms, combine sets of documents corresponding to these terms, displey the resulting record, and print when desired. Response time is about 2 seconds and the system is capable of handling multiple collections of information, eech with its own unique vocabulary deta elements and descriptions.

10. Literature Search Service

For reseerchers who do not have eccess to the NASA deta base locelly through RECON, the NASA Scientific and Technicel Information Fecility provides individuel literature searches on request to euthorized users. In addition to the NASA date base, the STIF specielists provide NASA investigetors with searches from e variety of othsr deta bases.

11. Microfiche end Microcopy Service

Microfiche copies of documents ennounced in STAR are distributed eutomaticelly to NASA libreries. This distribution is performed semimonthly end ensures thet microfiche of documents in a particular STAR issue is evailable locally before thet STAR issue is published. This is e greet help to librerians tasked to fill requests from patrons who spot en interesting report in the STAR issue.

The NASA Scientific end Technicel Information Facility provides microfiche for all documents announced in STAR except those that are copyrighted and those that ere barred from rsproduction by unusual physicel charecteristics.

Microfiched documents ere identified in NASA announcement journels end continuing bibliogrephies by e pound sign (#) following the accession number (for example N82-12345#).

The NASA Scientific and Tschnicel Information Fecility produces microfiche for about 18,000 documents e year. Approximatsly helf of this number represents original or "master" sheets prspared by NASA STIF from hard copy and the other half represents prepared ("convsrted") sheets by NASA STIF from other microfiche. From these masters and converted fiche, NASA makes more than two million copies e yeer for eutomatic distribution to about 235 user orgenizetions.

All microfichs produced by NASA STIF conform to ths Netionel Microfilm Associetion's Industrial Standerd. They meesure 105 mm by 148 mm and contain up to 98 peges et a reduction of 24X.

NASA microfiche is delivered to e centrel point, such es the library or information center, in eech organizetion that has registered with the NASA Scientific and Technicel Information Fecility to rsceivs document delivery service. The distribution of microfiche takes three forms:

- o Automatic dietribution of all microfiche to organizetions with broad information needs;
- o Selectivs dietribution to organizetions that havs specified STAR categories es edequats to their needs; and
- o On-request dietribution to NASA, forsign exchanges, and NASA Industrial Applicetion Centers.

12. Transletion Service

The NASA Scientific and Technicel Information Program provides translation services to NASA scientists, engineers, administratore, and its other personnel on e request basis. Foreign languege reports, books, journal articlee, and officiel correspondence are translated regulerly. Capability to translete from more than 30 foreign languages into English is eveilable.

Before beginning the transletion of e technicel document, to prevent duplication, e search of ths existing recorde of NASA and other U.S. Government agencies es well es published transletion indexes is made. NASA RECON is a veluable tool in thts regard. Telephonic and written inquiries are used with other U.S. Government egencies. The number of positive "hits" found during this eearching is low: less than 2% of all requests are satisfied by translations completed or in process. However, these searches pay for themselvee over e period of time.

NASA contracts with small businese firms which ectually producs the translations. These firms maintain on-site tranelation capability for the following langueges: Russian, German, French, Italian, Spanish, Japanese, Dutch, Czech, and Portuguese. Thsy also have effiliation with free lancee in more than 20 languagee.

All NASA field centers order their transletion ssrvices from the same firms. Thie unique provieion was covered in the contract signed with eech firm. Completed translation work is returned to the field center with e copy going to the manager of translation eervice et NASA Headquarters who provides quality control to the products and is the focus for any unique transletion need, problem, or solution.

NASA translatione are dietributed in the NASA Technical Memorandum series and announced in STAR.

13. Journal Holdings for NASA Libraries

Comprehensive lietings of all scientific and technical periodicels eveilable in the NASA Heedquartere Library and the libraries of ell the field centers are combined in the Journal Holdinge of NASA Libraries which is updated annually. A subject index classifies the elphabeticelly listed periodicele in 216 broad subject categories with extreme cross referencing. The Journal Holdinge telle what periodicels ere aveilable, which librariee have them, end which iesues of eech title are held. Croes rsferences indicate superseded

and superseding relationships between titles. Copies of Journel Holdings are evailable for reference at each NASA Centsr library.

14. Research and Technology Objectives end Plans Summary (RTOPS)

RTOPS is an annual guide to NASA-sponsored reseerch in progrsss. It is a summary, with indexes, of all Ressarch and Tschnology Objectives and Plens submitted by NASA Centsrs to NASA Heedquarters for manegement review. A separate RTOP is prepared et the beginning of eech fiscal year for every ressarch project funded by NASA, which can be inhouse, through contrect, grent, or interegency egreement. RTOP Summary is an annual publication which may be purchased from the Netional Technicel Information Service. Citetions for individuel RTOPS are includsd in the computerized NASA deta base.

15. NASA Ressarch and Development Contract Search (R&DCS) File

The NASA R&DCS File contains information about NASA R&D contrects, grants, and orders issued since January 1, 1971. References to over 15,000 contracts are included in the file. The NASA R&DCS File is eveilable to NASA personnel.

NASA USER COMMUNITY

One of the principles of the NASA information program has been that of local user services. Ths products and ssrvices produced at the centrel NASA Scisntific and Technicel Information Fecility are distributed widely and mainly to local user points, such es libraries, information centers, or designated individuals acting es getekespers who, in turn, service the information needs of e large locel populetion. Thus, the number of addresses receiving NASA products and services does not begin to reflect the ectual number of ussrs.

As of Jenuary 1982, within ths NASA family of centers there were 432 addresses of local user points. A total of 194 firms, institutes, end universitiss were registered es NASA contractors. NASA products and services were provided to 229 eddresses among government egencies and to 52 government contractors. There were 1,634 other domestic organizations, principelly universities and public libreries, and individuals receiving one NASA product or another. Among those clessed es foreign users, there were 366 organizations that had signed tripartite egreements, 225 organizations clessed as bileterel exchange partnsrs, ons es e NASA contrector, end 78 forsign organizetions which were not exchange partners but to whom NASA products were supplied, principelly STAR and STAR Index. The totel of all eddresses which include organizations end individuels was 3,477 in January 1982.

SOURCES OF INFORMATION

The current sources of the information received into the NASA scientific and technical information system arc shown in Table 1.

TABLE 1
SOURCES OF NASA ACCESSIONS (1981)

Source	Accessions	Percentage
NASA (including contrectors)	15,459	24%
Dept. of Defense (including contrectors)	12,062	18%
DOE, FAA, etc.	13,085	20%
Privete Industry	161	-
Research/Acedemic Institutions	2,840	4%
Foreign Sources	5,374	8%
Library of Congress	16,452	25%
TOTAL	65,433	

This table indicetes that NASA end its contrectors end grentees in 1981 were responsible for providing 15,459 eccessions or approximately 24%. The Department of Defsnse wes responsible for 18%, and other U.S. Government depertments and agencies responsible for 20%. The number of eccessions emaneting from privete industrial sourcss, thet is, sources not supported by government funds wes 161. Research end academic institutions were the source for 2,840 eccessioned documents, or 4%. Foreign sources were responsible for 5,374 accessions or 8%. Lastly, the Library of Congress provided 16,452 accessions or 25%. The book eccessions taken from the Library of Congress MARC II are evailable to NASA librarians on NASA NALNET, ths NASA Library Network.

TABLE 2
SOURCES OF INFORMATION ACCESSIONED IN
INTERNATIONAL AEROSPACE ABSTRACTS (1981)

	Journal Articles	Meeting Papers	Mono-graphs	Confarencs Volumes	Collected Works	Total No. of Accessions
Australia	88			144		232
Austria	143					143
Belgium	16		2	1		19
Bulgaria	78					78
Canada	89		1	93		183
China Communist	169				28	197
China Nationalist	12					12
Czechoslovakia	125		1			126
Denmark	4					4
England	4,541	10	32	471	112	5,166
Estonia	3					3
Finland	3					3
France	667	47	38	64	1	817
East Germany	192					192
West Germany	1,394	126	38	295	8	1,861
Hungary	37		1			38
India	200		1	69		270
International Association for Hydraulic Research			1			1
International Association for Hydrological Sciences					1	1
International Astronautical Federation		430				430
International Atomic Energy Agency					1	1
International Council of the Aeronautical Scisnces		1		11		12
International Society *for Photogrammetry*				279		279
International Solar Energy Society				2		2
International Union of Physiological Sciences		1				1
Ireland			1			1
Israel	29				22	51
Italy	224			15		239
Japan	596		1	287		884
Latvia	162		2			164
Mexico	7					7
Netherlands	1,380	4	19	307	62	1,772
NATO		4				4
Norway	4		1			5
Poland	254			40	2	296
Rumania	45					45
Saudi Arabia	2					2
South Africa	6					6
Spain	7					7
Sweden	59					59
Switzerland	275		2	79	2	358
USSR	4,526		287	38	555	5,406
Yugoslavia	1					1
Sub-total	15,338	623	428	2,195	794	19,378
United States	9,539	1,978	112	5,042	316	16,987
Sub-total	24,877	2,601	540	7,237	1,110	36,365
U.S. Translations of Sovist Pariodicals	3,570					3,570
British Tranalations of Soviat Pariodicals	47					47
TOTAL	28,494	2,601	540	7,237	1,110	39,982

Table 2 shows tha country of origin of eccessions recaived and processed in 1981 by the American Instituta of Aaronautics and Astronautics into its abstract journal, Intarnational Aerospaca Abstracts. Of the 39,982 accessions, approximately 48% or 19,378 accessions wara from foreign sources and the balance from United Statas sources. However, if the U.S. and British produced translations wera transferred to the foreign column then 58% of the accessions would be considered as foreign.

EFFORTS UNDERWAY TO IMPROVE SERVICES

Use of the RECON online retriaval system is being axpanded to meet the requirements of a variety of organizations involved in NASA programs. This extansion is mada possible by a computer upgrade to tha IBM 4341 cless of processor units combined with new technology direct-access storage devices, specifically, the IBM 3380 disks. The new storage devices make it possible to greatly increase onlina storaga of not only traditional bibliographic, project, and contract information, but also to store online new types of data. An example is descriptions of numerical data basas located at NASA Centers or contractor sites. Treating information of this class is a naw direction for the NASA sciantific and technical information program whereby modarn methods of communicetions serve to permit switching of inquirias and electronic delivery of information. Indeed, new communicetions, photocomposition, and data-entry methods are expected to allow word-processing data-entry devicas locatad et NASA Fiald Centers to tia directly by communications linkagas into tha central bibliographic data base. Thus, another cycla of decentralization would occur whera optimum usa is made of cantralizad capabilities. Following this avolutionary change, the sama or similar tachniquas are axpected to extend prasent data bases to include full-text data. Thus, full text can be axpected to complement the numerical data bases previously noted.

Indaxing of information for ratrieval has traditionally been a specialty of information centars such as tha NASA Sciantific and Technical Information Facility. Cooperative affort based upon work done at the Defansa Tachnical Information Center will lead to machina-aided indexing and more consistent application of the controlled vocabularies developad to meat NASA requirements. Following establishment of this partially automated approach to indexing, NASA planners expect to utilize similar online dictionarias and cross reference mechanisms to assist in the information ratrieval process involving natural language and full taxt.

Anothar area of service improvement is NASA's continual modification of the scopa of its bibliographic data basas to reflect naw aerospaca diractions. For axample, increased interast in NASA programs in larga space structures rasults in naw continuing bibliographies, and new approaches toward axisting subject areas such as life sciences rasult in incraased covarage. NASA has arranged with the Library of Congress and the Amarican Instituta of Aeronautics and Astronautics for expansion of the coveraga of the fiald of lifa sciences in IAA. In 1982 the Library analysts will provida a total of 1,200 additional accessions in aarospace medicina, behavioral sciances, man/system technology and lifa support, and planetary biology. It is expected that most of thase accessions will come from the Russian published literature.

THE NASA FOREIGN EXCHANGE PROGRAM

In general, NASA makes its scientific and tachnical information available only to foreign govarnment organizations, rasearch establishments, institutas of highar learning, and international organizations which have formally egraed to furnish NASA with documants pertinent to aaronautics or spaca and their related aarth applications. Categories of documantation providad vary in each case, and a formal arranga-ment is tailored to the type, quality, and utility of the documents NASA recaives in return.

NASA seeks from its formal exchanga partnars rasaarch reports, monographs, doctoral theses, bibliographies, and information other than formally published literature, which relata to tha NASA mission and objactivas. Contributions ara continuously monitored and each formal arrangement is subjected to an annual avaluation. If tha quality and quantity of documents contributed ara much less than anticipated, NASA may modify the tarma of tha errangement or terminata it complately.

A potential exchanga candidata must provide specimens of its information products, a quantitative astimate of anticipated yearly contributions and specific indications as to which matarial NASA may copy or photograph on microfiche and make available to the U.S. public. The terms of a formal exchange arranga-ment ara negotieted for NASA by its Scientific and Technical Information Branch in coordination with the NASA International Affairs Division.

Contributions from exchanga partners ara scraened, evaluated, indexad in tha NASA information system, and when appropriate, ara announced and abstracted in STAR and IAA.

Foraign contributions accessioned in the information system ara made available by NASA directly to its family of users and through tha National Technical Information Service to the aerospace community and tha public.

Tha primary products offared by NASA in its exchange are STAR and STAR Indaxas. Exchange partners which supply both substantial and significant contributions ara offarad additional sarvicas such as automatic distribution of NASA formal saries reports in selected subject categorias and secondary request privilegae.

NASA has formal biletarel axchanga arrangements with 225 organizations in 49 countrias. Some 2,574 documents wera recaived from foraign axchanga sourcas during 1981.

In addition, a special arrangement with tha Information Retriaval Sarvice of tha European Speca Agancy (ESA) providas not only for raciprocal document axchanga, but also for tha axchanga of speciel sarvicas. Under this arrangement, NASA providas its formal earias reports and microfiche of other raports announced

in STAR and the computerized tapa indax to thasa itams for ESA's on-lina usa of tha NASA files in Europa. In turn, European users which hava complated a Tripartite Agraamant with NASA and ESA hava on-lina accass to tha NASA files maintainad by ESA in Fraecati, Italy, in exchanga for at least ona, timaly, in-ecopa tachnical report for aach hour of on-line accass time. As of May 1982, thara wera 366 Tripartite participants in 17 countries. ESA also supplias complete documant procassing, including microfiche masters, for the NASA information system on acquisitions from its Membar Statas and salactad NASA exchanges and translation services on matarials salacted by NASA.

OVERALL CONCLUSIONS

From NASA's inception in 1958, thara has axisted a broad commonality of intarests betwaen the NASA aerospace technical information program and the dafensa technical information program. A vary closa dagraa of coordination and collaboration has baen maintained in the acquisition of sciantific and tachnological raports affacting the national spaca and dafanse efforts, which have as thair primary goal the advancamant of sciantific frontiars and tha prevention of unnecessary duplication of rasearch and developmant.

The Dafansa Technical Information Centar's servicas and products ara availabla to and usad extansivaly by NASA installations, contractors, and grantaes. Department of Defansa installations, contractors, and grantaes can and do racaive similar sarvicas from the NASA Sciantific and Technical Information Facility. Examplas of reciprocal sarvices are tha dissemination of the abstract journals, preparation of litarature searches, notification of on-going research, etc.

All possible staps have baen taken to permit tha utilization by either agency of the machina-readabla products of the othar; with machina output from ona being the direct machina input to the other, duplicative procassing of common materials is minimized. Further, each contributes to the other's development of basic cataloging rulas, standardization of microficha products, assistance in thesaurus davelopment, axchange of computer tarminals to utiliza each othar's data base in litarature saarches and in other ways.

Howaver compatible tha two information systams are, there ara diffarances which must remain. The dafanse information network is huge and supports a vast array of military and civilian installations. Classified information is a vital part of tha total information data basa maintained by DTIC. NASA STIF has small holdings of classified information; nearly all its information can ba raad in tha open literature or purchased from tha National Technical Information Sarvica. The classes of information held by DTIC axhibit much broader rangas of interests than tha NASA data base. NASA's association with tha Amarican Institute of Aeronautics and Astronautics is unique, too. Foraign accessions in tha NASA data base ara much graatar than in the DTIC data base. Thus, each information system has contributions to make to tha othar and has dona so for a long tima and will continue to do so in the future.

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