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Fifth Annual Report



THE SPACE AND TECHNOLOGY TRANSFER PROGRAM

at the

University of Pittsburgh

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Submitted to

The National Aeronautics and Space Administration

June 1969



University of Pittsburgh

Pittsburgh, Pennsylvania 15213

Fifth Annual Report

THE SPACE AND TECHNOLOGY TRANSFER PROGRAM

at the

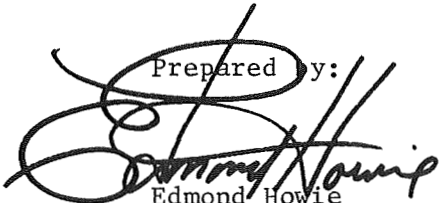
University of Pittsburgh
Knowledge Availability Systems Center

Submitted to:


The National Aeronautics and Space Administration

June 1969

Prepared by:


Edmond Howie
Assistant Director

Approved by:


Allen Kent
Director

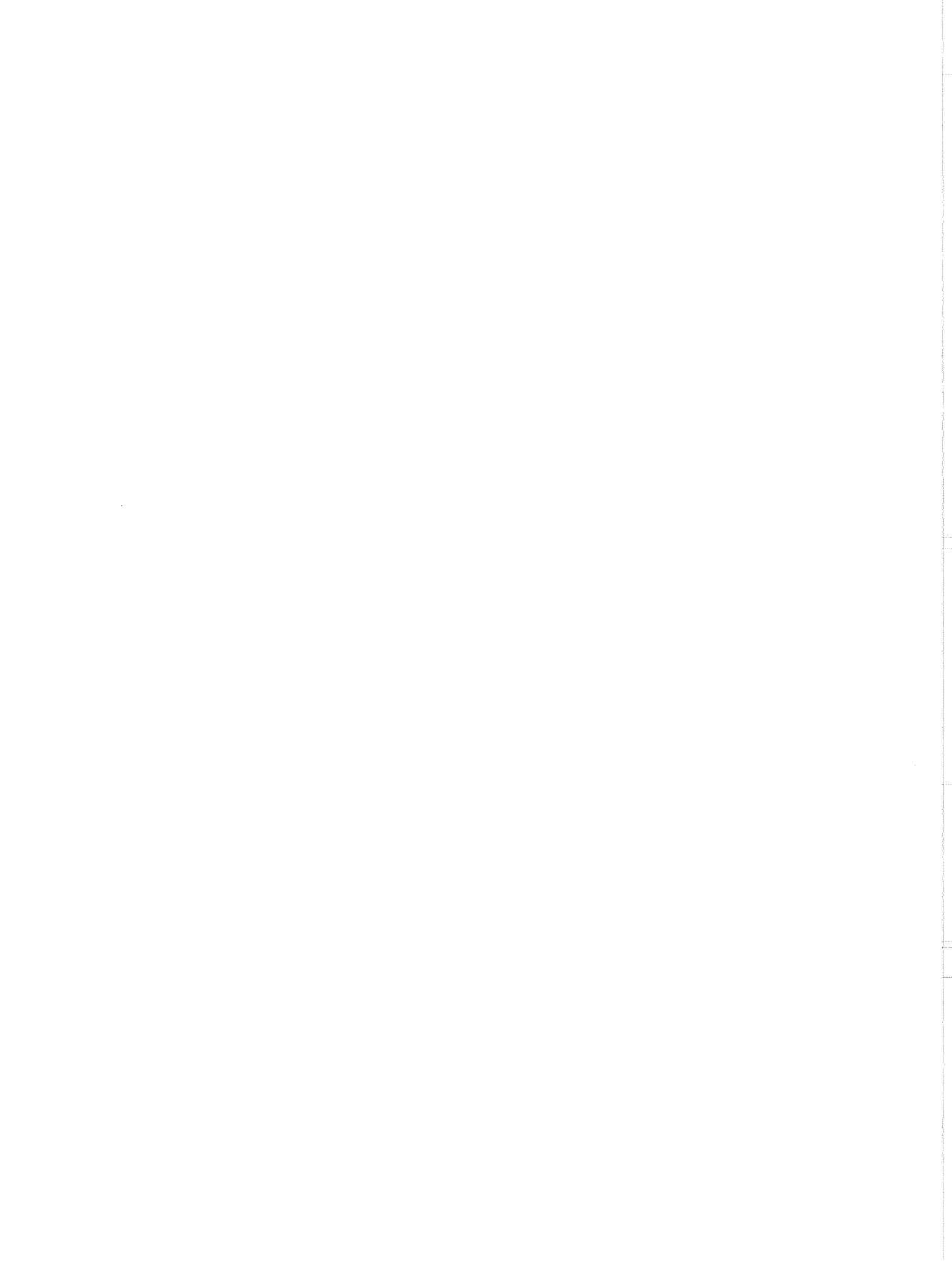


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I. INTRODUCTION

This report is submitted in fulfillment of the requirements of the National Aeronautics and Space Administration Contract No.

NSR 39-011-089.

The period of performance, as stated in Article II of the Contract, is March 1, 1968, through February 28, 1969. However, the calendar period spanned by various statistics in this report will vary (depending on available records) but in all cases will include the time span of the Contract.

The report is prepared in seven sections: Section I is intended to introduce the reader to the format or method of presentation and to indicate the type of information he may expect to find in the individual sections. Section II presents a general picture of the mission and organization of the Knowledge Availability Systems Center (KASC) of the University of Pittsburgh. Section III presents the mission and organization of the RDC activity at KASC. Sections IV and V, respectively, describe the scope of marketing and operations activities during the reporting period. Section VI describes our approach to impact reporting. The last section, Section VII, describes KASC's future plans as a NASA RDC.

In addition to these seven sections, there are two appendices. Appendix A contains some sample marketing letters, and Appendix B is a Letter of Intent, a new marketing tool implemented at KASC during the reporting period.

II. KASC ORGANIZATION

The organization charged with the responsibility for developing a University-wide program in the Information Sciences is the Knowledge Availability Systems Center. The Center was established in 1963 with a charter to develop a program of teaching, operations and research in this field.

The current administrative organization of the KAS Center is shown in the chart in Figure 2-1. The activities relating to regional dissemination functions are shown in the right side of the chart (under E. Howie, Assistant Director). The research and report coordination functions are shown in the center part of the chart (under E. D. Dym, Assistant Director). The direct research functions are shown in the left (lower) side of the chart (under A. Kent, Director). The shaded area on the left side (top) of the chart illustrates the relationship of the KAS Center research and academic activities with University units reporting to the Provost (C. Peake) and to which the Center provides senior personnel.

Teaching Program in the Information Sciences

The teaching program has developed to the point where formal curricula (involving 15 new courses and seminars) at the masters and doctoral levels, with majors and minors in the information sciences, are available from the KAS Center to a number of schools and departments of the University, including:

- Graduate School of Library and Information Sciences
- Department of Industrial Engineering, Systems Management Engineering, and Operations Research
- Department of Computer Science
- Department of Educational Communications
- Department of Special Education and Rehabilitation
- Department of Educational Research

In addition, students from psychology, philosophy, public and international affairs, and business, among others, have enrolled in selected courses in these curricula. During 1968, some 1500 credit hours were taught in these new courses and seminars. Five doctoral candidates are currently in the process of writing their dissertations in this field; ten additional doctoral students are preparing for their comprehensive examinations; and one doctoral candidate has already completed his dissertation and defended it successfully.

The chart in Figure 2-2 illustrates the academic involvement of the KAS Center, with various members of the senior staff participating in the teaching program through joint appointments. Examples are the Director (A. Kent) holding professorships in the Graduate School of Library and Information Sciences (GSLIS), the Department of Computer Science, and the School of Education; the Associate Director (J. Belzer) holding academic appointments in the Department of Industrial Engineering and GSLIS; one research associate holding appointments in the Department of Computer Science and GSLIS; and another research associate having an appointment in the Department of Industrial Engineering. In addition, a number of doctoral candidates participate in offering courses in GSLIS at the masters level.

The Information Science teaching program was formalized recently with

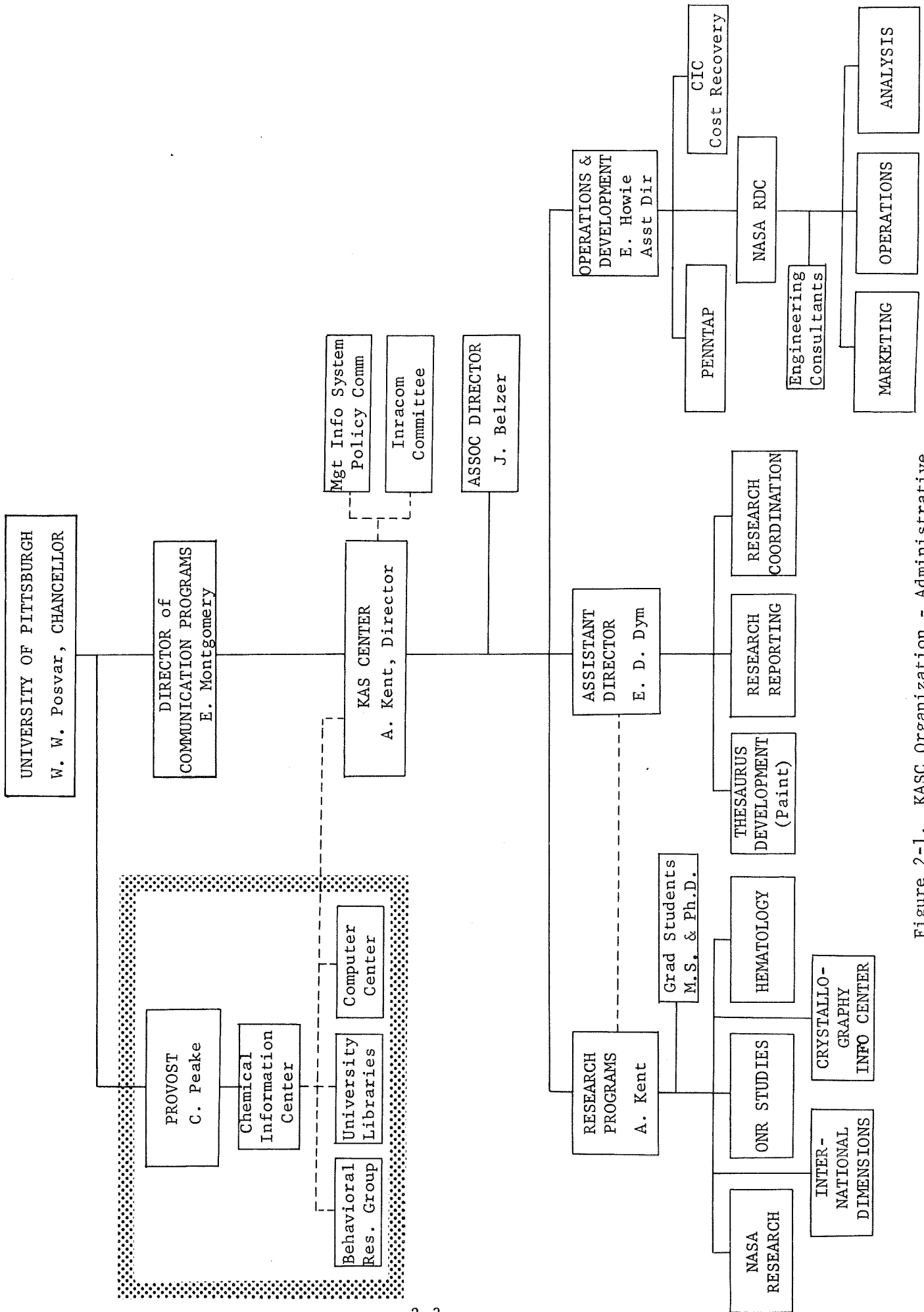


Figure 2-1. KASC Organization - Administrative

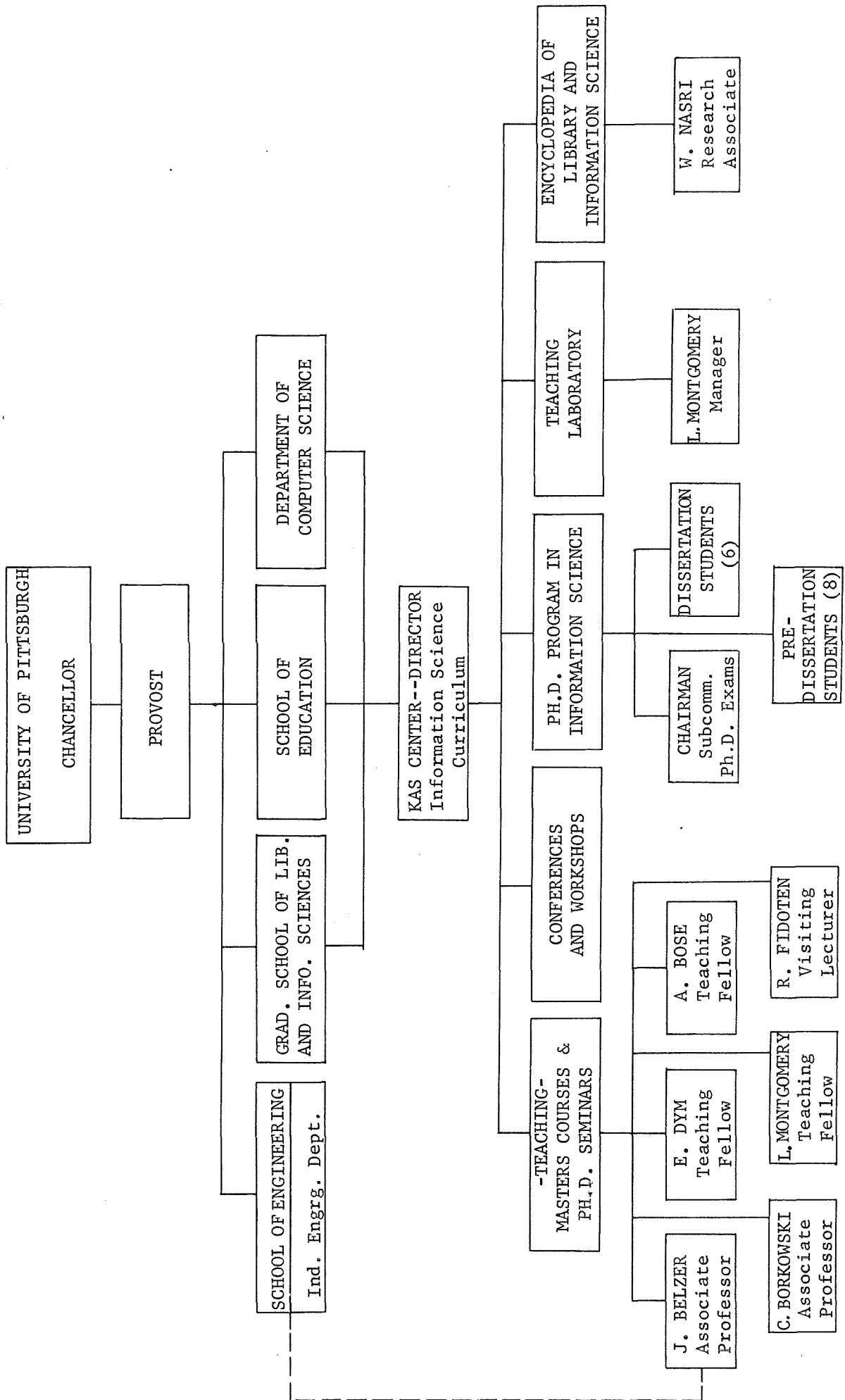


Figure 2-2. KASC Organization - Academic

the creation of:

- A Department of Information and Communication Science, in GSLIS, for M.S. and Ph.D. students.
- An interdisciplinary, University-Wide Program in Communication Science, reporting to the Provost, for Ph.D. students.

Professor Kent has been appointed Chairman of both of these activities.

Operations

The operations program has developed to the point where several computer-based files are being searched for the benefit of faculty, students and industry. The operational projects include:

- NASA Regional Dissemination Center
- Crystallography Information Center
- Pennsylvania Technical Assistance Program
Information Switching Center
- Chemical Information Center

In addition, an Anthropokinetics Information Center is being planned.

Research

The research program has involved the development of some 20 projects in basic areas of concern, including relevance predictability, interactive information retrieval systems, game theory in systems design and operation, learning-relevance relationships, thesaurus development and testing, and comparative indexing.

A research program in toxicology information handling has been initiated in June, 1969.

Authorization has been received to initiate research on the design of a campus-wide information system which would integrate the computer-based systems currently in operation and those in the planning phase.

Impact of KAS Center Activities

The activities of the Center, stimulated by the NASA support of the Regional Dissemination Center, has led to the rededication on the part of the administration of the University of Pittsburgh to pursue aggressively the operational, research and teaching aspects of the program, as evidenced by the formal establishment of the Information and Communication Science Department and the Interdisciplinary Communication Science Program, and by the authorization of the design stage of the campus-based information system.

These developments have occurred since the establishment of the KAS Center almost six years ago, and the term 'KAS' has been diffused into the thinking of most elements of the University.

III. RDC ORGANIZATION

Major Activities

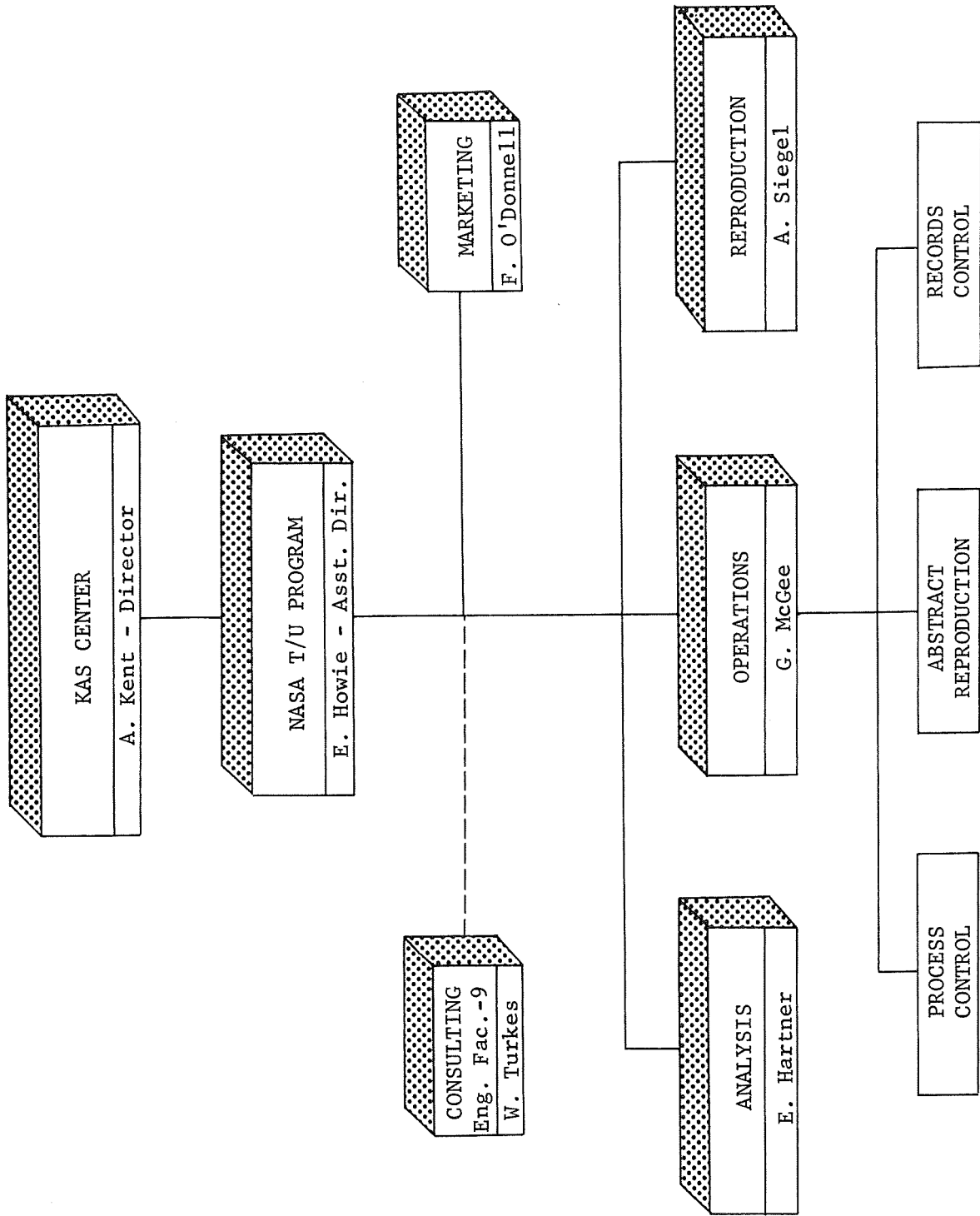
The KASC RDC efforts to successfully exploit the NASA files are concentrated in four major areas: Marketing, Technical Operations, Analysis and Engineering Consultation (see Figure 3-1). Each of these areas will be discussed separately. However, in general, the mission of the Marketing group is to publicize the Program within the proximate geographic area of the University of Pittsburgh. It is their function to convince all segments of the economy within the area that the NASA file is a scientific and technological reservoir of information having a real potential value to them, and that they could and should exploit it to their advantage.

The Technical Operations group has the responsibility for processing all profiles through the system and for timely service from receipt of the customer's query to submission of search output.

The Engineering Consultant group provides a technical expertise which is utilized to the client's benefit by phrasing his profiles, maintaining periodic contact with him and general interpretation of the technical content of identified citations.

The Analysis Section also provides technical expertise which is applied just as in the Engineering Consultant group. In addition, this group provides an Information Science expertise which is utilized in the preparation of search strategies and for the successful exploitation of both mechanically and manually searched files.

Figure 3-1. NASA/Pitt RDC Organization



Personnel

Currently, there are 31 personnel assigned to the NASA RDC at KASC. This is 13 less than last year. The total excludes the Director of KASC, his administrative assistant and his secretary, who together maintain a degree of administrative control and overall budgetary control over the NASA T/U Program.

Fifteen of the personnel assigned to the RDC activity are full-time professional and nonprofessional staff members of KASC. In addition, there are four part-time professional and three part-time clerical personnel on the payroll. The remaining nine personnel are full-time faculty and staff members of the School of Engineering.

Table 3-1 illustrates by category the KASC RDC manpower level for the last two years.

Table 3-1. KASC Manpower Levels

CATEGORY	1967/1968	1968/1969
Engineering Consultants	11	9
Full-Time Professionals	6	5
Full-Time Clericals	17	10
Part-Time Professionals	6	4
Part-Time Clericals	4	3
TOTALS	44	31

Physical Location

During the past few years, the RDC activity was located at two separate sites. The administrative, marketing and document reproduction activities were located at the Space Research Coordination Center (SRCC) which also housed the overall KASC academic and research personnel. The technical operations and analysis groups of the RDC were located at the Hotel Webster Hall site—approximately one quarter mile from the SRCC.

Early in 1969, and just at the close of the reporting period, the University of Pittsburgh purchased the American Institutes for Research (AIR) building situated on North Bellefield Street in Pittsburgh. Located in the Oakland district of the city, approximately five minutes walking distance from the Cathedral of Learning of the University, the fourth and fifth floors of the AIR building housed, on a rental basis, the Graduate School of Library and Information Sciences.

After the University purchased the building, KASC was assigned the third floor, and both the SRCC and the Hotel Webster Hall sites were vacated. Thus, for the first time in many years the KAS Center is under a single roof.

Engineering Consultants

This group is comprised of senior members of the faculty and staff of the School of Engineering of the University. Together, these personnel form a spectrum of scientific and technological competence which is applied to the client's needs.

These consultants are assigned to the client's profile, not to the company as an entity. Also, the assignment is made on the basis of the technical disciplines associated with the client's interest areas. Thus, depending on the number of interest profiles and the disciplines involved, a single client may have one or more consultants assigned to service him.

The group currently comprises nine personnel servicing KASC on a functional basis and is under the direction of Walter E. Turkes, Associate Dean of the School of Engineering.

Dean Turkes is responsible for establishing technical contact with new participants in the Program, maintaining technical liaison throughout the service period, and implementing periodic contact at the management level of the client organization. On the basis of these technical and managerial contacts, Dean Turkes advises the KASC Assistant Director responsible for the RDC operations as to any action needed to improve KASC/client relationships.

The remaining members of the consulting group are:

Coull, James, Ph.D.	Professor, Chemical and Petroleum Engineering
Geiger, Gene E., Ph.D.	Associate Professor, Mechanical Engineering
Gratton, Mercer.	Assistant Chairman, Metallurgical and Materials Engineering
Hamilton, Howard B., Ph.D.	Chairman, Electrical Engineering

Maggio, Ralph, Ph.D.	Associate Professor, Industrial Engineering
Miller, James P., Ph.D.	Associate Professor, Civil Engineering
Sze, Tsung Wei, Ph.D.	Professor, Electrical Engineering
Trout, Harry E., Jr.	Assistant Professor, Metallurgical and Materials Engineering

Each of the above personnel has academic responsibilities which comprises the major portion of his work load. However, that part of his time which is devoted to KASC clients is recognized as implementation of a formal commitment by the University of Pittsburgh to the RDC activity.

These subject specialists meet with client representatives to phrase interest profiles and, depending on the type of service desired, they review computer output to screen out system 'noise,' maintain periodic contact with their counterparts at the client's establishment, and report to the RDC administrator the results of each of their contacts.

Before describing the procedure by which subject specialists are assigned and customer service is initiated, it may serve the interests of the reader if a description is presented of the composition and function of the Information Analysis section. Both the KASC engineering consultants and the information analysts work so closely together that they are more frequently than not thought of as a single entity.

Information Analysis Section

The function of the analysis group is to successfully exploit the

technical content of the RDC files to the benefit of the participating clients. In implementing this function, the group relies heavily on the engineering personnel who provide in-depth subject expertise and who act as consultants in a limited capacity related to the technical contents of identified citations and the application of this technical information to the client's needs.

The analysis group currently comprises a complement of eight personnel, seven of which are professional. The nonprofessional is the secretary. The professional cadre includes two full-time and five part-time personnel identified below:

ELIZABETH P. HARTNER - Manager, Information Analysis
B.S. Chemistry and Bacteriology
M.S. Physical Chemistry
Graduate School of Library and Information Sciences
Experience: Extended engineering experience in physical metallurgy research; steel properties and relationships.

BAHAA EL HADIDY
B.S. Chemistry and Geology
M.S. Library Science
Candidate for Doctor's degree in Information Science developing Geoscience Information Studies.

LILY EL HADIDY
B.S. Chemistry and Biology
M.S. Analytical Chemistry
M.S. Biochemistry
Graduate student in Public Health
Experience: Research and medical work with micro-analysis, and biochemistry.

BETTY ELY
B.S. Biology and Chemistry
M.S. Library Science
Experience: Infrared, NMR, flame spectroscopy.

LEONARD S. LANG

B.S. Chemical Engineering

Experience: Extended engineering experience with treatment and processing of textiles, electronic encapsulation, specifications for steel mill equipment.

SUNANDA MAJUMDAR

B.S. Physics

M.S. Physics

Graduate School of Library and Information Sciences

Experience: Research in solid state physics.

CONSTANCE M. MELLOTT

B.S. Physics

M.S. Library Science

Advanced Certificate, Library Science

Candidate for Doctor's degree in Information Science

Experience: Carbon and graphite technology.

These personnel are all subject specialists who are technically competent in their own right. The reader will note that without exception each has an undergraduate degree in a physical science or technical discipline. In addition, all but one has at least one graduate degree in either a physical science or Library and Information Science.

Four major factors differentiate the analysis section from the engineering consulting group:

1. The consultants have greater in-depth expertise in their subject areas.
2. The analysts have greater in-depth expertise in reference sources and searching techniques.
3. The analysts have greater in-depth expertise in formulating computer search strategies.
4. The analysts are part of the line organization of KASC—the consultant group is only a functional unit of the Center.

The talents of both groups are so complementary that when assigning a

subject specialist to a profile, the discussions between Dean Turkes and Mrs. Hartner are based on the two groups being one subject specialist pool of talent. However, if an 'engineer' is assigned to a profile, the computer search strategy is prepared in consultation with an information specialist.

On this basis, the overall technical spectrum presented by both groups is utilized, as shown below. Profiles are categorized broadly, and these categories are followed by the names of reviewers deemed competent in that category. Where an asterisk (*) follows the reviewer's name, that individual is to be considered an expert within that category.

Aerodynamics, Aeronautics

Geiger.

Analysis and Spectroscopy

Coull*, L. El Hadidy*, Ely*, B. El Hadidy, Hartner, Miller, Trout.

Biology and Medicine

L. El Hadidy*, Miller*, Ely, Hartner, Mellott.

Ceramics, Refractories, Glass

B. El Hadidy, L. El Hadidy, Ely, Hartner, Lang, Mellott, Miller, Trout.

Chemical Processing, Catalysis, Chemical Engineering

Coull*, Miller*, B. El Hadidy, L. El Hadidy, Ely, Hartner, Lang.

Coatings, Corrosion, Surface Finishes

Hartner*, Lang*, Trout*, Coull, B. El Hadidy, L. El Hadidy, Ely, Gratton, Majumdar, Miller.

Composites

Coull*, Hartner*, Miller*, Ely, Gratton, Mellott, Trout.

Control-Computers

Sze*, Coull, Hamilton, Maggio, Mellott, Miller.

Electronics, Magnetics, Electrical Engineering

Hamilton*, Sze*.

Fluid Flow, Fluid Mechanics, Heat Transfer

Geiger*, Majumdar*, Miller*, Coull, Lang, Mellott.

Geology, Oceanography

B. El Hadidy*, Miller*, Ely, Hartner.

Hydraulic, Pneumatic Engineering

Geiger*, Miller*.

Information Science

B. El Hadidy*, Hartner*, Mellott*, Ely, Miller.

Inorganic Chemistry

Coull*, Ely*, B. El Hadidy, L. El Hadidy, Hartner, Majumdar, Miller.

Inspection, NDT, Metal Props, and Testing

Gratton*, Hartner*, Miller*, Mellott, Trout.

Joining, Brazing, Welding, Coupling, Fastening

Gratton*, Hartner*, B. El Hadidy, Ely, Lang, Majumdar, Mellott, Miller, Trout.

Lubrication, Lubricants, Petroleum Chemistry

Coull, B. El Hadidy, L. El Hadidy, Ely, Geiger, Hartner, Lang.

Management, Psychology

Maggio*, Miller*, Mellott.

Mathematics, Statistics

Maggio*, Miller, Sze.

Mechanical Engineering and Design

Geiger*, Sze*, Lang.

Metal Forming, Deformation and Wear

Hartner*, Ely, Gratton, Miller, Trout.

Metallurgy, Ferrous

Gratton*, Trout*, B. El Hadidy, Ely, Hartner.

Metallurgy, Nonferrous

B. El Hadidy, Ely, Gratton, Hartner, Trout.

Metallurgy, Powder

Gratton*, Trout*, B. El Hadidy, Hartner.

Microscopy

Gratton*, Hartner*, Ely, Majumdar, Miller, Trout.

Nuclear and Radiation Chemistry

Coull, L. El Hadidy, Mellott.

Optics, Lasers, Masers, Infrared and Ultraviolet Radiation

Majumdar*, Ely, Gratton, Mellott, Miller, Sze.

Photography

Gratton, Hartner, Mellott, Miller.

Physical Chemistry

Coull*, Ely, Hartner, Majumdar, Miller, Trout.

Physical Metallurgy-Solid State Physics

Gratton*, Hartner*, Sze*, Majumdar, Mellott, Trout.

Plasma Physics

Majumdar*, Hamilton, Mellott, Sze.

Polymers, Elastomers, Plastics

Coull*, Lang*, L. El Hadidy, Ely, Hartner, Miller.

Pumps Filters, Tubing, Valves

Geiger*, Miller*, Gratton, Lang.

Sound, Acoustics, Radio

Geiger*, Majumdar*, Mellott, Sze.

Surfactants

Coull*, L. El Hadidy, Ely, Hartner, Lang, Miller.

Vacuum Technology

Mellott*, Coull, Hartner, Majumdar.

Method of Operation

Participation in the KASC RDC activity is initiated in different ways, e.g., a formal agreement or a purchase order. Regardless of the mechanism, when a formal (and sometimes informal) relationship is established, our initial step is to arrange for a profile phrasing effort. And, because an interest can be stated in a variety of ways, a standard form was designed to be filled out by the customer himself. We believe that a written expression of his own interest aids the client in defining more precisely the interest profile and thus facilitates the preparation of a more effective computer search strategy.

The query form is filled out by the customer and submitted to the marketing section together with a purchase order (or other authorization). Upon receipt of the authorization, a memorandum is submitted to Dean Turkes (a carbon copy is sent to both the operations and analysis groups) informing him of the new participant's interest in exploiting the NASA file. A copy of the query form(s) is submitted with the initiation memorandum to provide a basis for assignment of the subject specialist.

When the subject specialist is assigned, a meeting is arranged with the technical representative(s) of the client. The purpose of this meeting is to phrase profiles, i.e., to document as complete as possible the background of the client's needs and interests. (This meeting can be a simple telecon if that is all that is needed.) Once the profile is phrased, an information analyst will convert it into a Boolean-type computer search strategy. A mechanized search will be performed, and the result will be a computer listing of the identification numbers of documents in the file whose index terms match those in the search strategy.

Up to this point in the procedure, all profiles are handled in much the same way. However, from this point on, service will differ, depending on the client's needs and wants. If a client has requested Type I service, he will receive only a computer listing of document identification numbers. Unless he has access to the published abstract journals, Scientific and Technical Aerospace Reports (STAR) and the International Aerospace Abstracts (IAA), this computer listing is of little value.

A customer subscribing to a Type II service will receive a complete

abstract of each citation identified by the computer search. In this instance, the customer will be saved the time and effort necessary to obtain the abstract journal and to locate the individual citation.

In both Type I and Type II service, the client will receive total computer output—including all 'noise.' Thus, if a classic example may be used, a client interested in 'venetian blinds' will also receive literature on 'blind Venetians.' In both Type I and Type II service, the assigned subject specialist participates only to the extent necessary to phrase profiles and prepare the search output. Computer output is submitted to the client without review by a subject specialist.

In Type III service, the client receives a complete abstract of only those citations deemed relevant to his interest profile by the subject specialist assigned to that profile. When the computer search is performed, the computer listing is given to a clerk who pulls an abstract of every citation listed. Each abstract is evaluated by the assigned subject specialist for relevancy to the client's profile. All non-relevant abstracts (blind Venetians) are discarded, and all relevant abstracts (venetian blinds) are submitted to the customer.

In addition to profile phrasing and output review, the subject specialist is expected to contact his counterpart on a quarterly basis for each profile assigned. The purpose of the contact is to determine client satisfaction (or dissatisfaction) and to document the specialist's recommendations or findings.

Scope of Subject Specialist Activities

During the reporting period, subject specialists serviced a total of 899 interest profiles for 90 individuals clients. This total may be broken down as follows:

New Profiles Phrased*	85
Engineers	39
Analysts	46
Total Profiles Reviewed**	875
Engineers	458
Analysts	417
Total Client Contacts	292
Engineers	73
Analysts	219

A more extensive and detailed description of the extent of service provided KASC clients during the contract period is to be found in the Technical Operations section.

Advantages

The relationship KASC has with the School of Engineering relative to the RDC activity cannot and should not be underestimated. As a 'sales' asset this relationship is tremendous. The technical knowledge of the consultants and the prestige of an 'Engineering Faculty' cannot be stressed too much.

* Does not include profiles submitted by mail or telecon which did not need a special profile phrasing effort.

** Includes only Type III profiles. Types I and II are not reviewed. Also note that profiles on a current awareness basis are searched and reviewed every month for a twelve-month period.

The expertise of the engineers is utilized to eliminate noise from the system. In addition, it is frequently used to interpret technical content of identified citations and to advise a client on 'direction' rather than on a specific solution to a specific problem.

Another advantage to the customer is the informal relationship which can be established with the engineer. This relationship can be of tremendous importance and benefit, if only from the point of view of identification of suppliers of materials and parts or even sources of information.

Disadvantages

There are some disadvantages associated with a relationship of the type enjoyed between the KASC RDC and the School of Engineering. The first which comes to mind is control.

In addition to the functional relationship which exists organizationally, there is the matter of physical separation. The engineers who service KASC are located in more than one physical location. Thus, the simple matter of getting material to them and back is time consuming and less efficient than if all personnel were located under one roof.

Also, these men are academic types. They carry academic work loads which fluctuate from term to term. And, they are not as sales oriented as we might desire them to be.

This latter characteristic is worthy of note (and applies to the information analyst as well). The subject specialist is involved with the

client from time zero. When phrasing profiles, he can recommend combining interest areas or splitting them. During the service period, he is in the best position to identify new needs and suggest new profiles.

A very serious disadvantage, which can be overcome by intelligent, ethical sales conduct and technical liaison, relates to the client's expectations. A client is very apt to expect 'applications' engineering consultation in the literal and fullest sense of the word. This expectation must never be permitted to develop. Complete candidness about the limitations of time and of financial remuneration allotted the engineer, as well as the extent and interests of his academic work, should be the order of the day when discussing this service with the client.

In spite of the disadvantages, the relationship with the School of Engineering is a tremendous asset. In fact, it can be considered our second greatest asset—our first being the knowledge, experience and dedication of all our KASC personnel to the field of information science.

IV. RDC MARKETING

KASC's marketing strategy is based on complete customer orientation and the RDC mission: successful exploitation of the NASA file on a fee-paying basis by both industrial and nonindustrial organizations. In this sense, our marketing strategy is oriented heavily toward a cost recovery objective. However, this orientation is tempered with primary emphasis on customer satisfaction. We avoid 'overselling' the potential of the file. We are most candid in explaining to the customer what he should expect, what he can expect, and what we think of the file relevant to his interest areas.

In keeping with our strategy, our primary efforts are directed toward those organizations whose interest areas and product lines are judged most amenable to utilization of the technical content of the NASA files.

Our experience to date has shown that within our geographic area, we have been most successful with companies whose product lines fall within the following Standard Industrial Classification codes:

- 33. Primary Metal Products
- 34. Fabricated Metal Products
- 35. Machinery (nonelectric)
- 36. Machinery (electric)
- 37. Transportation Equipment
- 38. Instruments
- 73. Research (commercial)

No discrimination is made on the basis of size or financial factors.

However, most success is achieved with companies possessing the technical competence to assimilate the sophisticated data contained in the NASA files.

Objectives

The primary objective of the marketing activity is self-sufficiency for the RDC at KASC. This main objective may be viewed as consisting of individual secondary objectives. The first of the secondaries is successful sales and advertising to induce potential clients to exploit the files. There can be no transfer before utilization—and no utilization before awareness of the files' availability and potential.

The second of the secondary objectives is the compilation of a body of knowledge about marketing of information center activities. For example: What types of services are judged most popular by a user? Does the type of service desired vary as a function of individual user idiosyncrasies or does it relate to the peculiarities of the file or even the query itself? Is it better to deal (in relation to marketing) with administrative types or with actual users?

The third of the secondary objectives (related to the second of the secondaries) focuses on the effectiveness of the marketing tools. Is direct mail advertising of any use? How good is the personal presentation approach? Is the group presentation approach any good?

Analysis and conclusions relevant to the above questions will not and cannot be forthcoming until a body of knowledge is compiled. However, some 'gut-feeling' opinions can be expressed on the personal experience of our marketing personnel (see the comments at the end of this marketing section).

Personnel

Only two personnel are assigned to full-time marketing activities. The manager is responsible for planning, controlling and implementing the overall marketing activity. His secretary, the other half of the team, has to be a 'gal Friday' in the fullest sense of the term. She must be a paragon—a market researcher; a correspondent; a production typist; a confidential secretary; a travel agent; a receptionist; and above all, she must be dedicated to her job. Her attitude must be professional, i.e., she must love her work above everything else—particularly money for her salary is most modest.

Although only two persons constitute the marketing group, the marketing manager has a number of competent 'salesmen' on call.

Professor Allen Kent, Director of the KAS Center, is an international figure in the field of Information Science. His experience encompasses all aspects of the field from theory to practice, from teaching and research to operations and management.

Mr. Edmond Howie, Assistant Director of KASC, has over fifteen years industrial experience, holds an undergraduate and graduate degree in Liberal Arts, as well as an M.S. in Library and Information Science. In addition, he is enrolled in the Doctoral program at Pitt, specializing in Information Science and has only six credits to go to complete his course requirements. Mr. Howie has been responsible for administration of the RDC activity at KASC since September, 1967.

Both Dr. A. Holzman, Chairman of the Industrial Engineering Department,

and Walter Turkes, Associate Dean of the School of Engineering, have been associated with the KASC RDC activity since time zero. Their technical competence and administrative abilities are exceptional. Both are well-known and competent speakers. Above all, they believe in the mission and objectives of the Technology Utilization Program and are strong supporters of the RDC effort.

In addition to these personnel, other members of the KASC staff and the consultant group are used to participate in conferences, seminars and workshops.

Tools

As in the past, KASC has placed major emphasis on direct mail advertising. Backing up the mail program, we use telecon follow-ups and contacts and the personal presentation. In addition, group presentations are utilized on an ad hoc and very intermittent basis.

Newspaper and trade-press advertisements have not been utilized, nor have we used the journal article approach.

Statistics reflecting the extent to which we used each of these tools during the past year are shown in Table 4-1.

Table 4-1. Marketing Tools Statistics

TYPE	MAR. TO MAY	JUNE TO AUG.	SEP. TO NOV.	DEC. TO FEB.	TOTALS
Direct Mail	978	1768	1886	2059	6691
Phone Calls	--	39	42	35	116
Personal Presentations	16	21	22	27	86
Group Presentations	2	1	2	1	6

Direct Mail Program

Three separate letters are used in the direct mail program. The first constitutes the initial mailing; the second is referred to as the first follow-up letter; and the last is called the second follow-up letter. A copy of each is included in Appendix A.

Each week approximately fifty letters are mailed out. If no response is received within thirty days, the first follow-up letter is mailed. Again, if no response is received within a thirty-day period, the second follow-up letter is sent. If this last letter does not elicit a response, the company name is removed from the mailing list.

Table 4-2 reflects the scope of the direct mail program and its results during the reporting period.

Table 4-2. Direct Mail Program Statistics
(March, 1969, through February, 1969)

TYPE	TOTAL MAILED	POSITIVE RESP.	%	NEGATIVE RESP.	%	TOTAL RESP.	%
Initial	2509	43	1.8	8	.3	51	7.4
First Follow-Up	2294	15	.6	11	.4	26	1.0
Second Follow-Up	1888	6	.3	11	.6	17	9.8
TOTALS	6691	64	1.0	30	.4	94	1.4

Personal Presentations

The positive responses elicited from the direct mail program are followed

up by telephone and/or mail contact. Usually, the first effort is by telecon with two primary objectives: (1) determination of our potential to benefit the prospective participant; and (2) determination of the degree of interest.

If there is considerable interest and little potential, our evaluation is expressed frankly and little effort is made to set up a personal presentation meeting. If there is considerable potential and little interest, a concerted mail and telecon effort is made to set up a personal meeting. If there is both potential and interest, a personal meeting follows almost naturally with little or no effort.

The presentation meeting is normally with an executive officer of the company. More frequently than not, there are two or three interested parties at the meeting. Also, quite frequently but not as a rule, if the company has a technical librarian, he/she is in attendance.

If a librarian is in attendance, it behooves the marketing man to (1) get the librarian on his side; (2) know the librarian's problems and emphasize how the service will supplement—not supplant—his/her efforts; (3) not to oversell the NASA data file itself.

The presentation itself comprises an explanation of NASA's Technology Utilization objectives, the role of the RDC in general, and the method of operation of KASC in particular. Considerable emphasis is placed on the relationship between KASC and the School of Engineering, and of the technical competence available to participants of the KASC operation.

A technique used and found particularly effective in the presentation

is to prepare a brochure slanted towards the company's interest area. This brochure is a simple folder which opens to reveal two pockets containing literature.

The left pocket contains two pamphlets, one describing KASC and the other describing the NASA Program. These two documents are seldom passed out during the presentation—they are intended as post-visit reminders.

The right pocket contains:

1. A list of company participants at KASC.
2. A list of the scope of the file (a Xerox copy of the front matter from STAR or IAA).
3. A list of subject areas currently being searched at KASC.
4. Results of a sample search of an interest profile reflecting a general (sometimes specific) interest of the company.
5. A fee schedule.
6. A query entry form.
7. Two copies of a formal agreement form.

With the exception of item number 7, the others are all used during the presentation. The technique of presentation will vary, depending on the size and make-up of the group. In the main, however, KASC personnel are taught to use the following technique:

1. Ask the company representatives to talk about their organization's mission and their respective roles, responsibilities and interests.
2. Identify the decision makers.

3. Note potential subject areas for later discussion. The subject areas noted should not exclude 'negative' ones. These must be discussed overtly.
4. Discuss NASA's overall mission in general and its T/U effort in particular.
5. Identify the various RDC's and their geographic location.
6. Identify common input and individual output operations.
7. Take the group on a step-by-step tour of the service procedure from phrasing of the profile to submitted hard-copy documents. In this 'tour,' the market man uses a prepared folder containing:
 - a. Strategy sheet
 - b. IBM card
 - c. Computer printout
 - d. Unscreened abstracts
 - e. Transmittal sheet
 - f. Screened abstracts
 - g. Microfiche
 - h. Hard-copy document
8. Describe the sample search prepared for the presentation, discuss its limitations (e.g., lack of technical liaison for profile phrasing and strategy preparation), then pass out results.
9. Open discussion period.
10. Close.

Group Presentation

This type of presentation is most often given at a professional society meeting or conference. It can be an industrial conference, a chamber of commerce meeting, or an academic event. Whatever the occasion, its value as a marketing tool cannot be assessed in quantitative terms and can only be surmised in qualitative terms.

One factor can be stressed—the speaker must be knowledgeable in technology transfer techniques and problems, in the scope and content of

the file, and in ways and means by which the file can be exploited.

Letter of Intent

The purpose of the Letter of Intent (see copy in Appendix B) is to bridge the gap between the personal presentation and establishing a formal relationship with a client. The Letter is quite informal and is not legally binding, nor is it intended to be binding—in the legal sense.

One of the major factors preventing an immediate 'close' on a formal relationship is the identification of subject areas to be searched, i.e., phrasing profiles. Such an effort is best done in conjunction with a subject specialist. However, it is not economical to expend manpower to phrase profiles unless we have some assurance that the client will participate in the Program. From our (KASC's) point of view, the Letter of Intent is a mechanism for reducing the risk entailed in authorizing the expenditure of Program funds before a contract or purchase order is in hand.

Under the circumstances, we indicate quite candidly (but do not make a point of the matter) that the Letter is not contractually binding, but that its purpose is to convince our (KASC's) management that we should assign a subject specialist in advance of a formal relationship because the customer is sincere in wanting to exploit the files.

The effectiveness to date of this approach is reflected in the following statistics which indicate the number of presentations made, the number of Letters of Intent signed resulting from the presentations,

and the number of signed contracts or purchase orders obtained.

Presentations Made	59
Letters of Intent Received	38
Contracts Obtained	17

Of the 21 Letters of Intent outstanding, we expect 90% of them to become clients.

KASC RDC Membership

At the close of the reporting period (February, 1969), KASC RDC membership consisted of 58 clients. This total is broken down as follows:

New (First-Year) Companies	25
Second-Year Companies	7
Third-Year Companies	12
Fourth-Year Companies	9
Fifth-Year Companies	<u>5</u>
TOTAL	58

The figures in Table 4-3 present the total number of companies served in the calendar years 1964 through 1968, respectively, and during the first two months of 1969.

Client Composition

A historical summary of client composition by geographic distribution, size, type and Standard Industrial Classification codes is shown in Tables 4-4 through 4-7, respectively. All statistics reflect clients served during the calendar period indicated.

Table 4-3. KASC RDC Membership, 1964-1969

TYPE	1964	1965	1966	1967	1968	1969+
New	10	35	25	19	18 ^o	9
Renewal	--	8	23	34	33	2
One-Time Contracts	--	1	3	7	7	2
Dropouts	--	2	14	19	18	2
Delinquent*	--	--	6	2	1	4
In Process**	--	--	--	--	--	43
TOTALS	10	46	71	81	77	62

+ First two months only.

o Includes one company whose contract period began and expired in 1968 (contract period 1/68 through 12/68). This company is not included in the dropout statistics in order to avoid duplication.

* Contract period expired but service continued during negotiations.

** Companies whose contracts are overlapping from the previous year and are not yet up for renewal.

Table 4-4. Client Composition - Geographic

STATE	1964	1965	1966	1967	1968	1969*
Connecticut			1	3	2	1
Delaware					1	1
Illinois					2	5
Maryland			2	3	4	2
Massachusetts		1	3	2		
Michigan		1	1	1	2	1
Missouri				1		
New Hampshire				1		
New Jersey		1	5	7	7	6
New York			2	5	4	4
Ohio		5	6	9	8	5
Pennsylvania	9	37	51	48	44	35
Texas				1	1	
Virginia					1	
West Virginia	1	1			1	1
Wisconsin						1
TOTALS	10	46	71	81	77	62

* First two months only.

Table 4-5. Client Composition - Size

SIZE	1964	1965	1966	1967	1968	1969*
Large	10	30	47	53	52	42
Small**	--	16	24	28	25	20
TOTALS	10	46	71	81	77	62

* First two months only.

** Under 1000 employees.

Table 4-6. Client Composition - Type

TYPE	1964	1965	1966	1967	1968	1969*
Manufacturing	9	43	68	71	66	55
Research and Development	1	3	3	9	9	6
Nonindustrial	--	--	--	1	2	1
TOTALS	10	46	71	81	77	62

* First two months only.

Table 4-7. Client Composition - SIC Code

CODE NO.	CATEGORY	1964	1965	1966	1967	1968	1969*
13	Petroleum, Gas Products				1	1	1
14	Mining, Quarrying					1	1
16	Construction (Non-Building)	1	1	1	1		
26	Paper and Allied Products					2	2
27	Printing, Publishing				1	2	1
28	Chemical Products		4	7	7	8	6
30	Rubber, Plastic Products		1	3	3	1	
32	Stone, Clay, Glass Products	1	1	2	2	3	4
33	Primary Metal Industries	6	18	17	16	16	11
34	Fabricated Metal Products		1	8	8	1	3
35	Machinery (Non-Electric)		5	8	6	9	9
36	Machinery (Electric)	1	12	16	19	17	9
37	Transportation Equipment			1	2	1	1
38	Instruments (Photo, Optical)		1	5	6	4	6
73	Research (Commercial)	1	2	3	6	8	7
89	Research (Non-Profit)				2	1	
91	Federal Government				1	2	1
	TOTALS	10	46	71	81	77	62

* First two months only.

Fee Schedule Change

A new fee schedule was introduced to KASC clients during August, 1968. This schedule separated document charges from search charges and offered three types of output for both retrospective and current awareness service. Figure 4-1 illustrates cost information submitted to potential customers.

The prior fees were \$125 per profile for 12 months of current awareness service and \$250 per profile for a complete retrospective. A profile being serviced on a retrospective and current awareness basis cost \$150. All profiles received subject specialist service (SDI service), and all fees included document service at no additional cost.

At the close of the reporting period, 24 active participants in the KAS RDC activity had converted from the old to the new fee schedule. Table 4-8 presents a comparison of total contract value of these 24 companies and the number of profiles being serviced for them, both before and after the fee schedule change.

Table 4-8. Impact of New Fee Schedule

	OLD FEE SCHEDULE	NEW FEE SCHEDULE	PERCENT CHANGE
Number of Profiles	695	263	62%
Contract Value	\$51,150	\$41,965	18%
Average Income/Profile	\$ 74	\$ 160	117%

Figure 4-1. KASC Fee Schedule (Sheet 1 of 2)

List of Available Standard Interest Profiles

- #91001 Ceramics, Cermets, Glass
- 91002 Elastomers
- 91003 Plastics
- 91004 Nuclear Materials
- 91005 Fiberglass and Fiber-reinforced Plastics
- 91006 Composite Materials
- 91007 Powdered Metals and Powder Metallurgy
- 91008 Lubrication and Lubricants
- 91009 Foods
- 91010 Forming Techniques
- 91011 Machining and Cutting
- 91012 Cleaning and Sterilization Techniques
- 91013 Joining and Welding
- 91014 Adhesives and Adhesion
- 91015 Surface Protection and Hardening
- 91016 Non-destructive Testing and Quality Control
- 91017 Reliability/Life Testing
- 91018 Experiment Design (Statistical)
- 91019 Instrumentation and Devices for Testing and Measuring
- 91020 Analyses for Chemical Composition
- 91021 Crystal Growth
- 91022 Equilibrium, Constitution, and Phase Diagrams
- 91023 Bearings
- 91024 Electrical Insulation
- 91025 Power Sources
- 91026 Bioinstrumentation
- 91027 Information Science
- 91028 Management Techniques
- 91029 Steels
- 91030 Corrosion and Stress Corrosion of Metals and Alloys
- 91031 Fluid Flow, Fluid Mechanics, Heat Transfer

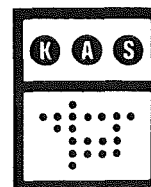
KNOWLEDGE

AVAILABILITY

SYSTEMS

CENTER

FEE SCHEDULE



For Further Information, Write To:

Director
KNOWLEDGE AVAILABILITY SYSTEMS CENTER (KASC)
University of Pittsburgh
Pittsburgh, Pennsylvania 15213

Telephone: (412) 621-3500, Ext. 6352

University of Pittsburgh
Pittsburgh, Pennsylvania 15213

NASA-Pitt-Industry Program

Figure 4-1. KASC Fee Schedule (Sheet 2 of 2)

SERVICES	FEE PER PROFILE*	DESCRIPTION OF SERVICES
<u>Type I</u>		<u>Type I</u>
Current Awareness	\$ 50.00	Subscriber to this service will receive only a computer print-out which lists the accession numbers of cited documents. No engineering review or abstracts will be furnished.
Retrospective	55.00	
Current Awareness and Retrospective	75.00	
<u>Type II</u>		<u>Type II</u>
Current Awareness	85.00	Subscriber to this service will receive abstracts of all documents cited by the computer search. No engineering service will be provided.
Retrospective	90.00	
Current Awareness and Retrospective	135.00	
<u>Type III</u>		<u>Type III</u>
Current Awareness	180.00	Subscriber to this service will receive engineering review plus relevant abstracts.
Retrospective	185.00	
Current Awareness and Retrospective	275.00	
<u>Type IV</u>		<u>Type IV</u>
Standard Interest Profile	** 100.00	Subscriber to this service will receive abstracts of cited documents which reflect interests of users in general in a subject area.

Documents

- 1) Hard copy . . \$.05 per page or original document (2 pages up)
- 2) Hard copy . . custom format and size, where available--\$.10 per page of original document
- 3) Microfiche . . \$.50 per document

NOTE: *Profile substitutions may be made on a Current Awareness Search service for a nominal fee of \$10.00

**SIP cannot be changed to satisfy individual user. KASC may make changes based on periodic feedbacks from all users of particular SIP.

GLOSSARY OF TERMS

Current Awareness Search - a search of the most recent monthly tape received from NASA containing that month's acquisitions -- approximately 5,500 new items per month.

Retrospective Search - a complete search of the entire NASA file which comprises about 300,000 items.

Engineering Review - a technical review of the abstracts of computer-cited documents for their relevancy to the customer's profile.

Relevant Abstracts - only those abstracts deemed pertinent to the Interest Profile by the engineer consultant and/or analyst.

Interest Profile - a term describing the documented interests of an engineer or scientist of a company.

Standard Interest Profile (SIP) - a profile covering similar information interests designed to meet the needs of many users at a substantial cost reduction. Subscriber will receive abstracts pertinent to SIP.

Industrial Income

Total industrial income for the calendar year 1968 and the first two months of 1969 is shown in Figure 4-2. Derivation of monthly income is based on total purchase order (or contract) value divided by the number of months in the service period. For example, a purchase order with a face value of \$1200 for 12 months' service would be considered as giving as \$100 a month for each of 12 months. Income is calculated as beginning with the first search period. Ad hoc funds are considered as income for the month in which the service was performed.

Comments

1. The operation of the RDC activity on a cost recovery basis cannot be viewed other than as the operation of a business (nonprofit or otherwise). And, the operation of a business within an academic environment is a challenge of no little magnitude.
2. The success of an RDC is measured in terms of cost recovery results. Any number of successful transfers may be nice to achieve, but if the income derived from client participation does not cover the cost of operations, the activity cannot and will not be considered successful. This opinion may be denied overtly—but it is implicit in all relations between 'top management' and operations personnel.
3. Success of the RDC activity is a direct function of the marketing activity. All the operational economies in the world will be of little avail if there are no clients to serve.

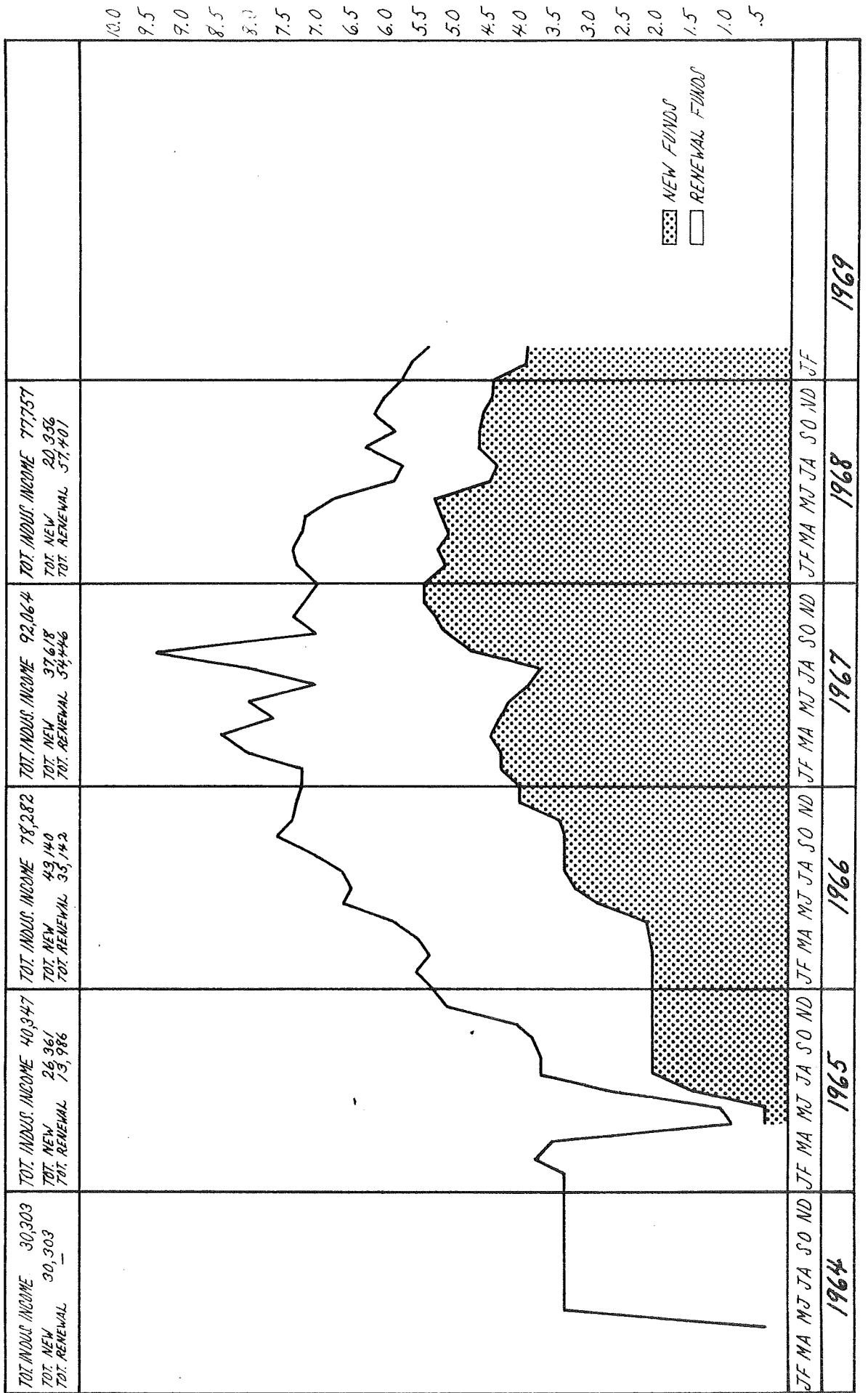


Figure 4-2. KASC RDC Industrial Income

4. The organizational strategy of any cost recovery operation must place major emphasis on marketing (or sales—whatever term in preferred) of the service or product.
5. Conversely, although quality and timeliness of service are decided factors in the RDC effort and contribute to successful marketing, the operational activity cannot take top priority in overall strategy—particularly in relation to the attention given it by management, and more so in the allocation of funds.
6. The effectiveness of a marketing program will be enhanced by continuity in its complement of personnel.

During the reporting period, KASC experienced more than 100 percent turnover in its marketing staff. This factor had a detrimental effect on the marketing program.

7. A direct mail program is an inexpensive and quite effective marketing tool. However, its effectiveness is a direct function of the mailing list used.

During the 1967-1968 period, we used a Dun & Bradstreet list compiled on the basis of Standard Industrial Classification codes. Our returns dropped to the one percent level.

The prior list used consisted of organizations whose complement of personnel were able, not only to recognize the potential value of the NASA files, but also to utilize the sophisticated information contained in the files.

The second list, based on SIC codes, consisted of organizations engaged in every aspect of a particular product area. Thus, its breadth detracted from our efforts to penetrate deeply an individual market area.

8. The personal presentation is the 'pay-off' tool. Here is where the contract is sold. Extreme care must be taken to be extremely candid about the potential of the service and its limitations. Today, more and more people are becoming aware of mechanized literature searching services, the associated costs, problems and limitations. It behooves the marketing man to be knowledgeable about competitive services and to be in a position to highlight his own organization's strengths without downgrading or demeaning other services.
9. The group presentation has some value—if utilized properly. If a conference or group meeting is being held in a particular geographic area and the sponsoring organization is engaged in a service similar to yours, an RDC speaker should discuss the information field in general, or concentrate on some specific area of the field. Of particular importance is a subject which every speaker in our field mentions—the benefits to be derived from exploitation of mechanized files.

Do not—repeat—do not describe your organization in terms which identify it as a competitor of the sponsoring organization of the conference.

10. The major benefit to be derived from group presentations is exposure.

Thus, the greatest utility one can make of such a marketing tool is to implant in the minds of the attendees the idea that the organization you represent has competent and dedicated personnel who provide a quality service or product.

11. The span of attention of any group of listeners is limited. Thus, the effectiveness of a speaker in a group presentation is related to his place on the agenda. For example, if a one-day conference is being held and the guest speaker (a Government official?) speaks right after lunch, then the effectiveness of later speakers will gradually decrease as the day wears on. The last speaker could end up with only about ten percent of the original attendees.

V. TECHNICAL OPERATIONS

The mission of the operations group is the timely processing of all inquiries, from initiation of service to submission of requested documents. The group personnel perform all the manual tasks associated with the group's mission, including the compilation of statistics related to system performance and effectiveness.

Personnel

The personnel complement for the technical operations group comprises one supervisor (B.S. in Chemistry and a Masters in Library and Information Science), seven full-time and four part-time nonprofessional employees.

In general, daily operations relating to search services and document service, respectively, are delegated to each of two assistants to the supervisor; the manual compilation of records is assigned to two clerks—one each for the search service and the document service; duplicating activities are assigned to two other clerks; and the seventh full-time person has responsibility for operation of the data handling equipment such as keypunches, sorters, duplicators and accounting machines and for ensuring prompt delivery and return of all materials to be processed at the Computer Center.

Two of the part-time staff are assigned primarily to duplicating functions; the third to duplicating, packaging and shipping functions; and the last member of the group is the messenger boy who also performs filing tasks.

The assignments of all personnel are shifted as required to meet the

established goals of a three-week time cycle for complete processing of all current awareness profiles (approximately 400), and a maximum ten-day cycle (minimum 48 hours) for ad hoc retrospective service.

Services—Previous

During the first seven search periods of the 1968 calendar year, KASC offered only two basic services: a current awareness search service and a retrospective search service. The combination of these two was treated as a third service, and all three had individual fees associated with them. Full document service was an integral part of the service.

Retrospective Search (Retro)

The NASA file (unclassified) from April, 1962, for STAR, and January, 1963, for IAA, is available to the RDC's on magnetic tape. A search of this file, whether for one year or of the entire file, is called a retrospective search.

Current Awareness Search (C/A)

Each month, NASA accessions into the system thousands of new items. Also, each month NASA distributes to its RDC's a magnetic tape containing the most recent accessions to the file. A search of this monthly tape for items relevant to a client's interests is referred to as a current awareness service. The normal service period at KASC for a C/A profile is twelve search periods.

Retrospective Plus Current Awareness Search

A combination of both a retro and a C/A performed for a single profile

has certain economies associated with it (e.g., one-time phrasing of profile, single search strategy, and a single set-up of files and basic records). A separate fee is associated with this service, and it is considered a 'third' basic service.

Services—Current

Beginning with the eighth search period of 1968, KASC established document service as a fee item separate from the search services. We also introduced three variations of each of the three basic services described previously. In addition, a fourth service type was established involving only current awareness search services.

The 'new' services were identified respectively as document service, and Types I through IV search services. (These variations were described in a previous section. However, for the convenience of the reader they will be repeated here.)

Type I Service

Subscribers to this service receive only a computer printout listing those accessioned items in the file whose index terms match the search strategy prepared for the subscriber's profile. Neither bibliographic citations nor abstracts are provided, nor are the search results reviewed by subject specialists. Subscribers must arrange for their own access to the abstract journals, STAR and IAA, in order to identify and review abstracts of the documents in the file whose accession numbers appear on the computer printout.

Type II Service

Subscribers to this service receive abstracts (with complete bibliographic information) of all documents identified on the computer print-out. As in the case of Type I service, subject specialist talents are used only in preparation of the search strategy. All output (including 'noise') is submitted to the client. No review of search results is performed by subject specialists.

Type III Service

Subscribers to this service receive abstracts (with complete bibliographic information) of only those documents cited by the computer which are deemed relevant to the client's profile as determined by a subject specialist.

Type IV Service

Subscribers to this service receive file output reflecting the general interest of a number of users. It is a current awareness service only.

Equipment

The equipment identified below are either leased or owned by the Knowledge Availability Systems Center of the University of Pittsburgh and are used for RDC activities. In addition, we utilize the IBM 7090 Data Processing System and other equipment (e.g., accounting and card reproducers) located in the University's Computer Center.

Data Processing

- IBM Card Punch
- IBM Card Sorting Machine (Type 082)
- IBM Tele-Processing Card Reader (Type 1056)
- IBM Tele-Processing Printer (Type 1053)
- IBM Tele-Processing Control Unit (Type 1051)

Copiers

- A. B. Dick 675
- Xerox 3600
- Itek 18.24RS
- Atlantic A-9 Printer
- Atlantic D-22 Diazo Developer

The A. B. Dick 675 copier is used almost exclusively for the duplication of abstracts of documents cited in KASC searches of the NASA data file. For reasons of economy, we reformat NASA tapes and use our own search program which provides as search output only the accession numbers of citations identified as responding to a particular search strategy.

Because all our clients subscribe to either a Type II, III or IV service, we utilize a file of abstracts in reproducible form. Until recently, we received from NASA 7" x 3" abstract cards of every citation accessioned into the file. This service was terminated at the end of 1968. Since that time, each Center has become responsible for obtaining its own cards. Currently, the Aerospace Research Applications Center of the University of Indiana in Bloomington is furnishing KASC—for a fee—the abstract cards we need.

Following the performance of a search, the computer printout is submitted to nonprofessional personnel who pull the abstract card of each of the cited accession numbers and copies the card on the A. B. Dick 675

copier—which is always loaded with three-inch wide paper. After duplication, the original card is refiled and the abstract copies are submitted directly to the client or to the assigned subject specialist, depending on the type of service requested.

When items other than those announced in STAR or IAA are cited, the full page (on which the abstract appears) of the pertinent abstract journal is duplicated on our Xerox 3600 and the full page submitted as required.

The Xerox machine is also used in the production of hard copy of document requests received from participating clients. This procedure is used primarily for requests relevant to documents available to KASC only in their original hard-copy form.

The Itek 18.24RS is used for documents which are available on microfiche. NASA provides KASC with microfiche of all N-documents available in this particular microform. The Itek reader/printer is used to produce hard copy at the rate of two frames per exposure. Unless special arrangements are made, clients receive their documents in two-pages-up form.

Microfiche requests are filled using the Atlantic Microfilm A-9 Printer and its companion, the D-22 Diazo Developer.

The KAS Center utilizes the services of the University's Computer Center for computer searches of the NASA tapes. An IBM 7090 computer is used in a batch processing mode of operation. Execution of the search is almost always performed during late evening hours. Thus, the program and data decks are normally submitted to the Computer Center at the close

of one work day and retrieved at the beginning of the next work day.

Scope of Services Provided

A total of 90 organizations received search services during the 1968-1969 reporting period.

This figure is two greater than that shown in the marketing statistics. The difference is explained as follows:

Two participants in the 1967-1968 service period were delinquent in contract renewal negotiations at the time the current search period began. As is our custom, we continued to service them until they made their decision. In this instance, they both dropped out of the system. From the marketing point of view, they were not in the system during the 1968-1969 service period. From the operations point of view, they were in the system even though they were only serviced for one or two C/A searches. The following statistics reflect this latter point of view.

Figure 5-1 identifies the number of companies serviced during each service period of 1967 and 1968 and the first service period of 1969.

A distinction must be made between unique profiles and search profiles (commonly referred to at KASC as 'searches'). During any one chronological year of current awareness service, a client will receive 12 monthly search results. NASA sends us a magnetic tape each month, and we search this tape for accessions relevant to each of the active profiles in the system at the time of the search. The quantity of active profiles varies from month to month. New profiles constantly are being introduced and old ones terminated. Thus, the number of 'searches' performed is seldom, if ever, 12 times the number of unique profiles serviced during the year.

Unique Profiles

During the reporting period, a total of 899 unique profiles were serviced by the KAS Center. By basic types, this total is divided as follows:

● Current Awareness Only	727
● Retrospective Only	78
● Combination of Both	<u>94</u>
TOTAL	899

We mentioned earlier that in the interest of economy, KASC reformats the NASA tapes. The reformat program 'strips' extraneous (to KASC) information off the NASA tapes and maintains only the accession number of the citation, its associated index terms and the NASA category to which the citation was assigned. Thus, the NASA retro file, which includes approximately twenty tapes, is compressed so that KASC's retro file comprises six tapes. Two tapes cover the calendar period April, 1962, through December, 1965; two tapes cover the period 1966 through 1967; one tape covers the period 1968; and the sixth tape covers the current year, 1969, to date. As each monthly tape is received, it is appended to the retro tape.

In January of 1968, NASA initiated its new approach to vocabulary control utilizing the NASA three-volume thesaurus. At that time, KASC decided to main its retro file on the basis of a single tape per year. Thus, a retrospective search of the entire file requires the preparation and utilization of two search strategies and a total of six computer runs.

The accessions on the four tapes covering the period 1962 through 1967

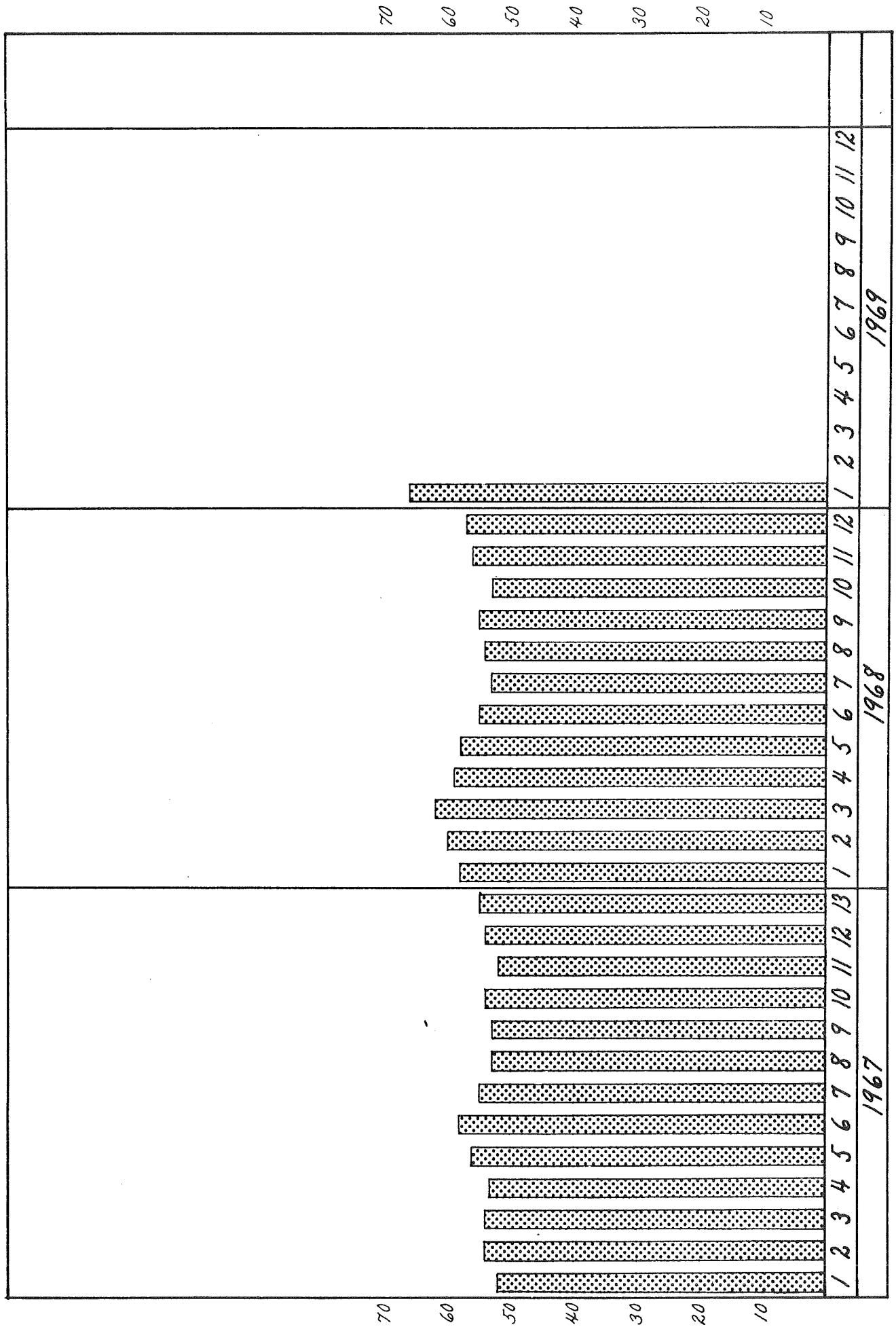


Figure 5-1. Companies Served Per Search Period

were indexed using the old NASA Subject Authority List (SAL). A retro of this portion of the file requires a SAL strategy and four computer runs.

Because the nature of our file does not permit a complete retro with a single pass through the computer, we do not attempt a complete retro at one time. Normally, we first perform a 1968 through 1969 search (two tapes). The output of this partial search is submitted to the client with a notice to the effect that the retrospective search is incomplete and, if he so wishes, the remaining portion of the file will be searched for him (1966-1967, then 1962-1965). In addition, we request his evaluation of the search results to determine the effectiveness of the search strategy used and whether changes are required.

The current KASC fees for retrospective service are for a search of the entire file. However, because the size of the file is increasing, a cost study is in order and soon we expect to establish retro fees on a 'time-span' basis. In this manner, a client can decide for himself just how far back he wants to search the NASA file.

Figure 5-2 illustrates the number of unique retrospective profiles introduced into the system compared to the number of 'searches' (computer runs) performed. Our statistics for searches are based on the premise that three searches are required for a complete retro. The time spans per search are: (1) 1969-1968; (2) 1967-1966; and (3) 1965-1962.

The shaded portion of the illustration reflects the number of unique profiles searched in the individual service period. The dotted line

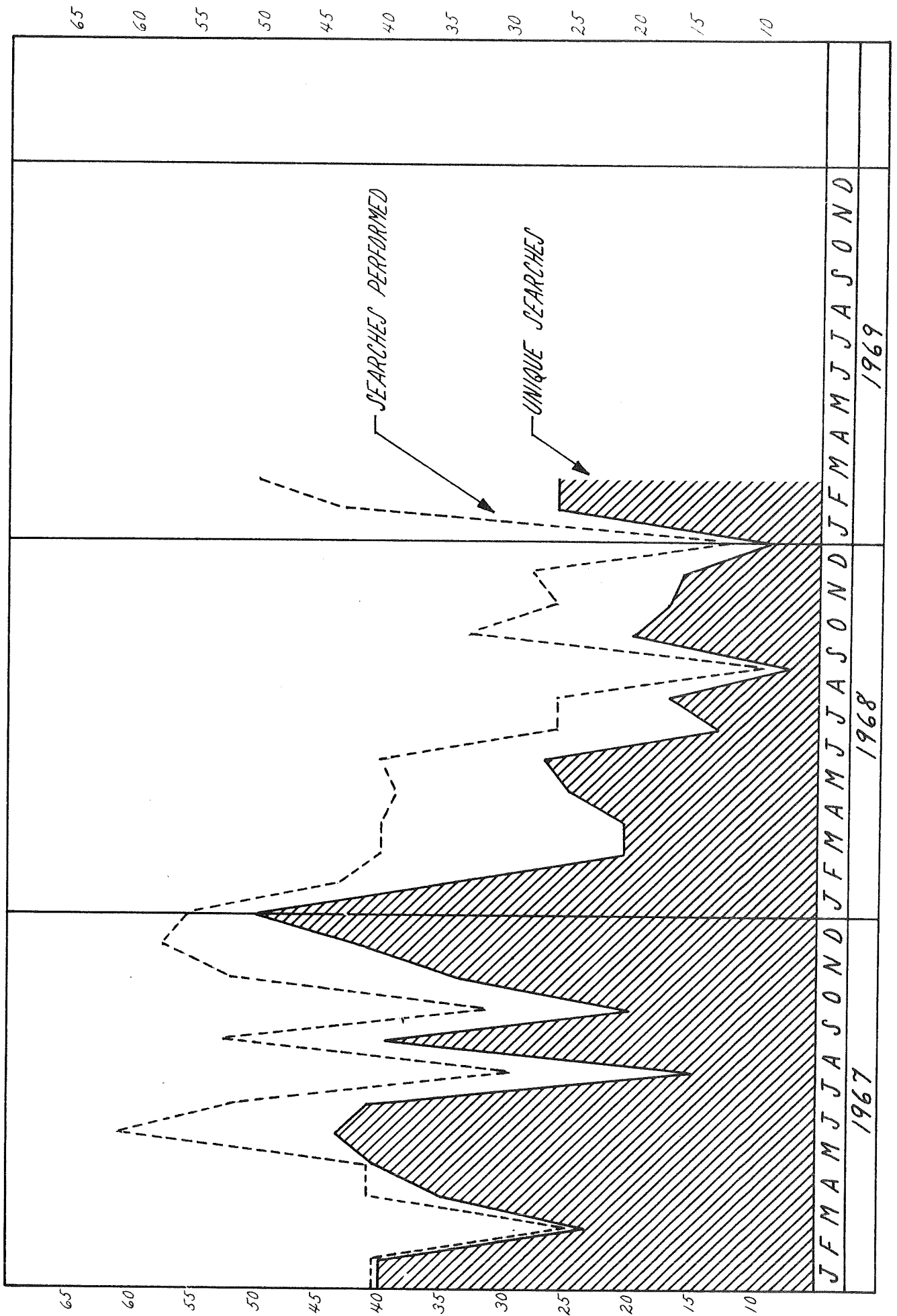


Figure 5-2. Retrospective Profiles (Unique vs. Searched)

reflects the number of searches performed. Thus, in March of 1968 we searched 21 unique profiles. However, these 21 unique profiles required 40 individual 'searches' to satisfy client requests. The 40 individual searches included the 'second' or 'third' portions of some retrospective profiles searched previously against the more recent portion of the file.

Figure 5-3 illustrates per search period the number of unique profiles serviced on a current awareness basis. The decrease in the number of profiles is attributed to the introduction of the new fee schedule during the eighth search period of 1968.

Previously, fees were very low and included free document service. The new fee schedule increased fees and made document service a separate cost item. Clients renewing their annual service agreements reviewed their information needs in relation to the options of the new service schedule and associated fees. The more obvious results of these reviews included a consolidation of profiles of narrow scope into a single broad profile (within limits), the cancellation of some profiles experiencing very nominal outputs, and the shifting of current awareness profiles from a Type III service (subject specialist review) to a Type II service (no review at all).

Another factor contributing in some degree to the decline in profile load related to the fiscal year and budgeting policies of individual participants. The budgets of some of the clients had already been determined at the time new fees were initiated. For those companies who could not obtain increased appropriations, the only alternative was

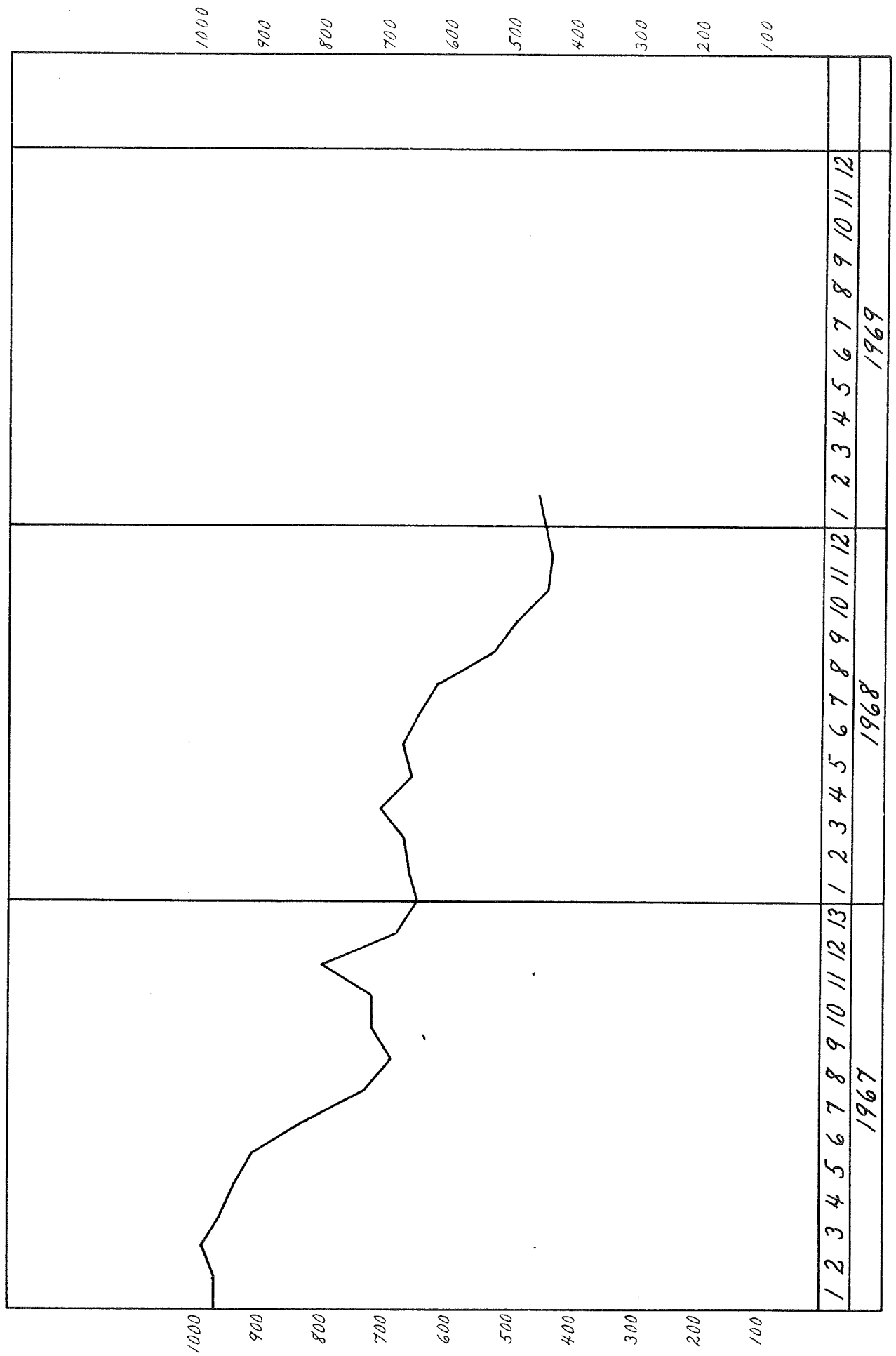


Figure 5-3. Unique Current Awareness Profiles

to reduce the number of profiles.

Profile Searches

A total of 6430 current awareness and retrospective searches were performed during the reporting period.

● Current Awareness	6095
● Retrospective	<u>335</u>
TOTAL	6430

Figures 5-4 and 5-5 illustrate the profile load by type of service per search period for both current awareness and retrospective profiles, respectively.

'No Citation' Searches

The total of 6430 searches performed during the reporting period included 1239 searches which resulted in 'no citations,' i.e., no citations were identified by the computer or, if there were, none were deemed relevant to the client's inquiry. Thus, 'no citations,' in effect, means no relevant citations. The total of 1239 (20%) reflects a 3% decrease since the last annual report. All 'no citation' results were associated with C/A searches only. All retros had some degree of positive response.

Figure 5-6 illustrates the 'no citation' results on a service period basis.

Citations Retrieved

The 6430 current awareness and retrospective searches performed for the

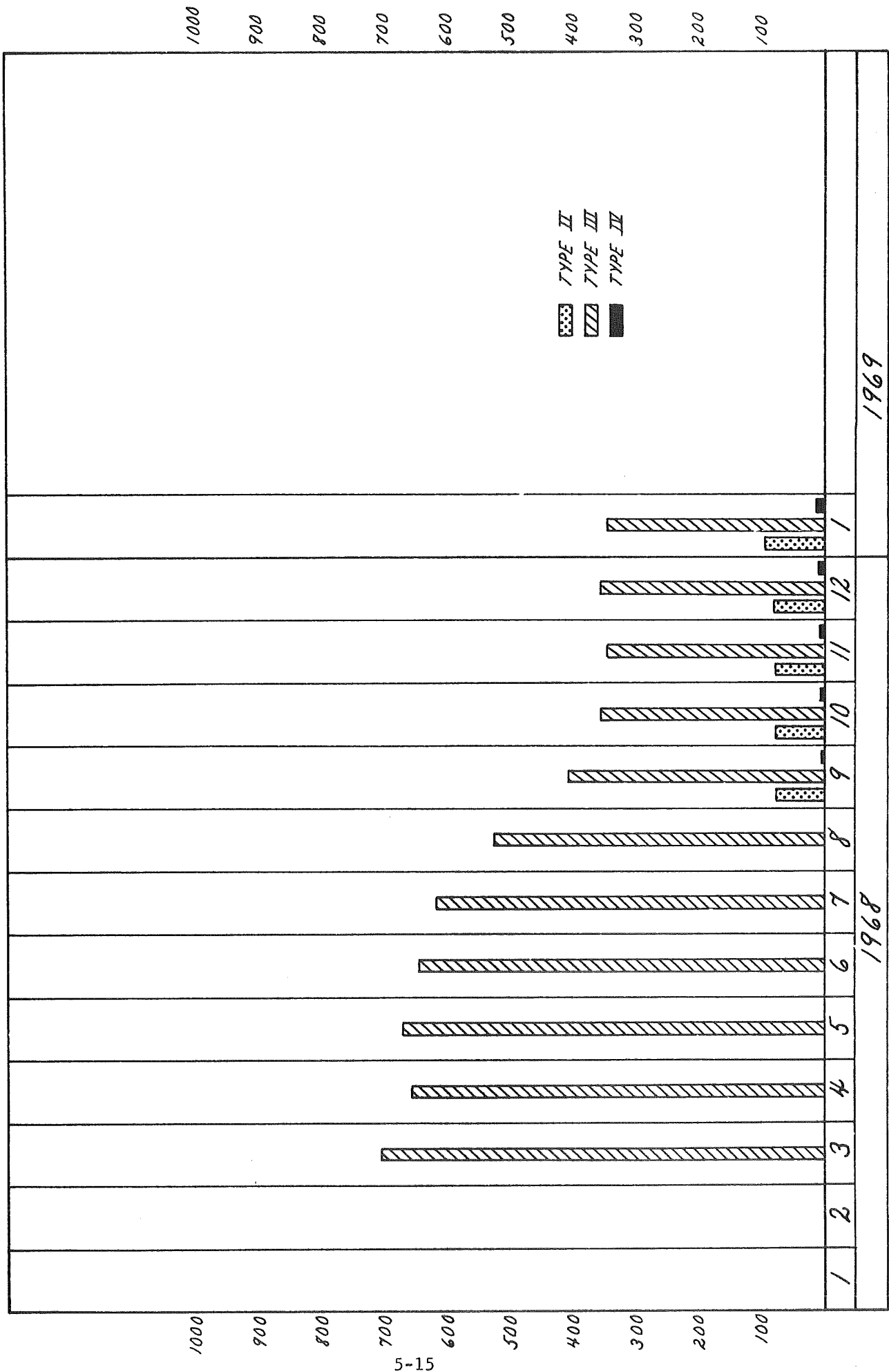


Figure 5-4. Current Awareness Profiles By Type

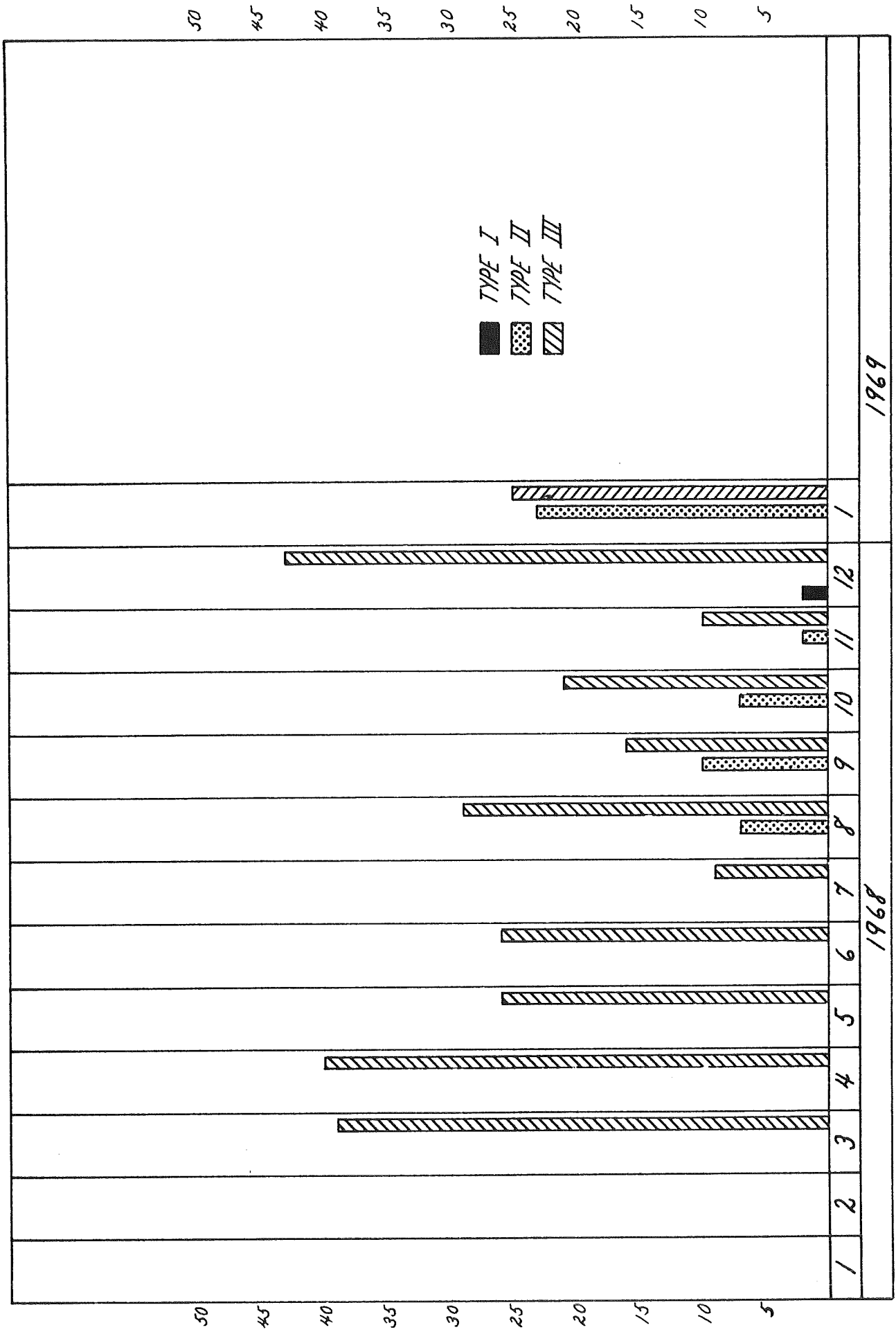


Figure 5-5. Retrospective Profiles By Type

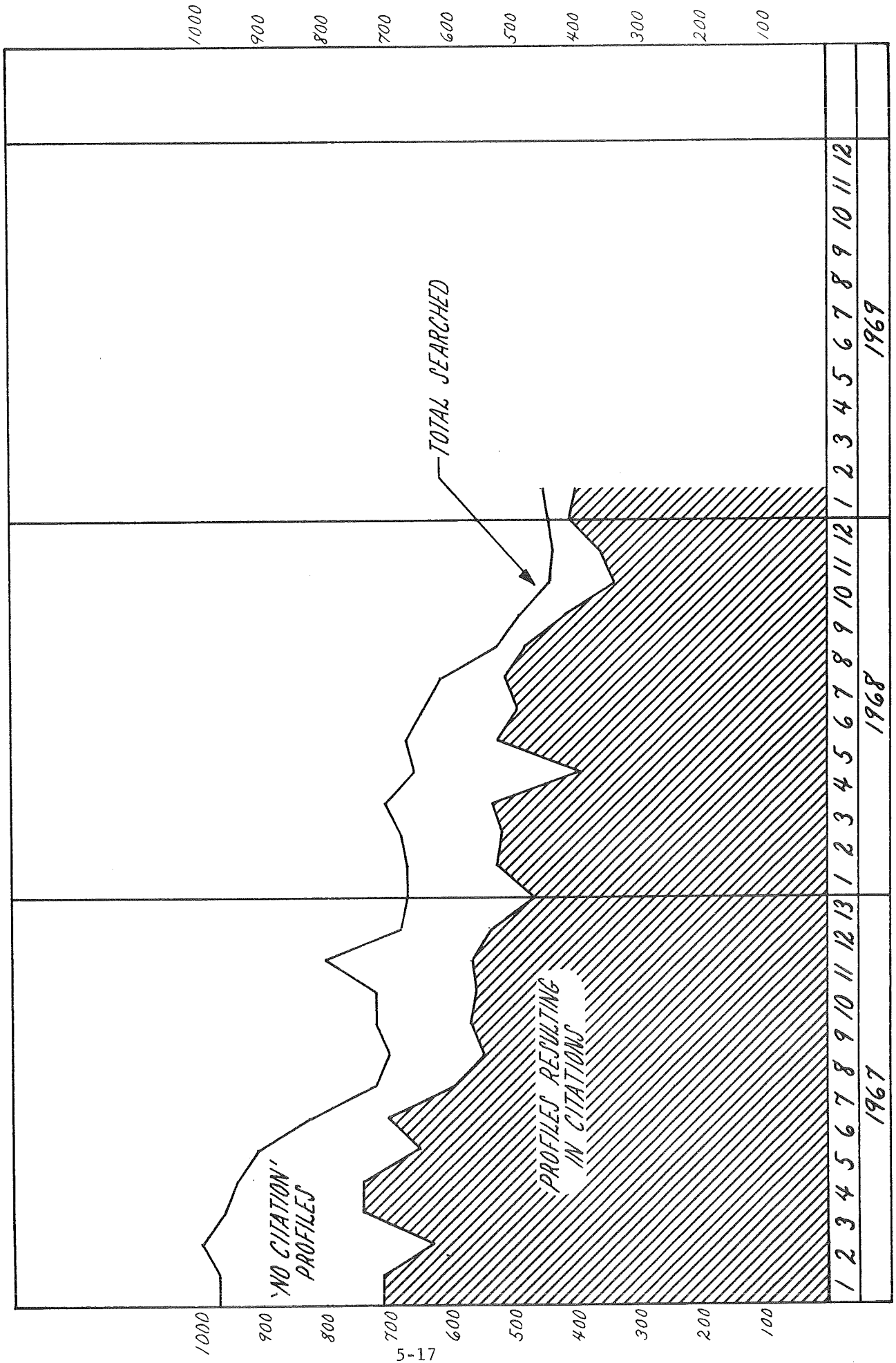


Figure 5-6. Profiles Resulting in No Citations

899 unique profiles serviced during the reporting period resulted in the retrieval of 235,959 citations.

● Current Awareness	152,414
● Retrospective	<u>83,543</u>
TOTAL	235,957

Comparing these results with those of last year, a decrease of 39% in unique profile load, coupled with a decrease of 48% in searches performed, resulted in a 45% decrease in citations retrieved.

The 235,957 citations consisted of items announced in:

- Scientific and Aerospace Technical Reports (STAR)
- International Aerospace Abstracts (IAA)
- Aerospace Medicine and Biology... (AM)
- NASA Tech Briefs
- Nuclear Science Abstracts (NSA)
- U.S. Government Research and Development Reports (USGRDR)

The majority of the retrieved items appeared in STAR and IAA and were retrieved mechanically. When a mechanical search is unsuccessful, a manual search of the above bulletins is often performed. The index terms of relevant items identified manually are reviewed and compared with the terms used in the computer strategy. Strategy revisions are made as required.

In order to facilitate the 'comparison,' a computer listing is printed out of all the accessions appearing on the monthly NASA tapes. Our information specialists regard this listing as an excellent reference and analysis tool.

Tech Briefs are listed on individual NASA monthly tapes only twice during

the year. For example, during 1968, Tech Briefs published in the first six months of the year made their first appearance on the eleventh tape of the year. Those published during the last six months of 1968 had not appeared on tape as of the end of the current reporting period.

Under the circumstances, Tech Brief retrospective searches are performed mechanically, and current awareness searches are performed manually. Manual searches utilize a typed listing of Tech Briefs titles received monthly. This list is circulated among the analysts who screen it for items relevant to profiles assigned to them.

AM entries appear on the monthly NASA tapes. However, the abstract journal seldom, if ever, arrives in time to be used in conjunction with the current NASA tape. Thus, like the Tech Briefs, AM retrospectives are more readily implemented mechanically and current awareness searches, manually.

Other item types are cited only in current awareness searches and are identified through manual searches of the subject index of the bulletin announcing the item. The search of these bulletins in relation to a profile is not a scheduled effort as part of the services offered by the KAS Center to its clientele. It occurs when the subject area of a profile appears to be appropriate for the aerospace literature, but for which mechanical searches have been relatively unsuccessful. The overlap between the report literature accessioned for NASA's system and reports announced in other Government agencies' bulletins is sufficient to sometimes enable KASC to identify a document through these other bulletins that it was not able to locate in mechanical or manual searches

of STAR or IAA. As expected, the quantity of items cited from these sources is a very small proportion of the total and their quantities have been included with citations from AM.

Table 5-1 illustrates the quantities of all items cited in current awareness searches by source, service type and mode of citation during the reporting period.

Table 5-1. Current Awareness Citations

SERVICE TYPE	MODE OF SEARCH		TOTALS
	MECHANICAL	MANUAL	
<u>Type II</u>			
IAA	3,185	0	3,185
STAR	3,534	0	3,534
TECH BRIEFS	0	0	0
AM & OTHER	1	0	1
			ST 6,720
<u>Type III</u>			
IAA	68,800	1,131	69,931
STAR	67,050	1,128	68,178
TECH BRIEFS	40	178	218
AM & OTHER	971	565	1,536
			ST 139,863
<u>Type IV</u>			
IAA	2,893	22	2,915
STAR	2,826	6	2,832
TECH BRIEFS	0	13	13
AM & OTHER	12	59	71
			ST 5,831
TOTALS	149,312	3,102	152,414

Similarly, for retrospective searches, the distribution of the items cited is given in Table 5-2.

Table 5-2. Retrospective Citations

SERVICE TYPE	MODE OF SEARCH		TOTALS
	MECHANICAL	MANUAL	
<u>Type I</u>			
IAA	1,416	0	1,416
STAR	2,789	0	2,789
TECH BRIEFS	0	0	0
AM & OTHER	59	0	59
			ST 4,264
<u>Type II</u>			
IAA	3,900	0	3,900
STAR	5,052	0	5,052
TECH BRIEFS	0	0	0
AM & OTHER	350	0	350
			ST 9,302
<u>Type III</u>			
IAA	29,990	188	30,178
STAR	38,895	193	39,088
TECH BRIEFS	6	3	9
AM & OTHER	694	8	702
			ST 69,977
TOTALS	83,151	392	83,543

Citations Forwarded

A total of 87,132 citations were forwarded to KASC clients during the reporting period. This represents 36.9% of all citations retrieved—both manually and mechanically. The reader should not overlook the fact that our Type I and Type II services do not have any 'post-computer search' review. Thus, all computer output—noise included—is submitted to the client.

Of the total 235,957 citations identified by the searches, 148,825 citations (63.1%) were identified as noise by subject specialist review. This degree of noise is even greater when computed on the basis of

citations retrieved for profiles requiring subject specialist review. Thus, 126,288 rejects out of a total 209,840 indicates 60.2% of search output was noise.

The above statistics indicate the value of the subject specialist review (positive thinking). The client receives both the benefit of an aerospace literature search more thorough than he personally has time to perform, and the benefit of an elimination process which he would have to perform to overcome the inadequacies that presently exist in the state-of-the-art of information retrieval systems such as ours.

Type IV (Standard Interest Profile) citations contained 3258 items considered noise by subject specialist review. This represents 55.8% of the total 5831 retrieved. Please note that SIP's are broader in scope than the normal profiles we service because they are slanted toward groups of users rather than at individuals.

The quantities of all citations resulting from current awareness service and forwarded to clients are identified in Table 5-3 by source, service type and mode of citations.

Similar statistics for retrospective searches are presented in Table 5-4.

Prior to the eighth search period of 1968, all KASC profiles received subject specialist attention. In our current service terminology, they were all Type III profiles. Some were C/A only, some retro only, and some were a combination of both—but all were reviewed prior to submittal to the client.

Table 5-3. Current Awareness Citations Forwarded to Clients

SERVICE TYPE	MODE OF SEARCH		TOTALS
	MECHANICAL	MANUAL	
<u>Type II</u>			
IAA	3,185	0	3,185
STAR	3,534	0	3,534
TECH BRIEFS	0	0	0
AM & OTHER	1	0	1
			ST 6,720
<u>Type III</u>			
IAA	22,280	342	22,622
STAR	21,437	346	21,783
TECH BRIEFS	10	137	147
AM & OTHER	547	313	860
			ST 45,412
<u>Type IV</u>			
IAA	1,390	21	1,411
STAR	1,108	6	1,114
TECH BRIEFS	0	12	12
AM & OTHER	0	36	36
			ST 2,573
TOTALS	53,492	1,213	54,705

Table 5-4. Retrospective Citations Forwarded to Clients

SERVICE TYPE	MODE OF SEARCH		TOTALS
	MECHANICAL	MANUAL	
<u>Type I</u>			
IAA	1,416	0	1,416
STAR	2,789	0	2,789
TECH BRIEFS	0	0	0
AM & OTHER	59	0	59
			ST 4,264
<u>Type II</u>			
IAA	3,900	0	3,900
STAR	5,052	0	5,052
TECH BRIEFS	0	0	0
AM & OTHER	350	0	350
			ST 9,302
<u>Type III</u>			
IAA	7,266	121	7,387
STAR	11,126	134	11,260
TECH BRIEFS	6	0	6
AM & OTHER	200	8	208
			ST 18,861
TOTALS	32,164	263	32,427

Combining all current awareness service prior to the eighth search period with all Type III current awareness service from the eighth search period till the end of the reporting period, permits us to compare 'apples with apples.' Thus, Figure 5-7 presents, on a search period basis, a curve of Type III current awareness profiles serviced, total citations retrieved, and total citations forwarded during the year 1968 and the first month of 1969.

Customer Evaluation of Search Results

When search results are mailed out, a combination evaluation/document order form is included in the packet. On this form are listed all the accession numbers of the abstracts being transmitted. The client is requested to evaluate each item and to return the form to KASC using an enclosed self-addressed envelope. Three possible choices of evaluation are possible:

- Abstract is related to the profile.
- Abstract is not related to the profile.
- Abstract is not related to the profile but is related to other interests of mine—please continue sending this type of information.

In addition to acting as a 'feedback' mechanism, the form is designed to serve as a document order form. A client may order a full document in either hard copy or microfiche. Where the client does not evaluate a citation but does request that it be sent to him in 'full copy,' KASC considers the citation as relevant to that profile.

During the reporting period, KASC performed 6430 searches and submitted

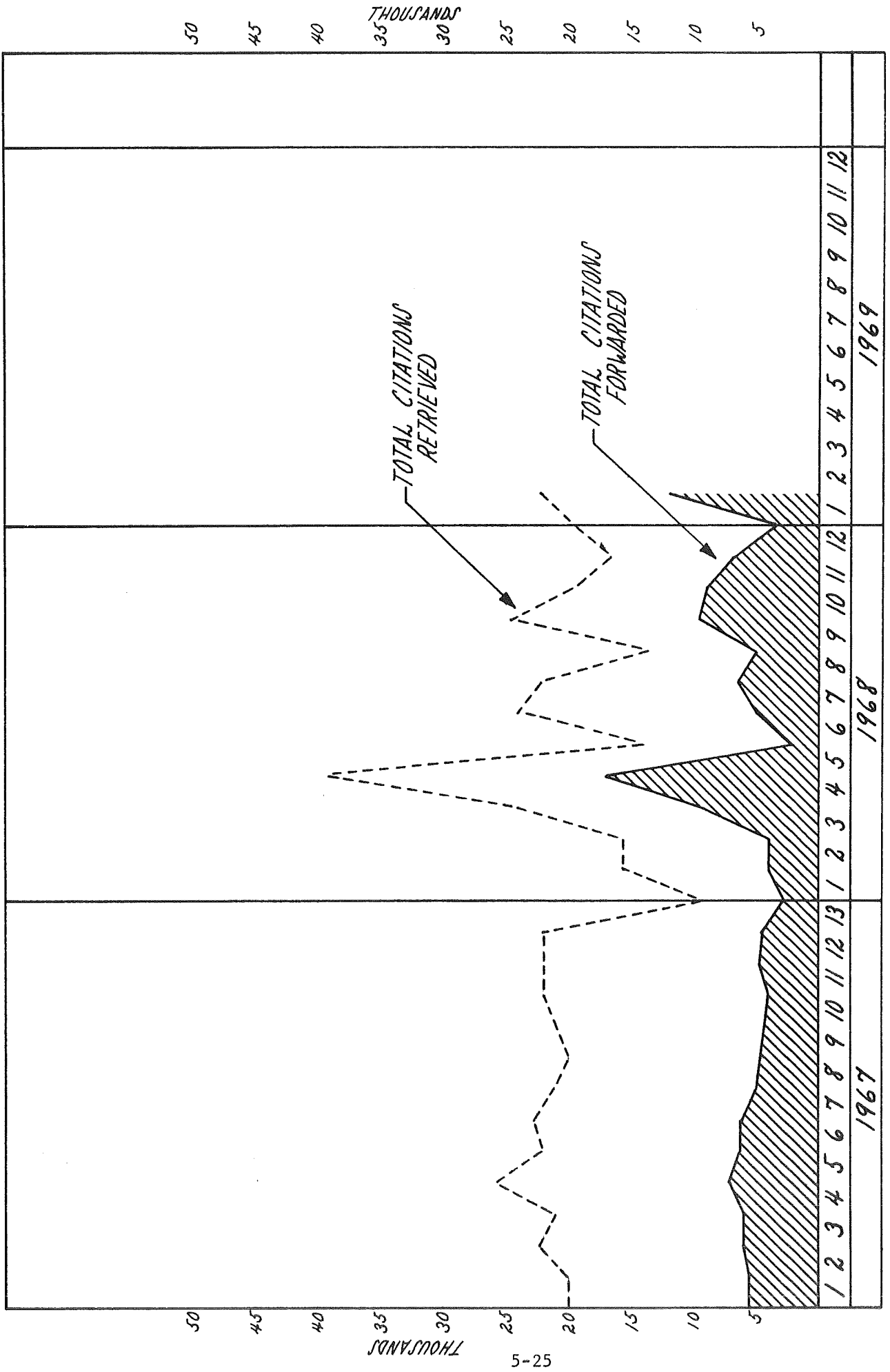


Figure 5-7. Citations Retrieved vs. Citations Forwarded

to clients the results of 5191 searches (1239 searches resulted in 'no citations'). Of the 5191 searches possible for the clients to review, they evaluated 3941. This figure represents a 76% return—which is pretty fair.

The client evaluations received in any one month (search period) obviously are not related to the search results submitted in that same period. In fact, the evaluations may be of results submitted many months earlier. It is interesting to note in Figure 5-8 the curve of evaluations received during the reporting period is not too different from the curve of the searches performed during the same period. (The significance of this factor—if any—escapes the writer.)

The 3941 searches evaluated by KASC clients consisted of 3818 current awareness searches and 123 retrospective searches. Together they resulted in 58,328 citations as follows:

<u>Service Type</u>	<u>C/A Searches</u>	<u>Retro Searches</u>
Type I	0	0
Type II	4,990	3,213
Type III	42,311	6,455
Type IV	<u>1,359</u>	<u>0</u>
TOTALS	48,660	9,668

Tables 5-5 and 5-6 present the quantities of evaluated citations for C/A and retro searches, respectively, and presents the distribution of these items by type of service and source of origin.

Document Service

Document service on a fee basis was introduced during the eighth search

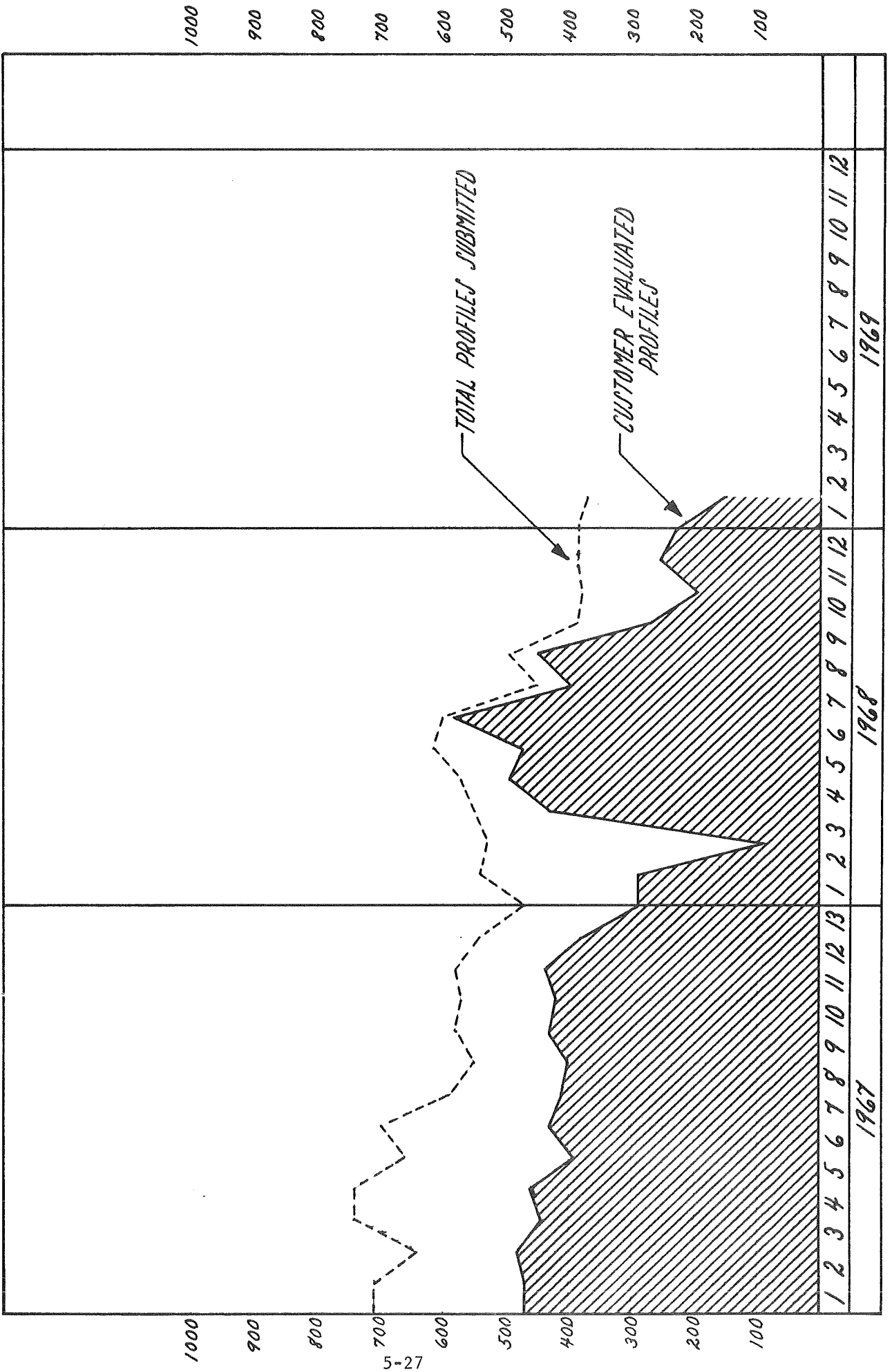


Figure 5-8. Customer Evaluated Profiles

Table 5-5. Customer Evaluation of Current Awareness Citations

SERVICE TYPE	RELEVANT	%	NON-RELEVANT	%	RELATED TO OTHER INTER.	%	TOTALS	%
<u>Type II</u>								
IAA	1,698	64	755	28	210	8	2,663	100
STAR	1,395	60	785	34	146	6	2,326	100
TECH BRIEFS	1	100	--	--	--	--	1	100
AM & OTHER	--	--	--	--	--	--	--	--
Subtotals	3,094	62	1,540	31	356	7	4,990	100
<u>Type III</u>								
IAA	14,453	64	4,249	19	3955	17	22,657	100
STAR	12,584	66	5,198	27	1217	7	18,999	100
TECH BRIEFS	92	84	11	10	6	6	109	100
AM & OTHER	377	69	111	20	58	11	546	100
Subtotals	27,506	65	9,569	23	5236	12	42,311	100
<u>Type IV</u>								
IAA	142	20	548	78	14	2	704	100
STAR	123	19	514	79	11	2	648	100
TECH BRIEFS	4	57	3	43	--	--	7	100
AM & OTHER	--	--	--	--	--	--	--	--
Subtotals	269	20	1,065	78	25	2	1,359	100
TOTALS	30,869	63	12,174	25	5617	12	48,660	100

Table 5-6. Customer Evaluation of Retrospective Citations

SERVICE TYPE	RELEVANT	%	NON-RELEVANT	%	RELATED TO OTHER INTER.	%	TOTALS	%
<u>Type II</u>								
IAA	655	45	754	51	61	4	1470	100
STAR	518	31	1125	66	47	3	1690	100
TECH BRIEFS	--	--	--	--	--	--	--	--
AM & OTHER	42	79	11	21	--	--	53	100
Subtotals	1215	38	1890	59	108	3	3213	100
<u>Type III</u>								
IAA	1668	59	1020	36	154	5	2842	100
STAR	1736	49	1509	42	318	9	3563	100
TECH BRIEFS	--	--	--	--	1	100	1	100
AM & OTHER	2	1	20	43	27	56	49	100
Subtotals	3406	53	2549	39	500	8	6455	100
TOTALS	4621	48	4439	46	608	6	9668	100

of 1968. Where a client's period of annual service had not yet terminated, document copy was provided as an integral part of the search services until the end of his service period. Because accession numbers of the STAR and IAA documents are preceded by their alphabetic 'N' for those announced in STAR and 'A' for those announced in IAA, these documents are commonly referred to, respectively, as N-documents and A-documents.

Most of the N-documents are available in microfiche form and are provided to KASC by NASA. Hard copies of these documents are provided to KASC clientele through the enlargement-exposure-development processes of a microfilm reader/printer. An Itek 18.24RS is used for this purpose. This model was available for use only during the last week of the present reporting period. Prior to its receipt, the slower model Itek 18.24 was used. With either machine, the documents on microfiche are exposed and printed two frames at a time, resulting in a page size which permits us to provide full document service at low cost.

During a major portion of the service year, requests for microfiche copies of N-documents were provided through the resources of NASA. Since the close of the reporting period, however, microfilm duplication equipment has been installed in the offices of the KAS Center, and its clientele requests are being filled through duplication of copies of N-documents already on microfiche in our files.

Requests for hard copy of A-documents are more difficult to fill. The American Institute of Aeronautics and Astronautics (AIAA), publishers of IAA, have found it impossible to serve their original purposes

without limiting the interlibrary loan service which NASA's Regional Dissemination Centers have imposed upon them. During the year, KASC has consistently and successfully decreased the quantities of items requested on loan from the AIAA. Yet, it has not reduced the loan requests to a level satisfactory to the AIAA. Local resources were the predominant alternative to that of the AIAA and exploiting their holdings became feasible with the publication by the University of Pittsburgh of a union list of the serial holdings of its various libraries. Approximately 30% of KASC's A-document requests are filled using serial publications held by these various libraries.

Non-University libraries in the area are known to hold other items for which KASC has received requests. However, loan copies are not made available by these organizations, and their copying services are either not available in the quantity required by KASC, or the charges for copying are greater than we can afford.

Although approximately 50% of the IAA accessions have been stored on microfiche which are sold by the AIAA, the KAS Center has avoided this procedure of purchasing microfiche and printing hard copy upon request. Past studies have shown that the frequency of duplicate requests for the same item have been less than two, and the investment in microfiche was deemed uneconomical.

Following the failure to obtain an item from some source other than the AIAA, a copy must be purchased, hopefully, at a cost which will enable KASC to continue to provide full document copy at a uniformly low per page cost. The problem presents itself of determining which of

the publications should be purchased and which should be borrowed. More than the purchase price must be taken into consideration. A single publication may cover several items accessioned for the IAA. This is particularly true for conference proceedings, each paper of which may constitute a separate item of accession. In this case, the quantity of pages of accessioned items divided into the purchase price of the proceedings may result in a per page purchase cost that will enable us to meet its objective (unless storage costs mount too rapidly) and, fortunately, these items are generally of high demand by KASC clientele. On the other hand, the publication may contain only one or two accessioned items resulting in a prohibitively high per page purchase cost. Fortunately, such items are of low demand by KASC clientele, but, unfortunately, the total quantity of individual publications is greater than can be met through the resources of local libraries or the interlibrary loan services of the AIAA. Where such items are available through the AIAA on microfiche, we have no alternative but to purchase the microfiche and print the requested hard copy with the hope that at some later time a second request will be received for the item, either in hard copy or on microfiche, to help ameliorate the purchase cost. Still, this action does not lower the individual publication needs of KASC to a level which can be met locally or through the AIAA. As a consequence, costs to the KAS Center for provision of document hard copy to its clientele will increase as it must purchase more and more of the publications containing accessioned items. In turn, KASC must increase the cost to its clientele for full document copy service.

The total documents requested during the reporting period were tallied by the type of search service which had been provided. The results are illustrated in Table 5-7.

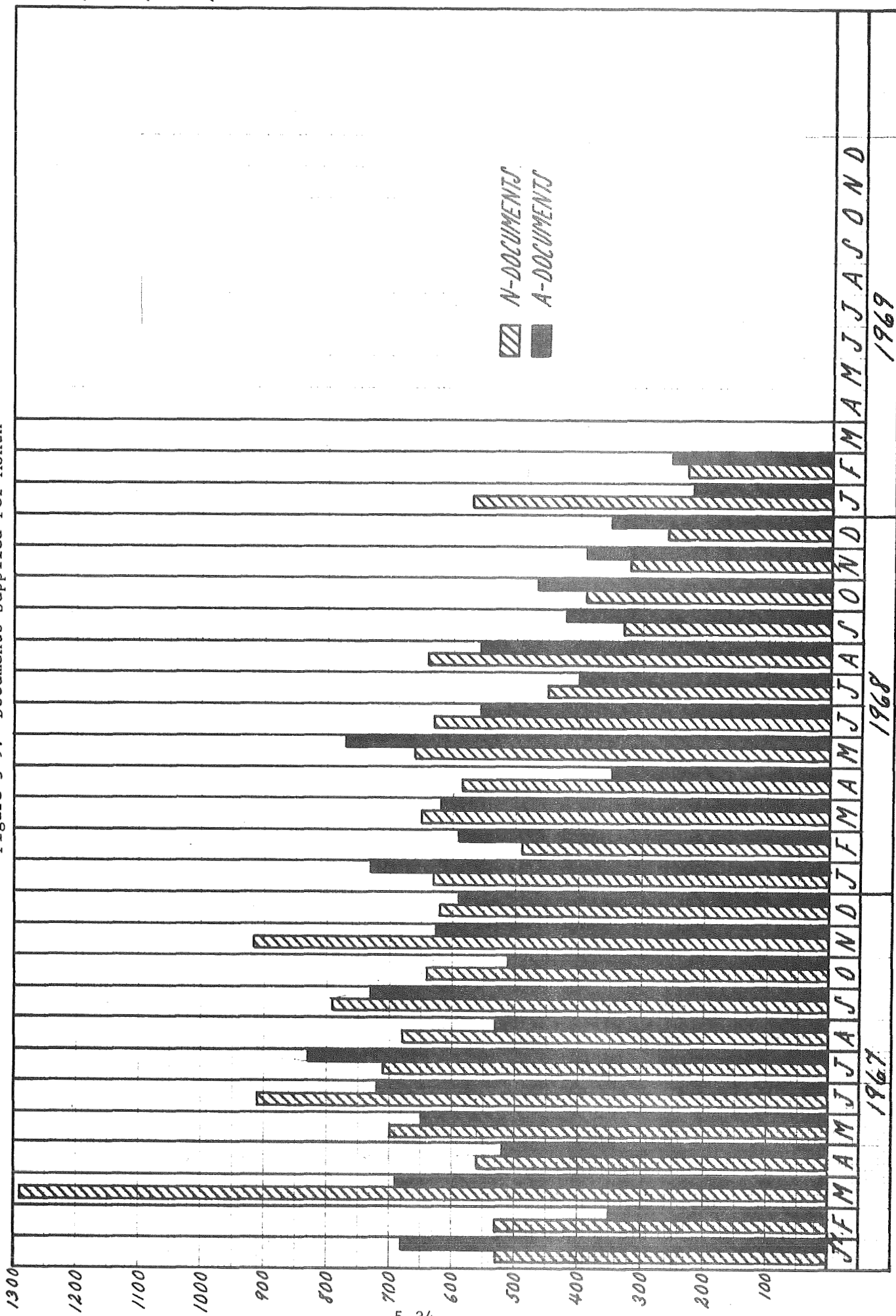
Table 5-7. Documents Requested Per Service Type

SERVICE TYPE	A-DOCUMENTS		N-DOCUMENTS		TOTALS
	HC	MF	HC	MF	
<u>Type I</u>					
C/A	0	0	0	0	0
Retro	0	0	0	0	0
					ST* 0
<u>Type II</u>					
C/A	85	55	122	84	346
Retro	61	25	110	34	230
					ST 576
<u>Type III</u>					
C/A	2780	707	2467	689	6643
Retro	361	83	495	146	1085
					ST 7728
<u>Type IV</u>					
C/A	27	2	33	2	64
Retro	0	0	0	0	0
					ST 64
<u>Uniden- tified</u>					
C/A	486	46	626	53	1211
Retro	0	0	0	0	0
					ST 1211
TOTALS	3800	918	3853	1008	9579

* ST = Sub-total

The documents supplied during the same period by month and document type is illustrated in Figure 5-9.

Figure 5-9. Documents Supplied Per Month



Related Activities

Materials Engineering

During 1968, Materials Engineering magazine joined the clientele of KASC for a purpose distinct from the remainder of the group. Profiles phrased by the magazine were directed toward the interest areas of its subscribers and required only retrospective search service. From the results for each profile provided by KASC, the magazine selected the abstracts of documents directly related to its readers' interests and announced each month the topic of the 'packet' of abstracts, the quantity of abstracts in the packet, and the packet's availability through the Materials Engineering reader services. Responses received by the magazine were forwarded to KASC, which then supplied the reader with a copy of the abstract packet. A total of 2381 copies of 34 packets were supplied during the year, representing a total of 54,100 citations.

Cost Analysis

Continuing the effort begun in the preceeding reporting period, KASC began to develop and institute an ongoing cost effectiveness study plan. The plan includes the following steps:

1. Identify subsystems, assemblies, components, etc. of the dissemination service.
2. Break down the identified components, such as by flow-charting, to units most convenient for cost estimation.
3. Characterize units by relevant parameters, such as man-hours, machine hours, redundancies, performance variables, weights, frequencies, etc.
4. Express cost of units as functions of parameters.

5. Store costs for use with computer system.
6. Utilize existing or build appropriate computer programs to utilize these costs and produce overall cost estimates for the various components and the total dissemination service.
7. Alter parameters for estimating costs of future service.

Building upon the work of the previous year, work progressed to some degree on each of the first four steps. The most obvious subsystems were quickly identified as corresponding with the array of service type and search types currently offered by KASC. The identification of current awareness and retrospective search service as a separate type and not merely a combination of current awareness and retrospective service is not without reason. Redundancies occur between the latter two which do not appear in the combined service. For purposes of cost analysis, then, the combined service becomes a separate subsystem. Components of these subsystems, except for full document copy service, were identified as consisting of (1) marketing, (2) analysis, and (3) technical operations. Components of the document service have yet to be formally identified, but in all probability will appear based on the source of the document. Additional subsystems identified are materials management, computer tape management, and clientele feedback.

Flowcharting of the components of the service-search types was begun first by revising the flow diagrams which appeared in the report of the preceeding work period in order to identify possible ommissions and to produce a more detailed diagram. The revised diagram is being used as a basis for the detailed flowcharting which must be performed. A rough chart of the technical operations of the combination Type III

current awareness and retrospective service was prepared from which a first draft of the technical operations of Type III retrospective only service has been prepared.

Simultaneously, the units of the flowcharts are identified by man or machine hours, and frequency of occurrence and the costs of the units have been tentatively identified in order to evaluate the present pricing schedule. More accurate cost determination of the units is being made than was previously performed.

For instance, computer hours required for performing a retrospective search during 1968 have been .074 for the average profile requiring such service. This is based on 22 batched searches containing an average of 7.78 profiles per search. However, searches of profiles in batches of less than 7.78 occur more frequently than in batches of more than 7.78. In fact, the number of profiles searched at one time on the average was most frequently 5.94. The average hours required for a retrospective search of batches of this size is .104 and for estimating costs of future service is a more reliable basis than the unweighted average computer hours of past services.

Equipment changes have affected the estimated costs of service as well. Copying of abstracts last year was based on an estimate of \$.025 per abstract for material costs and machine time. The recent installation of the A. B. Dick 675 copier has reduced that estimate to \$.007 per abstract.

Another recent factor affecting costs has been the added cost of abstract card production which was discontinued by NASA as a service to

its Regional Dissemination Centers on January 1, 1969. This cost is being shared among several Regional Centers at a cost of approximately \$1754 annually.

VI. RDC IMPACT

In the past, determination of impact has relied on identification by the client of direct benefits resulting from participation in the Program. The information on transfers normally was compiled and submitted to us by the client after a direct personal contact (visit or telecon) from a KASC representative. The results of these efforts comprised our impact reports.

This year, our report continues in this vein. However, we have also included mention of a recent effort to identify impact on the basis of a document questionnaire.

Direct Approach

Examples of direct transfers recorded on the basis of client inputs follow.

Transfer One

Large Industrial Client

Nature of Problem: In the steel mill, instrumentation related to the processing of the steel is frequently subject to interference by stray noises picked up by induction of currents. These induced, false signals are interpreted by the instrumentation as false instructions.

Information of Help: Complete retrospective search resulting in citations of documents reporting studies by NASA of sources and prevention of electrical noise interfering with control instrumentation.

Savings: Six months of laboratory investigation by an engineer and one or more technicians.

Transfer Two

Large Industrial Client

Transfer Two (Continued)

Nature of Problem: Instrumentation to determine wind loading on tall buildings.

Information of Help: TB68-10530 gave a suggested method which the engineer proposes to use to collect experimental data relative to wind loading of tall buildings.

Savings: Unknown.

Transfer Three

Large Industrial Client

Nature of Problem: Methods and techniques for examining unusual microstructures.

Information of Help: Document A68-26647 gave a method for examination of grain boundary precipitation in aluminum alloy which was applied to steel.

Savings: 150 hours of engineer's time.

Transfer Four

Large Industrial Client

Nature of Problem: Identify composition and phases of non-metallic inclusions in steel.

Information of Help: Document A68-26637 gave a technique for studying the composition and phases of a meteorite which was applied to non-metallic inclusions.

Savings: 75 to 100 hours of engineer's time.

Transfer Five

Leece-Neville Company

Nature of Problem: Need for high temperature resistant sealing and adhesive materials.

Information of Help: A66-13786—engineering data for polytetrafluoroethylene, and filled compounds. A67-22518—mechanical properties and environmental resistance of polybenzimidazole resin systems.

Savings: Unknown.

Transfer Six:

Large Industrial Client

Quotation from Letter: "There have been a few instances where we have been able to employ smaller samples in making a goodness of fit test as the result of having Table III in N68-16400. If I were forced to estimate how much time was saved in these instances, I should say that the savings amounted to somewhere between 5 and 10 percent of our data collections costs in those particular experiments. At this point I cannot say that product quality, per se, has been improved by our application of N68-16400.

The principal benefits to be gained from reports such as N68-16400 are somewhat intangible, but include improving the general level of our information and capabilities. In some instances information in these reports have saved us from 'reinventing the wheel.' Thus, the reports are practical, educational, and valuable whenever we do not have to repeat work already done by others. They are an extension to our library facilities into areas not normally covered by our current periodical lists."

Transfer Seven:

Large Industrial Client

Quotation from Letter: "Document N68-20950, for example, informs us that a new technique for non-destructive testing has or is being developed. When new equipment is being designed and purchased, we utilize this and similar information developed from other sources to advise on the proper non-destructive testing techniques to secure quality equipment at minimum costs. Information derived from such non-destructive testing permits safely using materials at a higher proportion of their ultimate strength with a corresponding reduction in cost. Utilization of new developed non-destructive testing techniques is estimated to save our company on the order of \$10,000,000 yearly. The documents in question did not contribute to this extent, however. All of the information on non-destructive testing furnished us through the NASA system could be possibly credited with \$1,000,000 or 10% of this saving yearly."

Transfer Eight:

Rockwell Manufacturing Company

The Rockwell Manufacturing Company submitted the following

Transfer Eight (Continued)

question for retrospective and current awareness search: "Methods of Coating Steel with Corrosion and/or Wear Resistant Layers." Among the documents retrieved by these searches was one cited in the October 1, 1968, issue of International Aerospace Abstracts, A68-38159, entitled "New Plasma Spraying and Its Application." This is a new shielded plasma jet spraying process which has been developed and applied to the surfacing of mild steel plate with Nickel-Chromium-Boron-Silicon alloy or WC-25% Cobalt sintered alloy. Examinations of the microstructures, hardness, density and bonding strength of the coating showed excellent results.

The company is now installing the equipment to operate this process at their valve manufacturing facilities in Raleigh, Virginia. While this process will improve the quality of their product and reduce the costs of coating the valves, it is too early to say how much the process will mean in terms of cost reduction and increased sales. However, they estimate that our service saves them at least \$6000 per year just in literature search time.

Document Oriented Approach

Impact may be defined in many ways. Therefore, it is important that we identify what we mean when the term impact is used in the following discussion.

Technology transfer programs include, as a major resource, bits of information packaged in units (documents) which are stored on semi-permanent mediums. These bits of information are transferred through human sensory input channels to the human brain where they are selectively assimilated and internalized. The assimilation and internalization process motivates the information seeker in varying degrees and results in an observable change in his behavior.

The effect of this transfer of information, from one medium through

human input channels and through processes of assimilation and internalization, on the behavior of the information seeker (which, in turn, is reflected in changes in company activities and policies)—this effect, is what we call impact.

The study of impact should not involve directly a study of the organizational or operational effectiveness and/or efficiency of the storage, retrieval and dissemination process conducted at the Regional Centers. The RDC's are intermediaries in the Technology Transfer Program and must be considered separately from the impact itself. Stated in another way, impact is a result; the RDC activities are the mechanism which contributed to the result. Thus, within this context we are trying to identify the result. If our efforts are successful and the results identified are good, then we may infer that RDC's are beneficial.

Within the context of our discussion this far, it is apparent to us that our study of impact should relate to the document—the full document that a client may have ordered—and the change in the information seeker's behavior resulting from his use of the document.

Our first step was to design a document oriented form (Figure 6-1) to study the documents ordered and to compile a body of data which could be analyzed and, hopefully, give us some criteria for identifying impact on the client and maybe even to develop some way to measure this ever so elusive phenomenon.

The first question is intended to give us more than just permission to 'use' his information. Any answer (yes or no) to the first question

Figure 6-1. Document Questionnaire

Document No. _____ Company Code _____ Question No. _____

TO: DOCUMENT REQUESTOR

Answers to the questions listed below will supply evidence as to the usefulness of the National Aeronautics and Space Administration information retrieval and dissemination effort. When you have completed your examination of the document, you will help us if you will answer these questions and return the questionnaire in the accompanying envelope. It is not necessary to answer every question, but only those you feel apply to the document.

1. May we reveal that this document was of interest to your company? Yes ___ No ___
 If the answer is "No" we will use the answers to the following questions in a statistical summary relating document source, subject area, etc. to value criteria, with no reference to the company which evaluated it.

2. After you received the document and examined it did you consider it of value to you? Yes ___ No ___
 If "Yes", answer the following questions. If "No", no further answers are needed.

3. Was the information in the document a direct answer to your needs? Yes ___ No ___
 - a. Specific data, such as temperature, properties, or rates, make the document useful to us. Yes ___ No ___
 - b. A useful mechanism, process, material, or technique is described. Yes ___ No ___
 - c. Will testing or experimentation previously proposed by you now be unnecessary because of the information obtained? Yes ___ No ___
 - d. If answers a, b, and c are "No", will you indicate in what way the document was directly of use? Yes ___ No ___
 If "Yes", indicate here.

4. Was this information indirectly of use? Yes ___ No ___
 - a. Will testing or experimentation previously proposed by you now be unnecessary because of the information obtained? Yes ___ No ___
 - b. Did the information assist in performing research? Yes ___ No ___
 - c. Did the information help to improve a process? Yes ___ No ___
 - d. Did the information help to improve equipment? Yes ___ No ___
 - e. Did the information usefully add to your knowledge? Yes ___ No ___
 - f. If none of the above is applicable would you indicate in what way the document is indirectly of use? For example: "for reference file."

5. Will this information be beneficial to your company in relation to any of the following:
 - a. Costs Yes ___ No ___
 - b. Productivity (quantity/time) Yes ___ No ___
 - c. Product (quality) Yes ___ No ___
 - d. Profit Yes ___ No ___

6. Is it probable you would miss this information were it not for the NASA source? Yes ___ No ___

7. Does there seem to be more information in the NASA literature on this subject than in other available sources? Yes ___ No ___
 If "No", what source is better?

8. Have you any suggestions or comments in regard to the service (or the questionnaire?)

Return to: KNOWLEDGE AVAILABILITY SYSTEMS CENTER
 HOTEL WEBSTER HALL
 UNIVERSITY OF PITTSBURGH
 PITTSBURGH, PENNSYLVANIA 15213

ATT: GUY McGEE

would be indicative of a good probability of some degree of impact.

The second question relates to a go/no-go decision. If the document is of no value, there is no point in going any further (no-go decision).

The third question is a multiple one. The 'set' is designed to identify direct technology transfer by pinpointing the area of possible transfer (e.g., a 'yes' to question 3a may mean that the document permitted the reader to avoid expending time and effort to determine the melting point of a particular alloy; or a 'yes' to question 3b may indicate that the document identified for the reader a non-destructive test method for detecting a dangerous flaw in a load supporting material.

The fourth question is intended to identify indirect transfers—an area extremely difficult to measure but which would be highly productive if we could design an effective measuring technique.

The fifth question was designed to permit a degree of quantitative measurement to be applied to the 'impact'—preferably in dollars and cents.

The last three questions relate to the file and KASC services in general.

A questionnaire is intended to reflect information relevant to a single document. Thus, the 213 questionnaires comprising the basis of the following statistics reflect information relevant to 213 separate documents. In addition, the population of 213 document evaluations reflects a user population representing 22 industrial organizations.

A total of 177 of the 213 questionnaires rated the documents evaluated as being of value. This represents 87.7% of the evaluated questionnaires. A study of these documents on the basis of NASA categories (STAR and IAA) indicates a distribution of these clients' interests as shown in Figure 6-2.

This statistical scene is dominated by three categories: Computers, Machine Elements and Processes, and Metallic Materials. Ten of the NASA categories are not represented at all: Aerodynamics, Electronic Equipment, Electronics, Meteorology, Navigation, Physics (Atomic, Molecular and Nuclear), Physics (Solid-State), Propulsion Systems, Space Radiation, and Thermodynamics and Combustion.

A statistical analysis on a per questionnaire basis is reflected in Figure 6-3. This illustration indicates rather vividly that the statistical scene is dominated by the NASA category Machine Elements and Processes, and the questions related to 'specific data in documents,' 'useful mechanisms, processes, materials identified,' 'direct answer resulted' and 'document was of value.' Obviously, some of these questionnaires overlap in subject coverage, but the overall interest area is very well highlighted.

The same information is presented in numeric form in Table 6-1.

Impact Measurement

A very crude effort has been made to develop an impact measuring algorithm based on qualitative factors having quantitative values assigned to them.

Figure 6-2. Population of Valuable Documents By NASA Category

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34			
1.																																					
2.																																					
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6.																																					
7.																																					
8.																																					
9.																																					
10.																																					
11.																																					

IDENTIFICATION OF NASA CATEGORY NUMBERS:

- | | | |
|------------------------------------|-----------------------------------|--|
| 1. Aerodynamics | 12. Fluid Mechanics | 23. Physics, General |
| 2. Aircraft | 13. Geophysics | 24. Physics, Atomic, Molecular & Nuclear |
| 3. Auxiliary Systems | 14. Instrumentation & Photography | 25. Physics, Plasma |
| 4. Biosciences | 15. Machine Elements & Processes | 26. Physics, Solid-State |
| 5. Biotechnology | 16. Masers | 27. Propellants |
| 6. Chemistry | 17. Materials, Metallic | 28. Propulsion Systems |
| 7. Communications | 18. Materials, Nonmetallic | 29. Space Radiation |
| 8. Computers | 19. Mathematics | 30. Space Sciences |
| 9. Electronic Equipment | 20. Meteorology | 31. Space Vehicles |
| 10. Electronics | 21. Navigation | 32. Structural Mechanics |
| 11. Facilities, Research & Support | 22. Nuclear Engineering | 33. Thermodynamics & Combustion |
| | | 34. General |

Figure 6-3. Population of Documents By NASA Category
As a Function of Relative Value

	NASA CATEGORY	A	B	C	D	E	F
8	Computers	• • • •	• •	•	• • • •	• • • •	• • • • • • •
17	Materials, Metallic	• • •	•	• • • • •	• • • •	• • • • • •	• • • • • • • •
14	Instrumentation & Photography	•			•	•	• •
15	Machine Elements & Processes	•	• •	• • • • • • • • • •	• • • • • • • • • •	• • • • • • • • • •	• • • • • • • • • • • • • • • •
16	Masers	•	•	• •	• • •	• • •	• • • •
19	Mathematics	•	•	•	• •	•	• • • •
4	Biosciences		•	•	•	•	•
13	Geophysics		•	• •	• •	•	• • • • •
5	Biotechnology			• •	• •	•	• • •

A. Information decreased cost or increased profit
 B. Information made proposed experiments unnecessary
 C. Specific valuable data in document
 D. Useful mechanism, process, material
 E. Document gave direct answer to needs
 F. Document was of value

Table 6-1. Population of Documents By NASA Category
As a Function of Relative Value (Numeric Form)

	NASA CATEGORY	A	B	C	D	E	F	TOT
8	Computers	7	3	1	6	10	23	50
17	Materials, Metallic	4	1	7	8	7	29	56
14	Instrumentation & Photography	2	0	1	1	1	3	8
15	Machine Elements & Processes	2	3	35	40	34	48	162
16	Masers	1	1	3	4	4	5	18
19	Mathematics	1	1	1	2	1	5	11
4	Biosciences	0	1	1	1	1	1	5
13	Geophysics	0	1	2	2	1	11	17
5	Biotechnology	0	0	2	3	1	4	10
	TOTALS	17	11	53	67	60	129	337

- A. Information decreased cost or increased profit
- B. Information made proposed experiments unnecessary
- C. Specific valuable data in document
- D. Useful mechanism, process, material
- E. Document gave direct answer to needs
- F. Document was of value

Four factors in the KASC environment were identified as being indicative (to some degree) of impact. These factors are listed as follows:

- The document oriented questionnaire
- Customer evaluations of search results
- Contacts between KASC personnel and the client
- Contract renewal

On the basis of these four variables, the following simple algorithm was developed:

$$I = Q + P + R + C$$

Where I = Impact
Q = Document Oriented Questionnaire
P = Pertinency Factor
R = Contract Renewal
C = Customer Contact

The maximum value for each of the variables was set as follows:

I - 100
Q - 60
P - 10
R - 20
C - 10

The value for Q was determined on the basis of responses to questions on the document questionnaire:

<u>Response to Question</u>	<u>Value</u>
No to No. 2	0
Yes to any part of No. 4	10
Yes to any part of No. 3 or 5c	20
Yes to any part of No. 5a, 5b or 5d	30
Yes to any part of No. 3 or 5c <u>and</u> 5a or 5b or 5d	50
Yes to any part of No. 3 or 5c <u>and</u> any part of No. 4 <u>and</u> 5a or 5b or 5d	60

(Increase in production was rated higher than improvement in quality since in most industries increased production stimulates higher profits more readily than increased quality.)

The value of P was derived as follows:

$$P = \frac{10E}{S} \left(\frac{A}{B} - \frac{N}{S} \right)$$

Where A = number of abstracts submitted to client which he
evaluated as relevant to his interests
B = total number of abstracts evaluated
S = number of searches performed in time period
E = number of searches evaluated
N = number of searches resulting in 'no citation' reports

The value of C was derived from contact reports. Each client contact is documented. When the report is made out, the reporter indicates on a 1-5 scale his opinion of customer satisfaction. The evaluation of each report is multiplied by 2 (because total value for C in the algorithm is 10) and the sum of all the reports is divided by the number of reports.

The value of R is either 0 or 20. The client either renewed or cancelled.

Twenty-two clients were evaluated on the basis of the above algorithm. Results are shown in Table 6-2.

The impact algorithm effort is still only a step or two beyond the idea stage. However, we plan to continue this study as rapidly as possible within the constraints of time and our resources.

Table 6-2. Impact Rating

CO. CODE	Q	+	P	+	R	+	C	= IMPACT
0110	20.0		9.1		20		10	59.1
0150	16.0		8.0		20		6	50.0
0171	10.0		9.5		20		6	45.5
0210	14.3		8.8		20		7	50.1
0230	45.0		5.8		20		6	76.8
0250	10.0		8.2		20		6.8	45.0
0300	15.0		7.6		0		6	28.6
0620	20.0		*		0		6	26.0
1290	10.0		8.2		20		6	44.2
1340	10.0		6.5		20		9	45.5
1570	50.0		8.9		20		5	83.9
1770	50.0		8.8		20		6	84.8
1980	10.0		*		20		6	36.0
2030	10.0		9.2		20		6	45.2
2110	12.0		6.0		20		6	44.0
2200	10.0		0		0		2	12.0
2330	0		*		0		0	0
4020	10.0		2.9		20		8	40.9
5020	20.0		9.9		0		0	29.9
5070	12.5		9.9		20		10	52.4
9030	0		0		20		8	28.0
0480	35.0		6.2		20		8	69.2
AVERAGE								45.3

* No evaluation

VII. FUTURE PLANS

New Services

During the past year, much work has been performed at the University relevant to mechanized exploitation of the Chemical Abstract Service's Condensates and Chemical Titles. The KAS Center has been very much involved in all aspects of this effort, although the principal responsibility for the Program lies with the Chemistry Department.

The experimental effort related to Condensates is now at a point where operational cost recovery activities can be initiated. NASA has encouraged KASC by its considerable interest in this work. On the basis of this encouragement, our plans for the coming year include an RDC network whereby respective Centers can exploit each others specialized files. In addition, we plan a centralized marketing program to introduce Condensates both as a new, independant service and as part of an expanded NASA RDC activity.

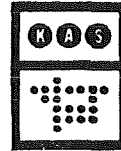
Current Services

Our plans in this area relate to streamlining and elimination of certain operational procedures currently employed in our RDC activity. For example, where we used to insist on collecting every bit of data possible to analyze search effectiveness, we now believe we have sufficient data to permit the introduction of a new procedure based on a sampling technique.

Also, for some functions which we have been 'verifying' each time performed, we now believe are so well ingrained in the work habits of our personnel that verification is unnecessary.

This effort, in conjunction with our cost analysis, is expected to yield a more efficient operational activity to support our marketing program.

APPENDIX A



THE KNOWLEDGE AVAILABILITY SYSTEMS CENTER

UNIVERSITY OF PITTSBURGH • PITTSBURGH, PENNSYLVANIA 15213 • PHONE 621-3500

January 1, 1969

INITIAL LETTER

Mr. John L. Roberts, President
J. L. Roberts Company, Inc.
101 Main Street
New York, New York

Dear Mr. Roberts:

The scientific and technological files of the National Aeronautics and Space Administration--comprising over 300,000 documents (indexed on computer tapes) and increasing at a rate of approximately 5,500 items per month--have been made available for use by private industry.

These files represent one of the major sources contributing to the tremendous amount of written material being generated every year. The quantity alone of scientific and technical data makes it physically impossible for individual scientists, engineers, managers, administrators, and supervisors to keep current in their respective fields. Thus, research is often duplicated, new technologies remain undiscovered and new techniques and disciplines remain hidden in a mass of untapped knowledge.

The NASA files, however, can be tapped.

This extensive data bank is a computerized reservoir of knowledge, from both national and international sources, which can be searched conveniently and expeditiously for current and retrospective literature. Exploitation of these files, through participation in the NASA/Industry/University of Pittsburgh Technology Transfer Program, can be achieved in various ways. For example:

Current Awareness Searches. The most recent literature--published and unpublished--can be searched on a monthly basis for items peculiar to your specific interest profiles.

Retrospective Searches. State-of-the-art surveys can probe the data bank to a depth of one, two, three, or four years. Or, a specific question--relating to some problem--can be searched for literature relating to that problem.

Mr. Roberts
January 1, 1969
Page Two

Your participation in this Program is encouraged because we are convinced that it will contribute to the prevention of wasteful duplication of your company's research efforts and funds, it will aid your personnel in keeping current in their respective fields, and it can make available to you new scientific and manufacturing techniques of potential value to your company and other business and industrial users.

The present list of participating members in the NASA/Industry/University of Pittsburgh Program numbers approximately 60. These firms range from small organizations employing as little as a dozen employees to such industrial giants as U. S. Steel, Pittsburgh Plate Glass and Westinghouse Electric Corporation. A list of these subscribers is submitted for your review.

The National Aeronautics and Space Administration has commissioned the University of Pittsburgh to acquaint industry--at no obligation--with this Program and to administer it in this area. As a member of the University staff, I have been assigned this responsibility.

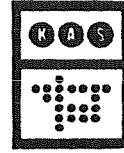
If you are interested in knowing more about our Program and how it can benefit your company, please contact me and I will be very pleased to discuss it with you in more detail.

Very truly yours,



Frank L. O'Donnell
Marketing Manager

FLO/kmt
Enclosure (1)



THE KNOWLEDGE AVAILABILITY SYSTEMS CENTER

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February 1, 1969

FIRST FOLLOW-UP LETTER

Mr. John L. Roberts, President
J. L. Roberts Company, Inc.
101 Main Street
New York, New York

Dear Mr. Roberts:

Recently I wrote to acquaint you with the NASA Technology Transfer Program and to encourage you to exploit it to your advantage. Our services--individualized and completely confidential--provide retrospective searching of the entire unclassified NASA files and, on a monthly basis, a review of new literature entering the system to identify that which is appropriate to your current interests.

During the past year, we have been searching more than 1000 interest profiles per month for approximately 60 participating members who are putting to advantage the scientific and technological knowledge available to them in the NASA files. I have enclosed a partial list of typical interest areas into which these questions are categorized. Perhaps some of these reflect one or more of your own company interests.

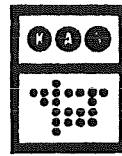
I am convinced that participation in this NASA/Industry/University of Pittsburgh Technology Transfer Program can benefit your company. Our faculty and Center personnel have an almost day-to-day contact with new applications of science and technology. These personnel phrase your questions for computer search, evaluate output and insure submittal to you of only pertinent literature and, through verbal and written communication with you, can facilitate the identification of literature related to your company interests.

We, at the KAS Center of the University of Pittsburgh, are confident that we can be of help to you. Do contact me for any questions you may have about our service and how you can exploit the NASA files to the benefit of your company. I will be pleased to visit you to discuss the Program in more detail.

Yours truly,

Frank L. O'Donnell
Marketing Manager

FLO/kmt
Enclosures (2)



THE KNOWLEDGE AVAILABILITY SYSTEMS CENTER

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March 1, 1969

SECOND FOLLOW-UP LETTER

Mr. John L. Roberts, President
J. L. Roberts Company, Inc.
101 Main Street
New York, New York

Dear Mr. Roberts:

When the Congress of the United States created the National Aeronautics and Space Administration under the Space Act of 1958, it obligated the agency to "...provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof."

NASA concentrated its information transfer function in the Office of Technology Utilization, established in 1962. This Program has four basic purposes:

- To increase the return on public investment in aerospace research and development by encouraging application of findings outside of aerospace.
- To shorten the time lag between aerospace discoveries and their effective use elsewhere.
- To move new knowledge across disciplines, regions, industries and markets.
- To learn how best to transfer technology and to spread the use of transfer mechanisms that prove successful.

The NASA data bank comprises more than 300,000 documents (unclassified) which are abstracted, indexed, and filed on computer tape by accession number and index terms. The tapes are located in Regional Dissemination Center (RDC's) set up by NASA to serve the civilian sector of the economy. One of these RDC's is the University of Pittsburgh.

Mr. Roberts
March 1, 1969
Page Two

I have already written to you about our Program and how it operates. I do hope this additional effort on my part will be accepted for what it truly is--a sincere desire to be of service.

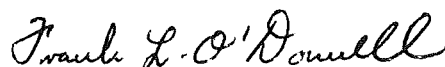
We, at the KAS Center of the University, are so enthusiastic about our work in locating and disseminating scientific information and scientific intelligence that we sometimes overlook the fact that others are not as aware as we are of the benefits already derived by so many organizations who have participated in this experimental Program during the past five years.

I am enclosing for your review a few 'sample' abstracts of recent literature accessioned by NASA. These are typical of the more than 10,000 abstracts being sent out each month to the participants in our RDC activities (of course, each participant receives only those abstracts that are relevant to his interest profiles). After reviewing the abstracts, the participants will receive 'hard' copies of each document requested.

I am also sending you a listing of the scope of literature contained in our data bank.

I do hope this information helps to further your interest in the NASA/Pitt/Industry Technology Transfer Program. If you would care to discuss it further, I would be most happy to visit you--at no obligation--to present the Program in more detail.

Yours truly,



Frank L. O'Donnell
Marketing Manager

FLO/kmt
Enclosures (2)

APPENDIX B

LETTER OF INTENT

This is a Letter of Intent on the part of _____
to become a participant in the Knowledge Availability Systems
Center (KASC) Program of the University of Pittsburgh, Pittsburgh,
Pennsylvania.

This Letter is to serve as a basis for establishing a formal rela-
tionship between _____ and the
University of Pittsburgh so that the University may initiate the
necessary action for a meeting between our respective representatives
to discuss our areas of interest and to determine the number of
Interest Profiles to be included in the formal agreement.

The University (KASC) agrees to honor a commitment to service the
number of questions to which _____ subscribes.

Name

Title