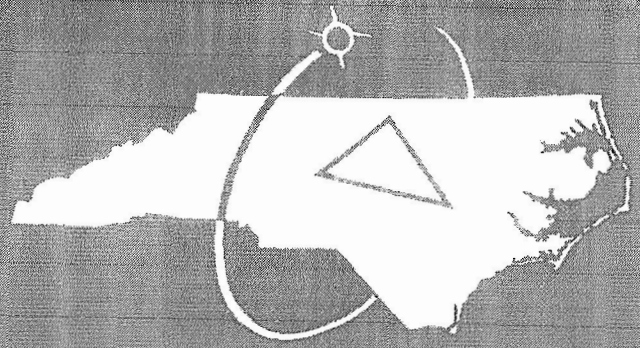




NORTH CAROLINA SCIENCE AND TECHNOLOGY RESEARCH CENTER

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TWENTY - THIRD QUARTERLY PROGRESS REPORT

ON A

REGIONAL TECHNOLOGY TRANSFER PROGRAM

**CASE FILE
COPY**



Contract NASW 2051

Period Covered: March 1, 1970 - May 31, 1970

T W E N T Y - T H I R D Q U A R T E R L Y P R O G R E S S R E P O R T

O N A

R E G I O N A L T E C H N O L O G Y T R A N S F E R P R O G R A M

NORTH CAROLINA SCIENCE AND TECHNOLOGY RESEARCH CENTER

P. J. Chenery, Director
Post Office Box 12235

Research Triangle Park, North Carolina 27709

Contract NASW 2051

Period Covered: March 1, 1970 - May 31, 1970

ABSTRACTS

North Carolina Science and Technology Research Center

Research Triangle Park, North Carolina

TWENTY-THIRD QUARTERLY PROGRESS REPORT ON A REGIONAL TECHNOLOGY

TRANSFER PROGRAM, March 1, 1970 - May 31, 1970

Contract NASW-2051

During this contract quarter, STRC processed 314 retrospective and 138 current awareness searches. A total of 1,112 documents were forwarded to industrial clients in 11 southeastern states.

Marketing efforts were highlighted by two conferences, one on New Technology - Its Management and Application, and one for the Textile Information Users Council.

Computer activities were centered on the addition of other data banks to the STRC information resources.

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NORTH CAROLINA SCIENCE AND TECHNOLOGY RESEARCH CENTER

Twenty-third Quarterly Progress Report

I. INTRODUCTION

This is the Twenty-third Quarterly Progress Report to be submitted to the Technology Utilization Division of the National Aeronautics and Space Administration by the North Carolina Science and Technology Research Center. It is the third report under Contract NASW-2051, and describes the continuing operation of a regional dissemination center for new technology.

The program was begun in June 1964 under Contract NASr-235; it was continued under Contracts NSR 34-007-003 and NSR 34-007-006. It is also supported by the North Carolina Board of Science and Technology and by subscriptions from user companies.

The objective of the experimental program is to provide selective scientific and technical information and related services to fee-paying subscribers.

II. STRC OPERATIONS

A. Staff and Facilities

STRC is housed in its own building in Research Triangle Park, N.C., in the heart of the triangle formed by Duke University in Durham, the University of North Carolina at Chapel Hill, and North Carolina State

University in Raleigh. This building is shared with the Triangle Universities Computation Center and the Research Triangle Park Post Office.

The permanent staff of STRC consists of a director, assistant director for marketing, marketing aide, technology utilization manager, four applications engineers, business manager, accounting clerk, technical editor, systems analyst, programmer, technical assistant, key-punch operator, assistant librarian, four clerk typists, and four secretaries. Four other staff members are on a part-time or consultant basis and consist of an assistant director for operations, consultant on electronics, information specialist, and assistant editor. A candidate for a doctoral degree in biomedical engineering at the University of North Carolina has joined the staff on a part-time basis to assist in applications engineering. Several students, both graduate and undergraduate, are being considered for special projects to be carried out by STRC during the summer months.

B. Services Provided

This was a busy quarter for STRC, with productivity increasing in nearly all areas. The total number of clients served rose from 64 to 81, a 27% increase over the previous quarter. Most of these were in the category of "demand" clients - those who have a close working relationship with the center but are not on an annual subscription basis.

Search activities increased sharply, with the total number of searches run for the quarter reaching 314. "Total searches run"

reflects complete searching on a question posed, not merely the machine runs necessary to cover various files or revise search strategy. Over half - 176 - were for other Regional Dissemination Centers (RDC's). These requests were received by STRC over teletypewriter (TWX), processed through the IBM 360/75 computer utilized by STRC, received from the computer on a teletypewriter computer terminal, and forwarded to the originating RDC via the TWX. Turn-around time for such searches is normally 24 hours. A copy of the computer printout is also mailed to the RDC for verification.

Another 114 retro searches were processed for STRC's own clients. These covered, as do the others, one or more of several files: NASA, the Department of Defense file, Institute of Textile Technology and/or Massachusetts Institute of Technology textile files, and the Education Research Information Center (ERIC) file. In addition, STRC staff members do manual searching whenever the situation warrants the time involved, and these are included in the total statistics. These 114 searches produced an average of 265.5 citations from which the reviewing applications engineer selected an average of 86 abstracts to be forwarded to the client.

Current awareness statistics are difficult to present accurately. Receipts of tapes from NASA, receipt of journals, modifications and revisions of search questions, numbers of files searched and frequency of searching - all these factors contribute to the almost impossibility of determining how many "searches" were run during a specified period. The total figure cited in Table I reflects the actual number of

TABLE I
SERVICES PROVIDED

	Previous Quarter (ending 2/28/70)	Current Quarter (ending 5/31/70)
I. Retrospective Searches (totals)	281	314
Regular Clients	79	114
Graduate Students	44	24
Other RDC's	158	176
II. Current Awareness Searches (mailed during this quarter)	187	138
III. Total Documents Sent*	974	1,112
Reproduced by STRC		
Xerox	165	139
From Microfiche	127	19
Microfiche-to-Microfiche		9
Other Sources		
STRC Stock	54	73
CFSTI** hard copy	143	121
- microfiche	21	9
ARAC ***	211	412
Other	253	339

* Document statistics are for industrial clients only and do not include graduate student program.

** Clearinghouse for Federal and Scientific Information

*** Aerospace Research Applications Center

current awareness bibliographies forwarded to clients during the quarter.

Document orders rose also, from 974 to 1121. These seemed to be about evenly divided between regular and demand clients; although many of both groups have their own well-stocked libraries, it is often more economical and quicker to order through STRC. As usual, the heaviest document orders were in the areas of non-metallic and metallic materials, instrumentation and photography, machine elements, biosciences, auxiliary systems and bio-technology. Many clients, in addition to their own libraries, have access to trade association libraries (such as the one maintained by the textile industry) and neighboring universities.

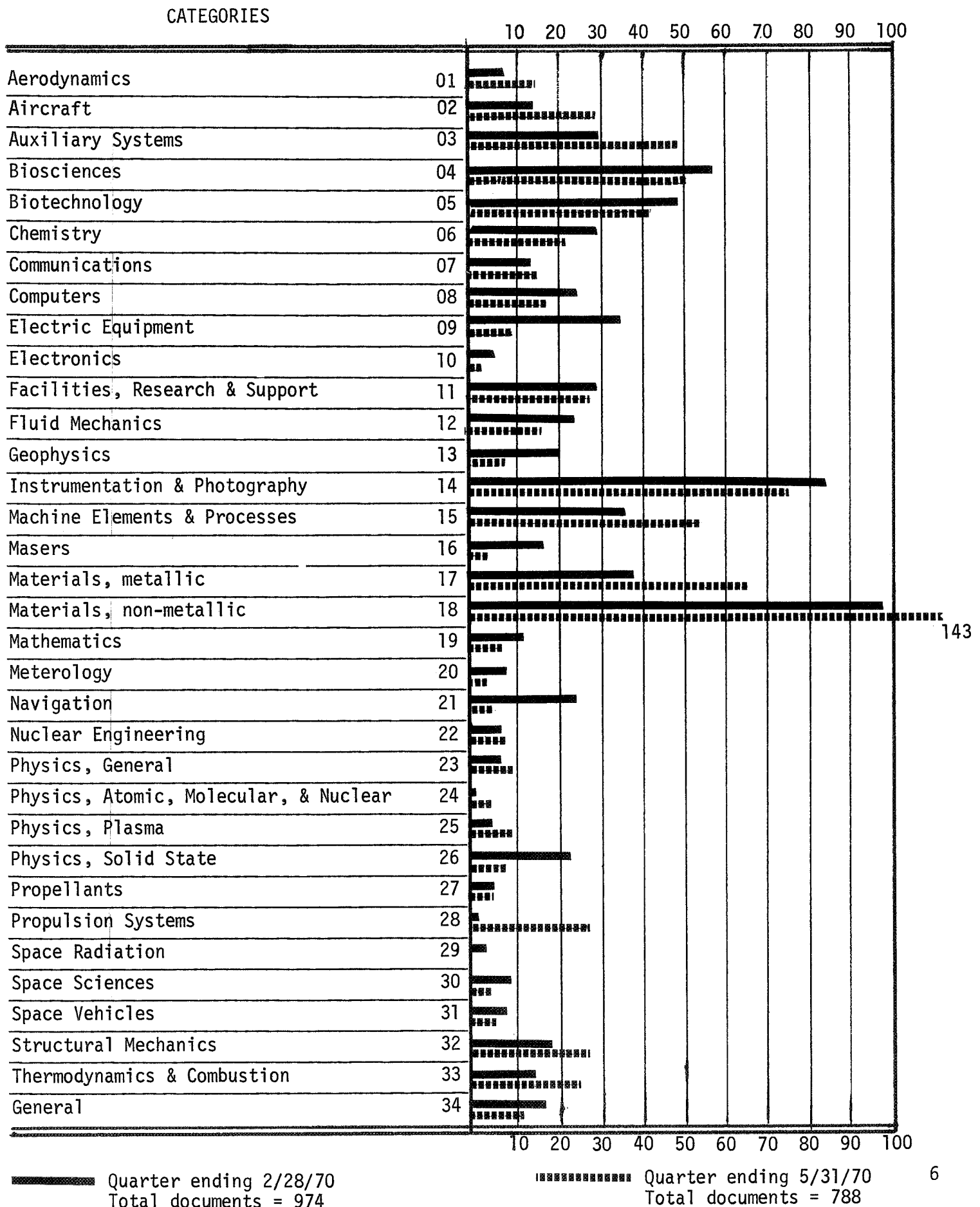
TABLE II
DOCUMENTS TRANSMITTED

Reproduced by STRC:	<u>Current</u>	<u>Previous</u>
Xeroxed	139	165
From microfiche	19	127
Microfiche-to-microfiche	9	
Hard copy from STRC stock	73	54
From Other Sources		
CFSTI**- hard copy	121	143
- microfiche	9	21
ARAC***	412	211
Other	<u>339</u>	<u>253</u>
TOTAL DOCUMENTS	1,112	974

**Clearinghouse for Federal and Scientific Information

***Aerospace Research Applications Center

CLASSIFICATION BY STAR CATEGORIES OF DOCUMENTS DISSEMINATED



Only in the Graduate Student program was there any decrease in activity - from 44 searches last quarter down to 24 this period - but this was due to the ending of the academic year and included in STRC's annual schedule. A discussion of the overall GSP will be found in the following section on marketing.

The bibliographies on general topics of interest to industry, prepared in cooperation with the N. C. State Technical Services program, have continued to be popular. Orders for an additional 195 copies brought the total number of STS search bibliographies ordered by industry to 493. Six new titles were added during the preceding three months:

1. Maintenance Scheduling
2. Requirements for Setting up and Operating Forty-five Different Types of Small Manufacturing Plants.
3. Humidity Control
4. Pollution and Waste Products of the Lumber Industry
5. Housing Construction
6. Vibration Isolation in Machine Tools

Two searches - PERT and PERT/Cost, and Zero Defects - were revised.

C. Marketing

During the period March 1 - May 31, 1970, the number of clients under annual contracts with STRC increased to 45 with the loss of only one. This company felt that since its basic requirements had been met by STRC services, they would prefer to operate on a demand basis for future information needs. Of the four new annual subscribers added since last quarter, two were formerly STRC demand clients.

TABLE III
STRC CLIENTS SERVED DURING QUARTER

TYPE OF ORGANIZATION	NUMBER OF CLIENTS	
	Quarter ending Feb. 28, 1970	Quarter ending May 31, 1970
<u>Annual Subscribers</u>		
Manufacturing Firms	37	40
Research Organizations	5	5
<u>Demand Users *</u>		
Manufacturing Firms	14	21
Research Organizations	2	4
Educational Institutions	3	3
Other RDC's	3	3
Individuals		2
Government Agencies		2

* Users receiving services during the quarter ending on the date shown

TABLE IV
CLIENT CONTACTS

TYPE	CONTACTS	March	April	May	TOTALS	TOTALS FOR PREVIOUS QUARTER
TECHNICAL	Visits	34	17	15	66	91
	Letters	66	36	56	158	127
	Telephone	129	94	93	316	295
MARKETING	Visits	52	122	33	207	183
	Letters	536	398	51	985	325
	Telephone	52	157	45	254	237

The number of demand clients on the books rose from 40 last quarter, with less than half active during the period, to 57 this quarter, with 35 requiring service. Five regular clients renewed annual contracts.

The marketing staff, concentrating on the Alexandria-Arlington-Falls Church, Virginia, area, contacted 56 companies this quarter. NASA's trend toward restrictions on information services except to NASA contractors has made companies in this geographic area more receptive to STRC attempts to communicate with them. It is hoped that it will become a productive area for future marketing efforts.

An article appearing in the March 27 issue of THE WALL STREET JOURNAL entitled "Data Banks Containing NASA Research Fruits Help Many Companies" portrayed very well the mission of the RDC's. The article also discussed the importance of information retrieval service for both large and small companies, and the author pointed out that the RDC's can help even those companies with access to the NASA collection by providing direct personal contact between information center and user.

Since the publication of the article, STRC has noted an increase in inquiries from companies not previously contacted, including several outside the Southeastern region. It is our feeling that more articles of this nature emphasizing the work of the RDC's would help increase usage of the information centers.

Two examples of negative reaction confronted marketing director L. M. Kelly and applications engineer A. W. Lockwood this quarter.

By invitation, they visited two North Carolina textile firms with whom they had been in contact for sometime. One company indicated an interest in flameproofing of textiles and requested a search of STRC's

textile files on the subject. The second company wanted information in the areas of fire retardation in textiles and reinforced plastics, specifically on the development of the safety air bag for automobiles. STRC provided both companies with NASA invitations to the May conference on flameproofing at NASA-Houston, which each gratefully accepted.

It is our opinion that both companies benefited by the contacts made during the conference. Representatives from the first company were able to meet with a NASA contractor representative who explained to them how the flameproofing process could be modified to help meet their specific needs in its application to textile-related problems. The representative from the second company obtained complete cooperation from a NASA-Houston engineer who had done work in the area of air bag material and design. NASA-Houston provided literature on the subject and agreed to make a bag for this company. Samples of materials used by NASA in water safety equipment (life jackets, flotation devices, parachutes, etc.) were provided.

In spite of the above - telephone calls, visits, the NASA trip, and subsequent follow-up by the marketing staff - both companies deferred literature search support in their respective interest areas. The reasons for their refusals are unknown.

Conference on New Technology

The major marketing efforts this quarter involved two conferences - one on New Technology - Its Management and Application, held in Raleigh, N. C., on March 25-26, and a conference for the Textile Information Users Council held in May. (See Appendix B - Exhibits)

The conference on new technology was held at the Hilton Inn over a two-day period, beginning at noon on May 25 and concluding at noon on

May 26. It was sponsored jointly by STRC, the Small Business Administration, NASA, the Industrial Extension Service at N. C. State University, and the N. C. Department of Conservation and Development.

Dr. Myron Tribus, U. S. Assistant Secretary of Commerce for Science and Technology, spoke to more than 150 guests at the evening dinner session. Speakers at concurrent work sessions during the meeting included specialists from NASA-Langley, Battelle Memorial Institute, the Air Force Machinability Data Center, the Martin Marietta Corporation, N. C. State University, and several small private industries. One session which attracted much attention was on a "water-cannon" developed by Exotech, Inc., of Rockville, Maryland. The potential applications of this tool, capable of blasting both rock and metal, were of particular interest to the mining and quarrying industries.

In addition to talks and demonstrations on innovations and new techniques, speakers also discussed financing new technology, adapting new products to the marketplace, and assessing a company's capabilities for making use of new processes, methods, and products.

Textile Information Users Conference

STRC hosted a meeting of the Textile Information Users Council at the STRC building on May 21. The Council is composed of representatives of the fiber, textile, and associated industries; it hopes to promote the development of comprehensive services for information handling in the areas of their special interests.

Various information files available at STRC were described and exhibited for attendees. A computer terminal tie-in between STRC and the Massachusetts Institute of Technology provided a demonstration of the MIT Textile Information Retrieval Program System. This was conducted by Dr. Stanley Backer of MIT, originator of the system.

Graduate Student Program

Only seven regular searches were run for graduate students during this quarter, as the academic year drew to a close. User questionnaires continued to come in, however, and the total return for the 1969-70 school year was 89 per cent.

Staff members continued to work on the library search service program and as of the close of the reporting period, searches had been run as follows:

Auburn University	4 ERIC
Louisiana State University	1 NASA + DDC
N. C. State University	9 NASA 1 NASA + DDC
Clemson University	1 ITT 1 NASA 1 NASA + DDC
University of South Carolina	3 ERIC
University of Tennessee	1 NASA
Virginia Polytechnic Institute	3 NASA 3 NASA + DDC <u>1</u> DDC
TOTAL	29

Nine universities are now participating in the Library Search Service. Requests for searches were somewhat slower than had been anticipated as a result of several factors:

- (a) Universities have not publicized the service as much as hoped;

- (b) This quarter included examinations, and most students working on a thesis during the spring semester had completed the research for their theses;
- (c) Many students receive free NASA and DDC searches in connection with their research projects and therefore do not feel the need for additional searching.

Library officials at the University of Florida are hopeful of securing university funds to pay for graduate student searches. They propose that the library pay for half the cost of each search with departments providing matching funds for the remainder. Some definite word on this funding should be available during the next quarter.

The value of the Graduate Student Program began to be apparent this quarter. A student from N. C. State University who received a search through his library is also working for a large electronics firm engaged in defense contracts. The student was so impressed with the results of his STRC search that he has arranged for representatives of the firm to visit the Center early in June.

A professor of electrical engineering at Purdue University, previously a graduate student at Virginia Polytechnic Institute, called the Center to request low-cost searches for his graduate students. Although he had not received a search himself while a student at VPI, several of his colleagues there had informed him of the service. As it is not the policy of STRC to perform subsidized searches for students outside the southeastern states, the professor requested a regular search. He was also interested in learning more of the Library search service. Details of the program were mailed to him, and he promised to discuss the possibility of establishing the service at Purdue with their director of libraries.

D. Computer Activities

Mrs. Mary Ann Williamson, systems analyst, and Mrs. Nancy Swyka, applications engineer, participated in a seminar at the Knowledge Availability Systems Center (KASC), March 12 and 13, on searching of the Chemical Abstracts file. Mrs. Williamson also reviewed the procedures for sending search requests to STRC from other RDC's.

On March 19 and 20, Mrs. Williamson attended the spring meeting of the Association of Scientific Information Dissemination Centers (ASIDIC) held in Atlanta. The purpose of the visit was to determine whether or not it would be worthwhile for STRC to join ASIDIC. Since that time, STRC has become a member of ASIDIC and plans to participate fully in its activities.

In April, STRC began receiving tape copies of the trial versions of the World Textiles Abstracts (WTA) tape files from the Shirley Institute of Textiles in Manchester, England. STRC is planning to aid the Shirley Institute in developing this tape file so that eventually computer searches of WTA will be available both in the United States and in England.

Mrs. Williamson also attended the National Information Retrieval Colloquium in Philadelphia, Pennsylvania, on May 6, 7, and 8. While there, she met with the directors of the Bio-Sciences Information Service (BIOSIS) of Biological Abstracts (BA) to work out an arrangement whereby STRC could obtain access to the BA files. Since these files are large and complex, it was decided that STRC would not try to search them at its own facility but would send searches to BIOSIS to be performed. A trial period was then set up so that STRC could run some searches of BA and obtain approximate cost figures.

During this reporting period, STRC also began to investigate the possibility of searching the full USGRDR file. A sample USDRGR tape was ordered from the Clearinghouse and exploratory work was started on the conversion of non-standard accession numbers.

D. M. Phillips, information specialist, and Mrs. Williamson were invited to participate in a conference on the Analysis of Ecosystems held at Oak Ridge National Laboratories by the International Biological Program, May 14 and 15. Mr. Phillips and Mrs. Williamson contributed suggestions concerning a proposed ecological information system. Mrs. Williamson was placed on a committee to investigate computer compatibility problems for the proposed system.

STRC became security-conscious during this quarter and began preparing back-up files, file inventories, and program inventories. Arrangements have been made for copies of all important files and documentation to be placed in the North Carolina State Archives.

III. MEETINGS, TRIPS AND VISITS

In addition to marketing and technical assistance visits, STRC staff members were involved in several conferences and the Center was host to a number of visitors.

March 12-13

Mrs. Williamson, systems analyst, and Mrs. Swyka, applications engineer, participated in a workshop at KASC, University of Pittsburgh. Session topic was preparation of searches of Chemical Abstracts and the DDC files.

March 18-19	Mrs. Williamson attended a meeting of the Association of Scientific Information Dissemination Centers in Atlanta, Georgia.
March 23	P. J. Chenery spoke to approximately 50 members of the Sir Walter Raleigh Lions Club, Raleigh, N. C., on programs of the Board of Science and Technology and STRC.
March 25-26	STRC staff members participated in the Conference on New Technology - Its Management and Application, held in Raleigh. Guests from NASA-Langley, including John Samos, Technology Utilization Officer; A. J. Lambiotti, T. P. Kelly, H. B. Dexter, G. M. Jurscaga, and W. H. Reed, III, toured the Research Triangle Park and STRC following the conference. Mr. Joseph M. Carlson, NASA Headquarters, also attended the meeting.
March 31	Mr. Chenery spoke at a meeting of the Young Presidents Organization at Research Triangle Institute. Following the meeting, several company presidents requested additional information on STRC and its services.
April 1-3	Mr. Chenery represented the Board of Science and Technology at the Eastern Regional Conference on Science and Technology for Public Programs.

April 13-14	Mr. Chenery visited NASA Headquarters in Washington, D. C.
April 19-22	Mr. Chenery represented the Board at a meeting of the Southern Interstate Nuclear Board held at Checotah, Oklahoma.
April 27	Mr. Phillips and Mrs. Williamson spoke to N. C. State University students and faculty of graduate-level course entitled "Information Storage and Retrieval." The discussion covered the history and development of retrieval systems, NASA programs, and the present STRC-IVS. Miss Becky Walker, STRC's coordinator of university projects, attended the meeting and exhibited sample search bibliographies.
May 5-6	Mrs. Doris Schroeder, technical editor, and T. R. Potter, electronics engineer, visited NASA-Langley Research Center. Mr. John Samos, TU officer, accompanied Mrs. Schroeder and Mr. Potter on a tour of the facilities. He also made available several displays and exhibits for use in the STRC lobby.
May 6-7	C. Leon Neal, mechanical and aerospace engineer, attended NASA's Conference on Materials for Improved Fire Safety at the Manned Space Craft Center in Houston, Texas.
May 7-8	Mrs. Williamson attended the National Infor-

mation Retrieval Colloquium and visited Bio-
Sciences Information Center, both in Phila-
delphia, Pennsylvania.

May 14-16

Mrs. Williamson and Mr. Phillips were invited to
a meeting on information retrieval systems for
the International Biological Program at Oak
Ridge National Laboratories in Tennessee.

May 21-22

STRC staff members were hosts to members of
the Textile Information Users Council at a
conference held by the Council in Raleigh and
at STRC. Council members, mostly technical
librarians, represented the giants of the
textile industry, including Burlington Industries,
Cone Mills, J. P. Stevens, Celanese, and du Pont.

May 22

Mr. Hiroshi Ando, Head of the Research Division,
Planning Bureau, Science and Technology Agency
of Japan and a participant in the International
Visitor Program of the U. S. Department of
State, visited STRC and met with Mr. Chenery.

IV. PLANS FOR NEXT QUARTER

A. Summer Personnel

Arrangements have been completed to employ a number of additional personnel for special projects during the summer months. Two undergraduates, one from California Institute of Technology and one from North Carolina State University, will work on various engineering and computer-related tasks. One graduate student with business training will be employed for a special marketing project. A technical writer will be added to assist in preparing various reports, and several clerical employees will fill in for regular staff during vacation periods.

B. Information Resources

Because of strong interest expressed by our staff and clients in obtaining full computer coverage of the contents of USGRDR (as opposed to partial coverage by means of the present DDC file), we have ordered a sample USGRDR tape. Tests will be made with this tape to determine the problems in converting it into an inverted search file. Difficulty is anticipated in handling the small number of reports listed in each issue which carry special accession numbers not in the regular (AD) series.

We plan further investigations of files in the area of biological sciences on the basis of expressed client interest.

C. Cost Accounting

Additional effort will be directed toward modifications to the present computer cost reports to provide monthly reports reflecting the costs of individual services to subscribers.

APPENDIX A - IMPACT REPORTING

CASE NO. 125

A large materials company (Code No. 0257) was interested in composite structures (laminates) in the fabrication of collapsible tubes for packaging foods, condiments, cosmetics, drugs and sundries. As a long-time and heavy user of STRC services, the company discussed this interest with Technology Utilization Manager J. Graves Vann.

Mr. Vann prepared a search on collapsible tube packaging materials which resulted in the following evaluated abstracts being forwarded to the client:

N69-12597	Nutrition.
N68-27925	Buckling Resistance of Inflated Cylinders in Bending.
N68-22045	Food For Space Flight.
N68-16080	Compressed Food Components to Minimize Storage Space.
A68-80688	Aerospace and Research Relative to Milk and Food.
A68-22917	Evolution of Space Feeding Concepts During the Mercury and Gemini Space Programs.
A68-14407	Space Flight Feeding Systems - Characteristics, Concepts for Improvement, and Public Health Implications.
N67-34250	Military Applications of Plastics and Related Materials.
N67-30387	Resistance of Flexible Packaging Materials to Penetration By Microbial Agents.
N64-27788	The Composite-Component Property Relationship of Plastic Films.
AD-683 468	Activities Report.
AD-680 906	Development of a Water-Free Molded Plastic Support For Packaging Fuses in the M2AI Ammunition Box.
AD-676 826	Bibliography of Technical Publications and Papers.
AD-676 152	The Use of an Infrared Radiometric Microscope in the Nondestructive Determination of Flexible Package Seal Defects.
AD-659 246	Space Flight Feeding Systems: Characteristics, Concepts for Improvement, and Public Health Implications.

The company reports that information cited in this search was helpful in preparing a feasibility report. They are now proceeding with development and expect to have such tubular material on the market within a few months.

CASE NO. 126

A large diversified company (Code No. 0345) requested a retrospective search on chromium - organic complexes as a starting point for a new project. STRC selected twenty-five abstracts from the citations listed, including:

- AD 683 968 Electronic Plating of Black Chromium on Metals.
- AD 649 005 Surface Properties of Perfluoroacids As Affected
By Terminal Branching and Chlorine Substitution.
- AD 648 890 The Structure of Hexamethylben-Zenechromium
Tricarbonyl With Comments on the Dibenzenechromium
Structure.
- N67-33146 Solvent Extraction Study of Metal Fluoroacetyl-
lacetates.
- N65-10997 Inorganic Coordination Polymers.
- N64-24345 Surface Potentials and Induced Polarization in
Nonpolar Liquids Absorbed on Metals.

The company later reported that information gained from these documents was important in establishing a course of developmental action which has led to a new corrosion and wear-resistant coating for stainless steel.

APPENDIX B - EXHIBITS

Announcing...

A CONFERENCE ON NEW TECHNOLOGY — ITS MANAGEMENT AND APPLICATION

Sponsored by:

COMMERCE AND INDUSTRY DIVISION, N. C. DEPARTMENT
OF CONSERVATION AND DEVELOPMENT

INDUSTRIAL EXTENSION SERVICE, N. C. STATE UNIVERSITY

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

N. C. SCIENCE AND TECHNOLOGY RESEARCH CENTER

SMALL BUSINESS ADMINISTRATION

Hilton Inn
Raleigh, North Carolina

March 25-26, 1970
\$20.00 per person

PURPOSE: *To bring to the attention of industrialists and businessmen in the Southeastern United States some results of government-sponsored research which may have significant impact on the economy of the region, and to illustrate by explanation and example how one may profitably exploit this new technology.*

Speakers will include experts from NASA, industry, universities, and financial assistance agencies such as the SBA.

TOPICS: Does the Technology or Product Fit My Needs?
Determining the Market; Financing Development;
Adapting New Technology for the Marketplace
Advances in Metal Forming; Electron Beam and Other
Cutting Techniques; High Rate Forming Processes
Adhesive Bonding; Advances in Processing and
Fabricating; The Water Cannon; Dielectric Heating
of Plastics and Plywood; Compression Molding Processes;
Fabrication and Structural Application of Advanced Composites;
Deaerating Castings; Welding; Sandwich Construction; Chain
Vibration Damper; Coating Technology. Where Do We Go From Here?

Additional information on program, speakers, and hotel accommodations will be mailed in February. Address all inquiries to IES, N. C. State University, Raleigh, N. C. 27607, or N. C. SCIENCE AND TECHNOLOGY RESEARCH CENTER, P. O. Box 12235, Research Triangle Park, N. C. 27709

GENERAL SESSION

10:30 a.m. Panel Discussion — What have we learned and where do we go from here?

— Participants and Speakers

11:30 a.m. Conference Ends

FEE

The fee for this conference is \$20.00 which covers the social hour, dinner, and refreshment breaks. The low fee is enabled, in part, by the support of funds from the various sponsoring agencies listed on the front cover.

LOCATION

The conference will be held on the second floor conference center of the Hilton Inn, 1707 Hillsborough Street, Raleigh, North Carolina. Phone: (919) 828-0811. The fee does not cover accommodations. A block of rooms has been reserved for this event. You are urged to make your reservations promptly to insure space.



CONTRIBUTING SPEAKERS

Dr. John R. Canada, Assistant Dean for Engineering Extension, NCSU, Raleigh, North Carolina

Mr. Louis L. Clipp, Exotech Inc., Rockville, Maryland

Mr. J. M. Daniel, Director of Research, Hackney Brothers Body Company, Wilson, North Carolina

Mr. Mel Day, Acting Assistant Administrator, Technology Utilization Division, NASA, Washington, D. C.

Mr. Forrest S. Decker, Jr., Chief of Research and Technology Assistance Division, SBA, Washington, D. C.

Mr. H. B. Dexter, Langley Research Center, Langley, Virginia

Dr. Ralph Ely, Research Triangle Institute, Research Triangle Park, North Carolina

Mr. Thomas P. Kelly, Langley Research Center, Langley, Virginia

Mr. Allen M. Knight, Manager, Packaging and Electronics Division, Garrison Machinery Company, Statesville, North Carolina

Mr. Jerome Kohl, Extension Specialist, Department of Nuclear Engineering, NCSU, Raleigh, North Carolina

Mr. Arthur J. Lambiotte, Langley Research Center, Langley, Virginia

Dr. James D. Mote, Director, Center for High Energy Forming, Martin Company, Denver Research Institute, University of Denver, Denver, Colorado

Mr. W. H. Reed, III, Langley Research Center, Langley, Virginia

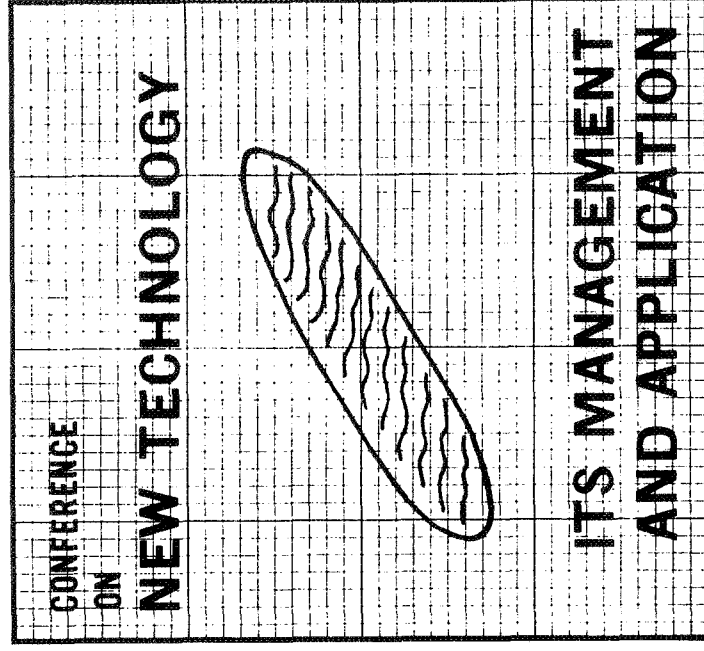
Mr. Wayne S. Slomp, Langley Research Center, Langley, Virginia

Mr. Robert E. Snider, Director, Air Force Machinability Data Center, Cincinnati, Ohio

Mr. Albert B. Stacy, Jr., Langley Research Center, Langley, Virginia

Mr. Bruce Strickland, Commerce & Industry Division, North Carolina Department of Conservation and Development, Raleigh, North Carolina

— and others —



Sponsored by:

National Aeronautics and Space Administration

Small Business Administration

North Carolina Science and Technology Research Center

North Carolina Department of Conservation and Development

Industrial Extension Service, North Carolina State University

HILTON INN

RALEIGH, N. C.

MARCH 25—26, 1970

A CONTINUING EDUCATION PROGRAM

CONFERENCE ON NEW TECHNOLOGY ITS MANAGEMENT AND APPLICATION

HILTON INN - RALEIGH, NORTH CAROLINA

MARCH 25 - 26, 1970

PURPOSE OF THE CONFERENCE

To bring to the attention of businessmen, large and small, some results of government-sponsored research which may have significant impact on the economy of the region and to illustrate by explanation and example how one may profitably exploit this new technology.

PROGRAM

WEDNESDAY, MARCH 25

12:30 p.m. Registration

GENERAL SESSION

1:15 p.m. Welcome -
Dr. William L. Turner, Director, State
Department of Administration, State of
North Carolina

1:25 p.m. State, Regional, and Federal Cooperative
Efforts in Promoting Growth

CONCURRENT TECHNICAL SESSIONS

Session I

MANAGEMENT OF NEW TECHNOLOGY FROM INCEPTION TO MARKET PLACE

2:00 p.m. Does the Technology or Product fit my
need?

2:30 p.m. Discussion

3:00 p.m. Determining the Market for New Products,
Processes, or Services

3:30 p.m. Discussion

4:00 p.m. Financing the Development of New Prod-
ucts, Processes, or Services

4:30 p.m. Discussion
5:00 p.m. Adopting New Technology for the Market
Place
5:30 p.m. Discussion
6:00 p.m. Adjourn

Session II

ADVANCES IN METAL FORMING

2:00 p.m. Numerically Controlled Machine Tools
2:30 p.m. Discussion
3:00 p.m. Electron Beam and Other New Cutting
Techniques
3:30 p.m. Discussion
4:00 p.m. High Rate Forming Processes (using ex-
plosives in the forming of metals and plastics
composites)
4:30 p.m. Discussion
5:00 p.m. Adhesive Bonding
5:30 p.m. Discussion
6:00 p.m. Adjourn

Session III

ADVANCES IN PROCESSING AND FABRICATING

2:00 p.m. The Water Cannon (use of high velocity
water jet in quarrying, tunneling and metal-
working)
2:30 p.m. Discussion
3:00 p.m. Dielectric Heating of Plastics and Plywood
(curing thru the use of radio frequency
electricity)
3:30 p.m. Discussion
4:00 p.m. Compression Molding Processes
4:30 p.m. Discussion
5:00 p.m. Fabrication and Structural Application of
Advanced Composites
5:30 p.m. Discussion
6:00 p.m. Adjourn

Exhibit 2

Evening

GENERAL SESSION

7:00 p.m. Social Hour
7:30 p.m. Dinner
Movie: *Tire Hydroplaning*
Speaker's Topic - *Forecast of the Future*
The Honorable Myron Tribus, Assistant
Secretary for Science and Technology,
U. S. Department of Commerce, Wash-
ington, D. C.

THURSDAY, MARCH 26

CONCURRENT TECHNICAL SESSIONS

Session I

ADVANCES IN METAL FORMING

8:30 a.m. Deaerating Castings
9:00 a.m. Discussion
9:30 a.m. Welding
10:00 a.m. Discussion

Session II

ADVANCES IN PROCESSING AND FABRICATING

8:30 a.m. Applications of Nuclear Technology
9:00 a.m. Discussion
9:30 a.m. Sandwich Construction
10:00 a.m. Discussion

Session III

MISCELLANEOUS

8:30 a.m. Chain Vibration Damper (employment of
simple hanging chains as vibration dampers in
structural columns)
9:00 a.m. Discussion
9:30 a.m. Coating Technology
10:00 a.m. Discussion

(Continued on next page)

Water Drill To Be Shown At Meet Here

A water cannon, capable of blasting granite and limestone, cutting through $\frac{3}{8}$ -inch steel under water, and piercing $\frac{1}{2}$ inch-thick armor plate will be introduced here tomorrow at a regional conference for businessmen and industrialists.

Using ten-pulse-per-second blasts of water reaching impacts of 40,000-80,000 pounds per square inch, the cannon fractures granite, hard sandstone, and limestone. Experts see important applications in mining and quarrying operations, tunneling, and grading for highway construction.

An adaptation of the same principle fires a 1/16-inch-diameter missile of water or glycerine gel at 25,000 feet per second at a pressure of 50 million psi. Tests have shown it can cut through metal without generating heat and is effective underwater at depths of several thousand feet.

The cannon, developed by Exotech, Inc. of Rockville, Maryland, is a by-product of work done by the company under contract to NASA. In an effort to stimulate the impact of high-speed micrometeoroids on satellites, Exotech discovered a decided similarity in the action of globs of water. Hydrotechnology research has helped push the company's sales curve up steadily since 1966.

The cannon is only one example of new technology to be presented in a two-day conference March 25-26 at the Hilton Inn. Business leaders, industrialists, bankers, and technical personnel will discuss new processes, new products, and market analysis. Small and medium-sized businesses interested in expansion and diversification will explore problems encountered in the implementation of this new technology.

Entitled "New Technology — Its Management and Application," the conference is co-sponsored by the Small Business Administration, National Aeronautics and Space Administration, N.C. State Department of Conservation and Development, N.C. State University and N.C. Science and Technology Research Center.



Sandstone fractured by jets of high pressure water

From the Raleigh (N.C.) TIMES