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ANNUAL REPORT AND FOURTH QUARTER OPERATIONS, FY 1970

TECHNOLOGY APPLICATION CENTER
INSTITUTE FOR SOCIAL RESEARCH AND DEVELOPMENT
THE UNIVERSITY OF NEW MEXICO
ALBUQUERQUE NEW MEXICO

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SUMMARY

Program development during the past year represents one of TAC's more successful accomplishments. Although income dropped slightly during this time period, client satisfaction with services was indicated more than in previous years. During the year, thirteen members attrited; four were regional STS programs, and three were aerospace contractors. Other attriting members stated or implied economic reasons for their decision not to renew. Most of these, however, felt that they would be making use of TAC services on an ad-hoc basis during the coming year.

Clients have informed TAC that they have been forced to become more cost conscious in their purchases. Staff members in serving our clients, have noted a trend for the problems posed for analysis to be of two types; problem solving, i.e., where the client has a particular problem that he wishes to overcome, or questions concerning the location of new products for potential consumer use. It is felt that these questions are a departure from the

general types of questions previously asked of TAC, that these specific questions are more challenging to answer, and are a consequence of this cost consciousness.

Although the termination of the STS program was a disappointment, TAC plans to contact the former users of STS in our region to attempt to make them members during the coming year. It is felt that these companies are familiar with the TAC services, and will, therefore, be receptive to membership.

During the coming year, TAC plans to further develop and market its product searches. These packages of material provide a unique introduction to the TAC data base, and a valuable resource tool for academic and industrial researchers.

PART ONE
ANNUAL REPORT

I. PROGRAM DEVELOPMENT FY 1966 THROUGH FY 1970

June 1970 marks the fifth year of existence for the Technology Application Center. The following charts summarize the earning history of TAC, and the success of the photography dissemination program.

TABLE I
EARNED INCOME

<u>YEAR</u>	<u>PHOTO INCOME</u>	<u>TOTAL INCOME</u>
FY 1966	-0-	608.00
FY 1967	416.00	22,292.00
FY 1968	6,615.00	35,215.00
FY 1969	25,065.00	84,016.00
FY 1970	33,499.82	81,485.16

TABLE II
UNITS OF PHOTOGRAPHY

	<u>PER YEAR</u>	<u>CUMULATIVE</u>
FY 1966	-0-	-0-
FY 1967	3,600	3,600
FY 1968	9,300	12,900
FY 1969	32,700	45,621
FY 1970	17,924	63,545

Table I indicates the changes which have occurred in the income distribution of the Technology Application Center. These changes exhibit a trend for photo services income to increase more rapidly, with other sources of revenue maintaining their existing growth patterns.

The slight decrease in the overall Technology Application Center earnings picture may, in part, be attributed to the discontinuance of the State Technical Services program of the Department of Commerce. Although some regional State Technical Services programs were TAC customers, in the sense that they ordered services from our program, the major impact of the loss of this program is in the State Technical Services provided to New Mexico businesses. The Technology Application Center administered this program, and it reached New Mexico businesses which felt that they could not afford normal TAC services.

Another development which impacted the TAC program was a loss, by research laboratories and companies in our region, of their Department of Defense and aerospace research programs. These companies had worked closely with TAC on numerous research problems. Their program cutbacks

are reflected in a decreased usage of TAC services.

TAC has developed an aggressive marketing program to offset the loss of these revenue sources. We are concentrating our efforts on making the research programs of our clients more efficient. This involves education in analysis of their research and planning information systems. This analysis is used to show the clients how the expanded services we offer may give them the maximum benefits of new technology which is available.

Space Photography

A new price list for space photography was devised during the first quarter of FY 1970. This list reflected the increased cost of the high quality reproduction requested by the users of space photography. Construction of a price list which accurately recovered the true costs of such production and distribution required close coordination with the supplier. Users have been generally receptive to the new pricing arrangements.

TAC cooperated closely with Denver Research Institute in their survey of the users of Remote Sensing Data. This

cooperation resulted in the publication of a report entitled "A Study of Gemini and Apollo Photography Users", which summarized TAC experience in providing space photography to the scientific community.

It may be noted that although the volume of imagery sold by TAC decreased, revenues from sales increased. Although a portion of the revenue increase may be attributed to the higher prices, the increase was also due to the sales of imagery on rolls.

Remote Sensing Development and Evaluation of Aircraft Information

During 1970 a great deal was accomplished nationwide in the field of Remote Sensing. New techniques for data acquisition and interpretation and new plans for extensive experimentation were announced. TAC expended a great deal of time to maintain our "in house" awareness of activities in this field. Trips to Washington, D.C. and Houston, Texas were made as a part of the efforts of TAC to remain involved in the far reaching research in this field.

Customer need analysis was a continuing aspect of our

evaluation program. In addition to the research which was cooperatively conducted with DRI, telephone calls and visits were made to ascertain customer needs, and match them to available information sources. Studies of various "rolls" of imagery were made in order to edit and prepare them for dissemination. These studies included both Apollo and Gemini photography.

Recent acquisition from Apollo flights have made it possible to construct, review, and revise disciplinary sets for distribution. Imagery from all manned space flights was reviewed for the purpose of dissemination in the form of educational aids for secondary school and college level use.

Plans were prepared for expanding the Remote Sensing capability of TAC to include that data and information resulting from the aircraft program. In conjunction with these plans, a concept paper was prepared soliciting NASA support, and support from MSC in Houston in this effort.

MSC support is deemed particularly necessary since

response to user requests for remote sensing information is currently being impaired by the lack of a NASA decision on how and under what conditions aircraft information will be made available to the public.

Ad Hoc Activities

During the past year, an increase in the number of ad hoc activities requested of TAC occurred. Much of this increase seems to be attributable to individuals and businesses who prefer to pay for TAC services as they use them. Ad hoc services, for example, increased in the fourth quarter of FY 1970 to 13 requests. The number of requests in the same quarter of the preceding year was four.

The development of the "product search" as a dissemination tool has added a new dimension to the services available from TAC. Staff personnel noted a large amount of company interest in specific information areas, and have developed product searches in both the Industrial and Natural Resources program. The most successful of these product searches to date is the Remote Sensing search of the Natural Resources program. Other product searches include:

CHART #3
TECHNOLOGY APPLICATION CENTER
PRODUCT SEARCH DEVELOPMENT

<u>Search Title</u>	<u>General Subjects Indexed</u>	<u>Typical Prospective Customers</u>
Air Pollution	Pollution control, monitoring, and abatement	Regulatory agencies Pollution producing companies
Ceramic and Metal Powder Characterization	Surface characteristics, particle size, morphology, ion absorption, classification, etc.	Sintering and sintering agglomerate manufacturing Metal and ceramic industry
Computers and Statistical Methods in Geology	Applications of modern statistics and computer in geological fields	Academic researchers Major exploration companies
Geothermal Phenomena	Devices for sensing earth heat flow temperature profiles, etc.	Academic researchers
Hospital Administration	Personnel, administration, design, sensing systems, etc.	Hospital administrators Hospital equipment mfgs Hospital architects
Hydrology	Citations of water and its occurrence	Regulatory agencies Academic researchers
Integrated Circuit Technology (5 volumes)	Fabrication, testing, reliability, applications, etc.	Electrical manufacturers and users of integrated circuits
Magnetic Recording Technology	All materials, techniques testing, and uses of magnetic material	Computer and peripheral data processing memory system users
Metal Carbide Technology	Tooling, machining, crystallography, etc.	Machine tool industry Developers and fabricators of unique materials
Oceanography	Physical and dynamic ocean properties	Oceanographic researchers
Quaternary Geology	Research in the most recent geological time period	Academic researchers
Remote Sensing (3 volumes)	Devices and applications of remote sensing	Major exploration companies Academic researchers
Water Pollution	Pollution control, monitoring, and abatement	Regulatory agencies Pollution producing companies

II. Benefits

The Technology Application Center participated closely with the Denver Research Institute on a second study this past year, that of Gemini and Apollo photography users. As with the study of TAC in the previous year, economic benefits were mentioned by customers.

The DRI report indicated many of the photography users felt that they did not expect economic benefits from the space photography or that the materials were for educational use, where the benefits would be difficult or impossible to measure. Some of the clients indicated that their stage of usage of photographic materials, or their accounting procedures did not provide a way of assigning economic value to space imagery.

A substantial number of respondents indicated that there were nonmeasurable economic benefits to be derived from the photography they purchased. DRI estimated that, "in approximately 95 percent of the cases, the photographs lead to economic or noneconomic benefits equal to or greater than the cost of the photographs."

Despite the cancellation of the Technical Services Program by the Department of Commerce, the State of New Mexico decided to continue the program and appropriated a modest amount for this purpose. This appropriation is in recognition of the benefits of the program to small businesses in the state.

During the coming year, TAC expects to devote the efforts of the equivalent of one-half person to measuring the impact of the program. This impact will attempt to ascertain both economic and noneconomic benefits of information and assistance provided by TAC.

B. Natural Resources Program

1. Marketing

In addition to the mail-out marketing campaign, marketing trips were made to contact petroleum research laboratories. Advertising for space photography was placed in four magazines, and a number of contracts were made with potential imagery users. Evaluation of the success of such promotional efforts is a continuous process.

C. Industrial Program

A mail-out advertising campaign utilizing the Wall Street Journal article and an introductory letter was conducted to prospects who recently inquired concerning the center's services. Several firms responded, and TAC hopes to obtain new members from this source.

Marketing plans were made for the summer months, including a sales trip to Phoenix to visit prospective members. This trip was planned for July.

PART TWO

FOURTH QUARTER OPERATIONS

Technology Application Center
FY 1970

I. TAC OPERATIONS

A. User Activity

	<u>Natural Resources Program</u>	<u>Industrial Program</u>	<u>Total</u>
1. Annual Membership			
(a) Annual members at beginning of quarter	12	15	27
(b) *New Members	2	4	+ 6
(c) Attritions	3	1	- 4
(d) Annual members at end of fourth quarter include 4 renewals and 2 due and in pro- cess of negotiation.			<u>29</u>

*Patterson State College
Wayne, New Jersey

University of Kansas
Lawrence, Kansas

Gates Rubber Company
Denver, Colorado

Nevada State Technical Services
Reno, Nevada

International Helium Incorporated
Longview, Texas

Inspiration Copper
Inspiration, Arizona

	<u>Natural Resources Program</u>	<u>Industrial Program</u>	<u>Total</u>
2. Ad Hoc Services	4	9	13
B. Marketing			
1. Sales trips conducted, including discussions in	2	1	3
Columbus, Ohio			
Wichita, Kansas			
Ponca City, Oklahoma			
Bartlesville, Oklahoma			
Tulsa, Oklahoma			
Dallas, Texas			
Houston, Texas			
2. Initial TAC presentations during quarter	20	23	43
3. Follow-up presentations during quarter	5	12	17
C. Dissemination Activity			
1. Retrospective Searches			
Computer/Manual	9	19	28
Computer	1	2	3
Manual	2	9	11
2. Selective Dissemination			
Service Profiles	15	pd/6 run 25	pd/28 run 40
		pd/34 run	
3. Industrial Application Reports			
Issues	0	61	61
Copies	0	61	61

C. Dissemination Activity (cont'd)

	<u>Natural Resources Program</u>	<u>Industrial</u>	<u>Total</u>
4. TAC Action Reports			
Issues	2	0	2
Copies	19	0	19
5. Tech Briefs			
Issues	67	67	134
Copies	246	246	492
6. Special Reports			
SP 5000	10	23	33
7. Gemini Photos			
Ordered this quarter	5574	--	5574
Total to Date			60,620
8. Full Reports			
STAR	19	170	189
IAA	12	38	50
OTHER	19	189	208

D. Personnel

Total number of TAC employees - 31

1. Administration	4
2. Industrial Program	7
3. Natural Resources Program	5
4. Development Program	2
5. Information Services	8
6. Photo	4
7. Computer	1

II. TAC Programs

A. General

1. Outlook

The general outlook for TAC business improved during the past quarter, despite what can be considered adverse economic conditions. This improvement may be attributed to these sources:

- 1) The additions of new bases has offered expanded services to our older clients, and new clients are expressing interest in these information sources.
- 2) TAC, and the NASA RDC program received a great deal of publicity through the Wall Street Journal. Queries stimulated by this article concerning our programs were numerous.
- 3) "Product Searches," as an information package have met with a favorable response on the part of the users of TAC services.

TAC plans to capitalize on each of these opportunities through expanded marketing during the coming year.

2. Earth Oriented Space Photography

During May a mail-out marketing campaign to reach potential remote sensing imagery and product search

users was conducted. This mail-out was in the form of a double postcard format, which, it was anticipated, would make response more convenient. The response on this mail-out was 4%.

During June a similar mail-out which described the Natural Resources Program of TAC was sent out. This particular mailing returned an 11.5% response. Follow-ups on these contacts is continuing, and sales are increasing as a result.

3. Management Information System

TAC has completed the format of its management information system and is in the process of documenting this format. The system has been implemented since the beginning of the fourth quarter and looks promising as a management as well as a reporting tool.

4. New Product Searches

Descriptive materials and price list have been prepared for some of the new product searches mentioned in Section I of this report. These searches which have been completed in the past quarter are:

Ceramic & Metal Powder Characterization

MC-21

A great deal of research has been conducted in recent years on the sintering of powders. However, there is a lack of information concerning the selection of a precise powder of a known characterization for various material applications.

In order to expand on this little known area and to bring about a high degree of precision in selecting the proper powder and technique, TAC has recently completed an exhaustive search and study. The search was conducted to determine and catalog such factors as purity, composition, particle size, distribution, surface area characteristics, surface texture, morphology, surface ion arrangement, etc. of many ceramic and metal powders.

The search package consists of one general category followed by the oxides listed one at a time from aluminum oxide through zirconium oxide. Interspersed between the oxides, are categories labeled carbides, sulfides, and rare earth oxides. Each broad category is then subdivided into nine specific subcategories.

Metal Carbide Technology

MC-22

The hostile environments to which we subject today's developed materials demand very unusual characteristics. Fortunately the metal carbide family lends itself to many of these unusual applications and deserves, therefore, a special compilation and study of direct and related information.

The Technology Application Center has recently completed a comprehensive search, of both U.S. Government reports and worldwide published journal and periodical literature, on the important subject of Metal Carbide Technology. The results of our search effort go back to 1964 and the search strategy is being preserved in order to conduct six-month updates. Every possible avenue of contribution, whether it be crystalline growth, superconductivity, machining, physical characteristics, or applications is included in this package.

Memory Systems Technology

MC-20

This search contains nearly 1,000 recent abstracts dealing with information on the design and fabrication of memory systems associated with computers and data processing equipment. Research and development in the areas of magnetic materials, optical, thin film and holographic memories is reported.

The collection of abstracts represent a comprehensive survey of documents derived from U.S. Government reports and worldwide published literature. The retrieval system employed to identify the current and recent past documents will be utilized to update the search twice a year. Therefore, the recipient will be offered information on the latest technological developments as well as new designs and materials. The results of our present search should be valuable to the engineer, researcher or scientist working in the area of computer memory systems.

III. OTHER CENTER ACTIVITIES

- A. The April Newsletter of the National Oceanographic Data Center contained TAC's "news story" sent to them some time ago. A number of requests for information have resulted from the release in this publication.
- B. On May 20th Dr. Tom Lyons and Warren Oates gave an illustrated talk on "Uses of Space Photography" at New Mexico Institute of Mining and Technology, Socorro. Some good will was obtained for TAC from this presentation.
- C. A follow-up request for TAC to provide a one morning seminar for Earth Science teachers has been made by New Mexico Institute of Mining and Technology. Material to be presented in this morning seminar, with emphasis on space photography as a teaching aid, is being prepared by Dr. Lyons.

- D. On April 14th Mr. William H. Clingman, a private consultant from Dallas under contract to NASA/TUD, visited TAC to obtain first hand information about the Center's operating procedures, search strategy techniques, and normal modes of operation.
- E. On May 14, 1970 (Mrs.) Terry Heller, a DRI researcher, visited TAC for discussions with William Shinnick and Walt Long on a number of subjects related to "Technology Transfer". Her purpose was to gain the value of TAC's experience and consultation in this field.
- F. On May 20th, a request was made for someone from TAC to speak in Denver at the October 1970 meeting of the American Society of Photogrammetry and American Congress on Surveying and Mapping. TAC has consented to prepare an article for this meeting.
- G. On June 3, the Rehabilitation Inventory Team, Department of Neurology, University of New

Mexico, represented by Betty Schwamb, met with William Shinnick, Walt Long and Mark Money to discuss services which could be performed by TAC for rehabilitation programs in the state.

H. On June 10th Mr. John Hunger, Director of the Albuquerque Urban Observatory was briefed on TAC's services and the benefits to be derived from having the Technology Application Center participate in his program.

I. The week of June 22 was spent at MSC, Houston by W. R. Oates. Monday and Tuesday of the week were spent at the Earth Resources Survey Program Data Facilities with Messrs Shinnick and Lyons. One major aspect of this visit resulted in negotiations with MSC to run some Retrospective Searches of their Data Bank. Later in the week two of our present clients each asked for a Retrospective Search from the MSC Data Bank, should such a search be possible.

J. During the week of June 22, the City of Houston's Air Pollution Control Department was briefed on TAC and our Air Pollution Retrospective Search. In addition, two key newspapers, The Houston Post and Houston Chronical, each agreed to run a press release announcing the availability of this product search in their paper.

IV. OTHER TAC VISITORS

Other TAC visitors included:

- A. Representatives of agencies of the State of New Mexico.
- B. American university professors.
- C. Foreign university professors.
- D. Representatives of natural resources and industrial companies.

REGIONAL DISSEMINATION CENTER INCOME BY SOURCE

Thousands of Dollars	NASA	INDUSTRY	OTHER-PHOTOS
200,000			
187,500			
162,500			
150,000			
137,500			
125,000			
112,500			
100,000			
87,500			
75,000			
62,500			
50,000			
37,500			
25,000			
12,500			

1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q
FY69	FY69	FY69	FY69	FY70	FY70	FY70	FY70	FY71

REGIONAL DISSEMINATION CENTER ANNUAL MEMBER CLIENTS BY PRIMARY SIC CODE

STANDARD INDUSTRIAL CLASSIFICATION CODE

[illegible]

REGIONAL DISSEMINATION CENTER OTHER THAN ANNUAL CLIENTS SERVED BY PRIMARY SIC CODE

MEMBER CLIENTS

[illegible]

REGIONAL DISSEMINATION CENTER MARKETING APPROACHES

TYPE	1969 3rd Qtr-Cal.	1969 4th Qtr-Cal.	1970 1st Qtr-Cal.	1970 2nd Qtr-Cal.
DIRECT MAIL	315	400	1020 *	347
PERSONAL PRESENTATIONS	42	27	33	29
GROUP PRESENTATIONS	12	10	11	5
ADVERTISEMENTS	1	1	3	3
PERIODIC PROSPECT CLIENTS	126	122	176	119
JOURNAL/MAGAZINE ARTICLES	1	1	1	0
TELEPHONE	98	91	80	141

* 638 mailouts to past photo users

REGIONAL DISSEMINATION CENTER MARKETING/SERVICE CONTACT WITH CLIENTS

CLIENT	TYPE CONTACT	1969 3rd Qtr-Cal. July/Sept.	1969 4th Qtr-Cal. Oct/Dec	1970 1st Qtr-Cal Jan/Mar	1970 2nd Qtr-Cal. April/June
TECHNICAL (Applications Engineers)	TELEPHONE	36	42	46	44
	VISIT	8	14	6	5
	MAIL	45	51	63	45
	TELEPHONE	36	53	44	42
MARKETING	VISIT	11	13	9	4
	MAIL	37	85	109	44

Other than Tech Briefs, Industrial Applications Reports. et cetera

STAR/IAA CATEGORY

	1Q FY69	2Q FY69	3Q FY69	4Q FY69	1Q FY70	2Q FY70	3Q FY70	4Q FY70	1Q FY71
1	0	0	0	0	0	0	1	0	
2	0	3	3	2	0	0	2	0	
3	7	1	3	2	1	0	1	0	
4	0	5	4	2	1	7	4	0	
5	0	7	8	2	5	8	6	3	
6	3	0	3	3	1	2	1	4	
7	9	11	12	0	5	4	5	2	
8	16	7	53	16	21	11	3	3	
9	45	15	20	17	11	37	2	5	
10	7	3	7	0	4	3	2	0	
11	1	1	0	1	1	1	1	0	
12	10	6	2	2	0	3	1	0	
13	13	5	14	9	9	14	4	20	
14	6	10	22	17	22	13	2	12	
15	11	2	14	4	18	10	8	7	
16	0	6	1	3	1	0	2	0	
17	4	2	9	8	12	5	15	4	
18	8	14	24	5	14	7	10	11	
19	1	1	4	1	2	2	3	3	
20	1	3	1	2	1	7	7	5	
21	0	0	0	6	0	8	1	3	
22	1	0	0	1	1	1	1	2	
23	2	2	2	3	1	5	1	0	
24	1	0	0	1	1	0	1	1	
25	3	3	1	0	0	2	1	0	
26	17	10	11	4	3	11	1	3	
27	4	0	1	0	0	1	1	0	
28	0	2	0	0	0	1	1	0	
29	0	0	0	0	1	0	1	0	
30	0	2	3	2	3	0	1	4	
31	0	1	1	1	1	2	1	1	
32	3	11	9	2	1	1	1	1	
33	4	2	5	0	2	3	1	0	
34	2	10	12	5	7	16	16	6	

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STAR/IAA CATEGORY

	1Q FY 69	2Q FY69	3Q FY69	4Q FY69	1Q FY70	2Q FY70	3Q FY70	4Q FY70	1Q FY71
1	0	0	5	0	6	16	9	12	
2	0	0	3	0	2	2	1	0	
3	5	0	2	1	1	0	1	1	
4	1	0	14	15	16	2	20	2	
5	0	0	53	5	6	11	7	0	
6	2	0	3	6	4	21	7	7	
7	6	0	9	2	0	1	2	2	
8	5	3	59	8	3	4	1	2	
9	26	6	31	10	8	13	4	19	
10	6	1	25	1	0	3	3	1	
11	0	1	2	2	1	0	2	1	
12	0	0	1	1	12	33	41	33	
13	5	0	6	2	2	6	5	4	
14	2	2	8	6	3	6	5	6	
15	3	0	31	0	0	1	1	7	
16	0	0	3	2	1	2	9	1	
17	1	0	3	0	5	2	2	8	
18	2	2	2	0	5	17	21	6	
19	0	0	58	1	2	3	1	2	
20	2	0	27	3	0	0	9	8	
21	2	0	0	1	3	0	1	0	
22	0	0	1	0	1	1	1	0	
23	0	0	1	2	4	0	2	1	
24	0	2	1	0	4	2	1	1	
25	0	1	2	0	5	10	8	3	
26	2	0	9	7	6	3	1	2	
27	1	0	1	0	0	0	2	0	
28	0	0	0	0	1	0	1	0	
29	0	0	1	0	0	0	1	0	
30	0	2	3	0	1	12	4	0	
31	0	0	1	0	7	13	4	2	
32	0	2	8	0	3	7	8	1	
33	3	0	0	0	8	4	3	2	
34	2	0	18	12	7	6	9	5	

MICROFORM ISSUED BY STAR/IAA CATEGORY

ABSTRACTS RELATIVE TO MICROFORM OR HARD COPY DOCUMENTS ISSUED

	1 Q. FY69	2 Q. FY69	3 Q. FY69	4 Q. FY69	1 Q. FY70	2 Q. FY70	3 Q. FY70	4 Q. FY70
ABSTRACTS	*29,323	*20,898	*21,326	*37,480	*35,559	*30,932	*44,465	*40,482
DOCUMENTS	**264	**234	**786	**342	**641	**742	**643	**430

*FIGURE INCLUDES: RSS'S, SDS'S, SIP'S, IAR'S, TAC ACTION, TECH BRIEFS

**INTERNATIONAL AEROSPACE ABSTRACTS
 SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS
 OTHER
 SP 5000'S