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COSMIC

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FOREWORD

This annual report describes the work performed from January 1, 1983, through December 31, 1983, under contract NASW-3247* in continuing the operation of the Computer Software Management and Information Center (COSMIC) by the University of Georgia. COSMIC serves as a collection, evaluation, and distribution center for computer software developed under the auspices of NASA and certain other federal agencies. The period of performance which is reported herein represents the seventeenth year of operation of COSMIC by the University of Georgia.

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INTRODUCTION

The Computer Software Management and Information Center (COSMIC) is a computer software clearinghouse and distribution center operated by the Office of Computing and Information Services of the University of Georgia, under contract to the National Aeronautics and Space Administration (NASA). This center is supported by the NASA Technology Utilization program as part of its mission to make available to the public the results of technology deriving from NASA sponsored research and development efforts. Computer programs developed by NASA installations and NASA contractors are deposited within COSMIC. The programs are then disseminated not only to other NASA installations, but also to business, industry, educational institutions, and other government agencies. Through an inter-agency agreement between NASA and the Department of Defense, software developed by certain DOD agencies and their contractors is also deposited within COSMIC for dissemination in the same manner as the NASA technology.

This report covers the activities of the COSMIC center for the period January 1, 1983, through December 31, 1983, under contract NASW-3247, which was the seventeenth year that the COSMIC facility has been operated by the University of Georgia. The report is divided into seven sections, paralleling in certain respects the center's function. The first section presents a summary description of the major operational areas of the center with emphasis given to those activities notable during the period of performance of contract NASW-3247. Quantitative data on the software submittals, program verification, and evaluation are presented in the second section. The

dissemination activities are summarized in the next section. The fourth section describes customer services and marketing activities of the center for the calendar year. The fifth section describes those activities devoted to the maintenance and support of selected programs. The sixth section reports on the performance of three special tasks under the contract: one being the development of a Customer Information system; the second, continuation of the COSMIC Abstract Recording System Project; and the third being the COSMIC Microfiche Project. The final section presents a brief summary of operational cost data.

1

OPERATIONAL SUMMARY

OPERATIONAL SUMMARY

Traditionally the operation of COSMIC has been described in terms of seven major functional areas whose characteristic activities have evolved naturally from the experience of more than a decade of continued operation of the center by the University of Georgia. Although the functional areas are closely interrelated, with staff members often contributing to several, these areas were separately designated as Administration, Dissemination, Customer Service and Marketing, Program Checkout, Evaluation, Inventory Control, and Special Developmental Tasks. In this operational summary, the characteristic process involved in each of these functional areas is briefly summarized. In addition, beginning with NASW-3247, a new functional area has evolved as part of the the COSMIC operation. This new area is the maintenance of selected computer programs and it is also discussed. The functions of these operational areas are described in detail in the COSMIC Operations Manual.

The area of Administration includes the normal management and supervisory activities for COSMIC. These activities include coordinating the software dissemination operations, providing technical direction, and assuring technical performance on contracts. Responsibility for this area rests primarily with the directorship and project managers. As part of this activity, the Director of COSMIC made visits to the Goddard Space Flight Center, the Lewis Research Center, the Johnson Space Center, and the Earth Resources Laboratory during 1983. The specific purpose of each vist was to promote the working relationship between COSMIC and the NASA Field Centers.

Also in 1983, a preliminary Marketing Plan and a Business Plan for COSMIC were developed.

The Dissemination function involves the tasks of order filling for both programs and documents and the maintenance of customer sales and lease records. Quantitative data on dissemination activities for 1983 is given in Section Three of this report. In summary, however, 487 Non-Leased programs were distributed, including 80 distributions to NASA centers. A total of 2,044 documents (excluding catalogs) were distributed during the contract period, 324 of which were supplied to NASA facilities. The total sales value for 1983 was $1,111,346.66 with an actual income of $1,078,305.34.

Software distributions through leases increased during the contract period with a total of 161 leases or lease renewals executed. This figure does not include the 38 lease program products distributed to NASA. A total of 45 program products were made available through lease agreements in 1983. The lease agreements were standardized for all leases with the exception of NASTRAN and STAGS, and a new Educational Support Lease was initiated during 1983.

A new dissemination activity initiated during 1976 and continued during 1983 was the direct transmittal of program code and documentation to designated recipients at the request of Technology Utilization Officers. These packages are not subjected to technical screening and are transmitted for a fixed handling charge. These transmittals are termed 'AS IS TRANSFERS' and typically involve programs which would normally fail to meet COSMIC submittal standards but which were transmitted to requestors via COSMIC in order to make utilization of the COSMIC distribution facilities more routine by NASA personnel.

The area of Customer Service and Marketing involves the dual tasks of providing for communication between customers and the center, and of promoting COSMIC and the services provided. The majority of the inquiries received by COSMIC involve requests for searches to identify programs potentially applicable to a user's stipulated needs. The total number of such searches logged by the COSMIC staff during 1983 was 6,476 domestic and 357 international. In addition, 43 problems concerning distributed programs were reported and handled. Improvements in the Customer Service activity this year included the redesign of the Customer Service telphone search form and the development of a customer search review team. Both of these improvements have reflected well on COSMIC's service to its users.

The promotional activities carried out by COSMIC are described in detail in the Marketing section of this report. In brief, these efforts involved the continued solicitation of gratis advertisement of computer programs available from COSMIC in various technical press and trade journals; an increased attendance at trade shows and professional society meetings to promote the services and software available from COSMIC; the use of various media for the general promotion of COSMIC; the use of benefits analysis to highlight COSMIC's end results and to assist in marketing decisions; and the preparation of abstract collections and program summaries. Some of the high points in the Marketing activity include the acquisition of a display booth, the writing of a preliminary Marketing Plan, the redesign of the Benefits Analysis form, and the preparation of a hardcopy printed version of the catalog. The most significant highlight was the employment of a well-qualified Marketing Manager.

The Program Verification function, or the machine processing phase of the technical screening service provided by COSMIC, involves the compilation and/or assembly of submitted program code followed by linkage and/or loading in order to ascertain if the program code is syntactically correct and complete with respect to referenced subprograms as well as confirming the integrity of the recording medium on which the programs are supplied. During this year, the total number of programs processed in this way was 123. Although batch processing techniques are still commonly used in processing submitted programs, especially large systems, extensive use of interactive time-sharing facilities is employed in some program verification.

The Evaluation function involves the review of programs and supporting documentation following the machine processing phase to determine their suitability for public release relative to the standards of completeness and content specified in the COSMIC Submittal Guidelines. For accepted packages, Abstracts and new Technology Briefs are prepared in this phase of the operation in addition to the assignment of category codes and index terms. Prices for distributed materials are also established during package evaluation. Factors considered in establishing the price charged for the program code include program source instruction counts as a gross measure of development effort, machine independence or vintage, the quality of the supporting documentation, the known or assumed sales potential for the package, the functionality of the program relative to comparably classified packages, and the demonstrated level of developer programming support. Program classification and publication activity during this contract year included the evaluation and re-evaluation of 185 packages, the preparation of

56 Tech Briefs, and the preparation of 68 program abstracts. Also, the COSMIC Submittal Guidelines were completely rewritten and supplied to all TUO's and other NASA personnel.

Inventory Control activities involve primarily the maintenance of receipt and processing records on all submitted programs and documentation, utilizing the computer based COSMIC Library Management and Reporting System. This is done to determine the status and location of submitted materials and to provide the regular management and service reports necessary for the operation of the COSMIC center. Continued emphasis has again been given this year to reviewing the accuracy and completeness of the data recorded on the master files for this system with the introduction of additional data entry editing and quality control specifications.

Special Projects in the operation of COSMIC are normally those projects begun under a particular contract at the request of the contracting agency. The duration of such projects is typically limited to a particular contract period, but the results often have a continuing influence on the center, generally in terms of increased efficiency or ease of operation. During 1983, the COSMIC staff was involved with three special projects. The first was the continued maintenance of the COSMIC Abstract Recording System (CARS) Project; the second was the continuation of the Microfiche Project; and the third was the Customer Information Project. The result of the CARS project has been the creation of a machine-readable data base containing copies of COSMIC program abstracts, the development of support software to maintain the data base, and the development of an on-line searchable abstract data base. The result of the Microfiche Project has been the recording of program documentation on

microfiche. This is an on-going activity due to the continuing submittal of new programs into the COSMIC inventory. The result of the Customer Information project was the initial analysis and design of a comprehensive system to maintain and process data related to COSMIC operations. A detailed discussion of each of these projects is reported in the section on Special Projects.

COSMIC began maintaining and providing support for the NASTRAN structural analysis computer program in May, 1979. A subcontract was awarded to the Computer Sciences Corporation in November, 1979 to provide support for the maintenance of the NASTRAN system. During 1982, the maintenance contractor was changed from CSC to Sperry. The solution of Software Problem Reports (SPR's) continued and a number of enhancements were added to NASTRAN for the April 84 release. A total of 72 SPR's were corrected for the April 83 Release, with an additional 47 SPR's corrected by Sperry for the April 84 release. For the first time at the NASTRAN User's Colloquium, not only were papers presented, but short courses were also held for the attendees. These short courses were introductory and intermediate level courses on NASTRAN features and capabilities.

And finally, three pieces of equipment were acquired during 1983 that impacted all activities within COSMIC. The DEC VAX 11/780 computer was delivered in December. The primary purpose of this machine is to support the NASTRAN Maintenance activity. The DECMATE II word processor was received in August and it primarily supports the Customer Service activity. The IBM PC microcomputer was delivered in June for the Program Verifications activity.

2

SOFTWARE SUBMITTAL PROCESSING

SOFTWARE SUBMITTAL PROCESSING

One hundred and fifty-one (151) programs and/or documents were submitted to COSMIC during the 1983 period compared to one hundred and seventy-two (172) submitted during 1982. Of the 151 logged receipts, 90 (60%) represent initial packages (both program and documentation), 3 (2%) were initial program submittals for which no corresponding documents were received, 2 (1%) were initial document submittals for which no corresponding programs were received, 8 (5%) were additional packages (both program and documentation), 13 (9%) were update packages (both program and documentation), 13 (9%) were additional documentation for previously submitted packages, 4 (3%) were documentation updates for previously submitted packages, 14 (9%) were subroutines or code corrections requested to complete previously submitted packages, and 4 (3%) represent source code updates or new releases of previously submitted packages. The distribution of these submittals from NASA and DOD sources is shown in Table I.

TABLE I

1983 NASA AND DOD SUBMITTALS

Submittal Type Received	NASA	DOD	Total
Initial Packages (Program and Document)	85	5	90
Initial Program (No Document)	3	0	3
Initial Documents (No Program)	2	0	2
Additional Packages	8	0	8
Update Packages	12	1	13
Additional Documentation	13	0	13
Documentation Updates	4	0	4
Additional Program Materials	13	1	14
Program Updates	4	0	4
	144	7	151

Table II illustrates the number of submittals COSMIC received from each center during 1983. The largest number of submittals, 34 (23%), was received from the Lewis Research Center (LEW). The Lyndon B. Johnson Space Center (MSC) was the second largest source of submittals, 26 (17%), followed by the Langley Research Center (LAR) with 19 (13%), the Goddard Space Flight Center (GSC) with 16 (11%), and the Jet Propulsion Laboratory (NPO) with 15 (10%). Table III illustrates the total number of individual new technology reportable items received from each center since the beginning of COSMIC. Note that Table II reflects the total number of submittals in 1983 and Table III reflects the number of new technology reportable items submitted to COSMIC since the beginning of COSMIC. George C. Marshall Space Flight Center leads all centers with a total of 1,336 (31%) followed by the Lyndon B. Johnson Space Center with 1,042 (24%). Figure 1 shows the total number of submittals received each year since the beginning of COSMIC.

TABLE II

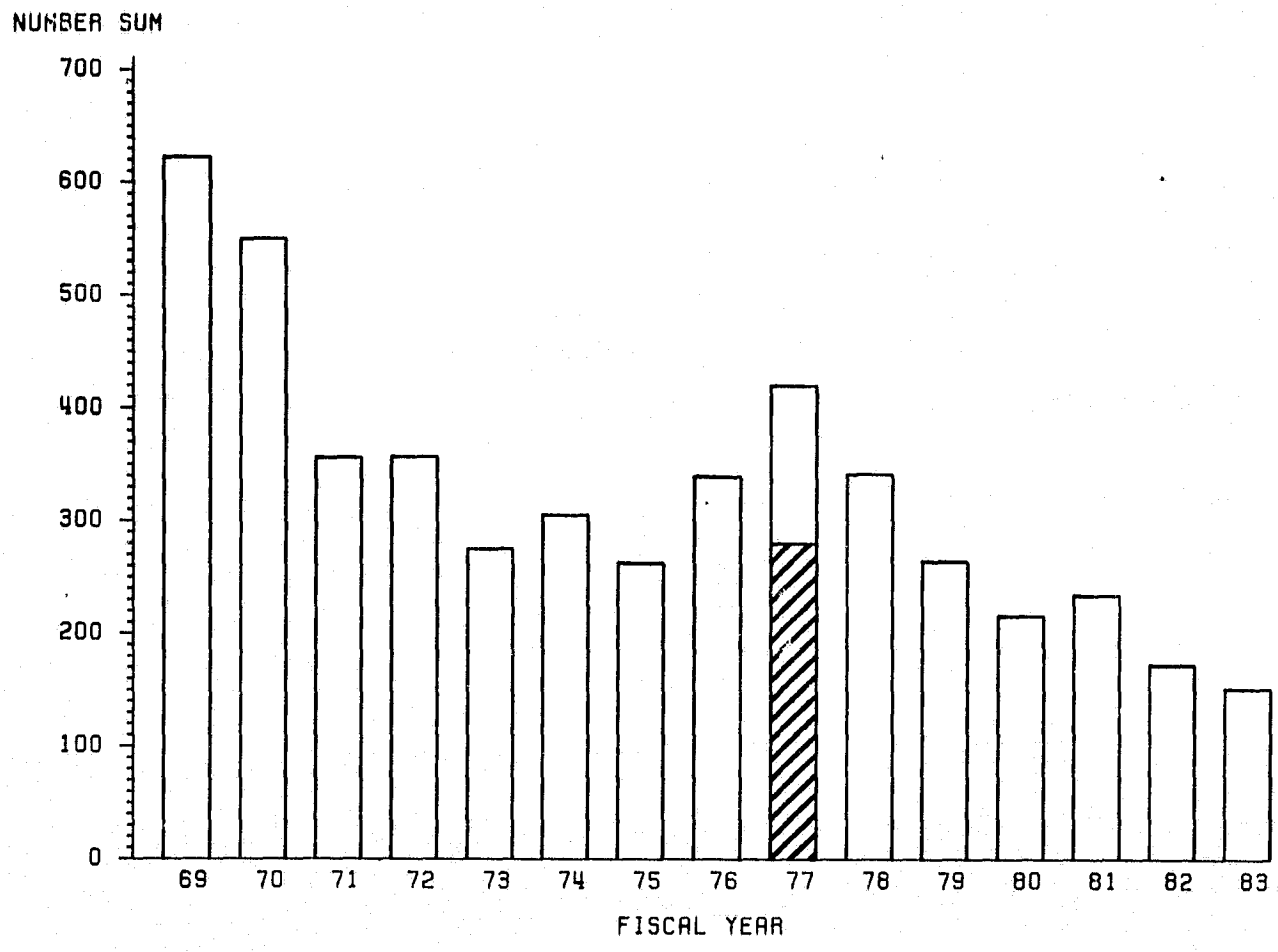
COSMIC 1983 SUBMITTAL ITEMS BY CENTER

Center	No. Submittals
Ames Research Center (ARC)	4
COSMIC (COS)	0
Department of Defense (DOD)	7
Earth Resources Laboratory (ERL)	5
Goddard Space Flight Center (GSC)	16
NASA Headquarters (HQN)	12
John F. Kennedy Space Center (KSC)	5
Langley Research Center (LAR)	19
Lewis Research Center (LEW)	34
George C. Marshall Space Flight Center (MFS)	8
Lyndon B. Johnson Space Center (MSC)	26
Jet Propulsion Laboratory, Pasadena (NPO)	15
	151

TABLE III

CUMULATIVE NEW TECHNOLOGY SUBMITTALS BY CENTER

Center	No. of Submittals
Ames Research Center (ARC)	84
COSMIC (COS)	83
Department of Defense (DOD)	87
Electronics Research (ERC)	13
Earth Resources Laboratory (ERL)	18
Flight Research Center (FRC)	15
Goddard Space Flight Center (GSC)	357
NASA Headquarters (HQN)	99
John F. Kennedy Space Center (KSC)	113
Langley Research Center (LAR)	325
Lewis Research Center (LEW)	322
George C. Marshall Space Flight Center (MFS)	1,336
Lyndon B. Johnson Space Center (MSC)	1,042
Jet Propulsion Laboratory, Pasadena (NPO)	398
Westinghouse Astronuclear Laboratory (NUC)	75
Wallops Station, Virginia (WLP)	11
	4,378



*EIGHTEEN-MONTH REPORTING PERIOD, JULY 1, 1976, THROUGH DECEMBER 31, 1977. SHADED AREA REPRESENTS COMPARABLE TWELVE-MONTH DATA.

FIGURE 1

TOTAL NUMBER OF SUBMITTALS BY FISCAL YEAR

One hundred and twenty-three (123) programs were processed by the programing staff during 1983. These figures include processing of new submittals, processing of programs from previous years requiring checkout prior to dissemination, and processing of updates, corrections, or additions to packages previously processed and found to be incomplete or erroneous. Program checkout can require from several days to several weeks, depending upon the size and complexity of the package.

Evaluation and classification during 1983 resulted in the distribution shown in Table IV (based on the IR classification dates). The number of program packages evaluated does not necessarily equal the number of program packages subjected to machine processing for a number of reasons: (1) documentation-only packages can be evaluated without machine processing; (2) packages may be reclassified when additional (requested) documentation is received without requiring additional processing of the program; (3) packages may be reclassified due to policy changes on screening criteria without requiring checkout; and (4) programs which were checked out under previous contracts may be machine verified again but not re-evaluated to ensure correctness and completeness when new orders are placed. The counts also reflect all classification transactions for a given package during the year; that is, a program designated Class 4 due to a request for additional information may later be reclassified 1 or 2 (and counted) when the information is received.

Those packages assigned a Class 1 status are programs developed under NASA sponsorship that not only meet the COSMIC submittal requirements for completeness and operational status but have been evaluated as innovative and

TABLE IV

1983 PACKAGE CLASSIFICATIONS BY SUBMITTAL SITE

CENTER MNEMONIC	CLASS 1	CLASS 2	CLASS 3	CLASS 4
ARC	3	0	5	1
COS	0	0	0	0
DOD	0	4	3	1
ERL	5	0	11	0
GSC	12	1	6	2
HQN	12	0	1	3
KSC	1	1	2	1
LAR	13	0	4	2
LEW	15	0	0	8
MFS	4	0	16	6
MSC	12	4	5	4
NPO	10	1	5	1
	87	11	58	29

of exceptional quality. New Technology Briefs are prepared for publication in the NASA report series. During 1983, there were 87 packages of Tech Brief status processed, with the majority being packages submitted from the Lewis Research Center, the Langley Research Center, the Goddard Space Flight Center, and the Johnson Space Center. Because some of these packages represent update submittals for which Tech Briefs had previously been prepared and different machine versions of the same programs, the number of Tech Briefs actually written in 1983 was 56.

Class 2 packages, of which 11 were evaluated during 1983, are packages which meet the COSMIC submittal requirements for completeness and operational status but represent technology that is not of Tech Brief caliber. Abstracts are prepared for all newly submitted and for updated Class 1 and 2 packages for publication in the COSMIC Software Catalog. During 1983, 68 abstracts were prepared for publication. Abstracts are prepared for all Class 1 and 2 packages which are initial receipts or significant updates, therefore, a correlation between the Tech Briefs written and abstracts written cannot be made. The largest number of accepted packages (Class 1 and 2) for 1983 came from the Johnson Space Center (MSC), the Lewis Research Center (LEW), the Goddard Space Flight Center (GSC), and the Langley Research Center (LAR). Table IV indicates, by submittal center, the number of packages evaluated during 1983.

Although the number of published items has no direct relationship to the number of submitted items during any year because of the publication of previously incomplete items, a measure of the acceptance rate for packages received in any period can be obtained as the quotient of the number of packages with an initial status of 1 or 2 which were originally received during that period divided by the total number of packages which were initially received and evaluated during the same period. Applying this

measure to the packages received during 1983, an acceptance quotient of 76% results compared to a value of 67% for the previous reporting period.

Class 4 packages are those, which for one reason or another, were found to be incomplete or required additional information. They are assigned Class 4 status pending receipt of the required information. Items normally remain in Class 4 status up to twelve months, at which time they are reclassified as Class 3 (inoperative and/or unpublishable) unless the required information has been received for Class 1 or Class 2 disposition. During this year, 16 programs were upgraded from Class 3 or 4 to published status (1 or 2) through the receipt of the requested information.

During 1983, 58 packages were evaluated as Class 3. This number includes packages that had been Class 4 for twelve months or longer, packages that were replaced by newer packages, previously published packages that were reviewed and found to be obsolete or inoperable, and submittals that were evaluated as inappropriate for distribution by COSMIC. This number also includes packages which were made Class 3 as a result of an effort to remove all outdated packages from the COSMIC inventory prior to the publication of the COSMIC Software Catalog. Table V gives the current status of all packages received from each submitting source since the inception of COSMIC. The entries under 'Withdrawn' represent items previously Class 3 for which discard or return authorization has been received from the appropriate Technology Utilization Officer. From the table, 886 of the 1,344 programs available are submittals from the Johnson Space Center, the Langley Research Center, the Lewis Research Center and the Marshall Space Flight Center with each having approximately 200 programs currently available.

TABLE V

CUMULATIVE PACKAGE CLASSIFICATIONS BY CENTER

Center Mnemonic	Class 1	Class 2	Class 3	Class 4	In Process	With-drawn	Total
ARC	35	10	4	1	0	35	85
COS	0	17	0	1	0	65	83
DOD	0	51	0	0	2	34	87
ERL	6	0	11	0	0	1	18
FRC	5	6	0	0	0	4	15
GSC	86	40	0	1	2	228	357
HQN	14	7	0	3	0	73	97
KSC	6	22	1	1	2	81	113
LAR	170	60	0	5	3	85	323
LEW	144	77	0	5	9	87	322
MFS	91	107	2	2	2	1137	1341
MSC	94	143	4	1	5	795	1042
NPO	87	51	1	1	5	254	399
NUC	9	6	0	0	0	60	75
	747	597	23	21	30	2939	4357

The new "COSMIC Software Submittal Guidelines" were printed in January, 1983. During the year approximately 500 copies of the new guidelines were distributed to NASA and NASA contractor personnel, primarily through the field center Technology Utilization Offices.

COSMIC actively investigates sources of information regarding computer programs developed with NASA funding. Through the review of such sources as NASA SCAN, STAR, and other publications, COSMIC identified 14 programs that had potential utility outside of NASA and requested their submittal from the appropriate TUO. The 1983 RTOP summaries were also reviewed to identify potential future sources of computer programs. COSMIC identified 32 RTOP's for followup and provided the TUO's with information packets to supply to the appropriate RTOP monitors.

In 1983 COSMIC obtained an IBM PC micro computer for processing microcomputer software. The number of microcomputer program submittals grew significantly last year. Several of the microcomputer programs have proven to be quite popular (e.g., Dr. Tausworthe's "SOFTCOST" program sold 21 copies this year).

In December of 1983 COSMIC took delivery of a DEC VAX 11/780. The DEC VAX series computer is widely used at many of the NASA field centers and COSMIC received 22 programs for the DEC VAX in 1983. The availability of the VAX will increase our submittal processing capability significantly.

3

DISSEMINATION ACTIVITIES

DISSEMINATION ACTIVITIES

A summary of the program and document distributions for the contract period is given in Table VI.

TABLE VI

1983 SALES AND SERVICES SUMMARY

Total Items Invoiced	Volume	Value
Program Sales	407	$417,816.25
Document Sales	1,720	72,522.50
Lease Distributions	161	583,501.14
Miscellaneous Sales (Including catalogs)	1,449	37,506.77
	3,737	$1,111,346.66
NASA Distributions (No Charge)		
Programs	80	$ 86,355.00
Documents	324	17,107.00
Lease Distributions	38	144,740.00
Miscellaneous Sales (Including catalogs)	156	1,810.00
	598	$250,012.00

The total items invoiced includes all sales or lease distributions for which income can be expected. The contribution to the total invoiced value due to foreign distributions is $267,445.08, arising from 266 miscellaneous sales, 92 program sales, 268 document sales, and 7 leases. The lease distribution value of $583,501.14 derives from 104 leases and renewals of NASTRAN, and 57 leases of other programs. An analysis of Table VI indicates that approximately 54% of the total sales value of program products was derived from lease distributions. Program products include: program sales, document sales, and lease distributions.

The volume and value of DOD items invoiced during the year are shown in Table VII; these items are also included in the Total Items Invoiced as shown in Table VI.

TABLE VII

DISSEMINATION OF DOD ITEMS

	Volume	Value
Programs	29	$20,445.00
Documents	68	1,864.00
	97	$22,309.00

An analysis of the dissemination activities in 1983 (Table VIII) reveals 28 packages with a total invoiced sales value of more than $5,000.

For 1983, total COSMIC sales were $1,111,346.66. When compared with total sales for 1982, this represents an increase of 21%. This increase can be attributed in part to the large increase in lease distributions. The program sales volume decreased by 20% and program sales value increased by 1% in 1983 as compared to 1982. The total value of lease distributions (of which NASTRAN is the largest part) for 1983 is $583,501.14. When compared to 1982, this represents an increase of approximately 41%. These figures indicate that NASTRAN is still an extremely prominent part of the COSMIC sales picture (documentation and leases of NASTRAN accounting for approximately 38% of total sales), and that the leasing of all program products accounted for approximately 53% of the total sales value for 1983.

A comparison of package activity by volume of distributions is given in Tables IX and X, with Table IX listing the most active packages in terms of the number of copies of public program sales and Table X listing the most

TABLE VIII

MOST ACTIVE SOFTWARE PACKAGES BY TOTAL INVOICED PUBLIC SALES VALUE

PROGRAM NUMBER	PROGRAM ACRONYM/TITLE	DOCUMENTS VOLUME	DOCUMENTS VALUE	PROGRAMS VOLUME	PROGRAMS VALUE	TOTAL VALUE
HQN-10952	NASTRAN (IBM)	287	$14,430.00	60	$244,895.00	$259,325.00
GSC-12600	NASTRAN (DEC VAX)	0	-0-	25	107,800.00	107,800.00
HQN-10953	NASTRAN (CDC)	0	-0-	13	52,920.00	52,920.00
GSC-12671	SINDA (DEC VAX)	29	1,711.00	14	51,000.00	52,711.00
ARC-11446	Hidden Line Computer Code	98	1,173.00	70	23,500.00	24,673.00
HQN-10967	STAGSC-1 (DEC VAX)	3	260.00	6	24,000.00	24,260.00
ARC-11398	PANAIR	16	2,499.00	3	21,000.00	23,499.00
LAR-12623	Three-Dimensional Potential-Flow Program with Geometry Package for Generation of Input Data	6	615.00	4	19,200.00	19,815.00
HQN-10960	STAGSC-1 (CDC)	2	104.00	4	18,000.00	18,104.00
GSC-12014	GEODYN	4	1,432.00	2	15,100.00	16,532.00
HQN-10954	NASTRAN (UNIVAC)	0	-0-	4	15,960.00	15,960.00
ARC-11278	Subsonic/Supersonic Advanced Panel Pilot Code	4	364.00	2	13,800.00	14,164.00
ARC-11434	GASP	3	420.00	3	13,080.00	13,500.00
LAR-12702	WIBCO	4	240.00	3	13,080.00	13,320.00
MSC-20423	A Computer Security Package for the DEC VAX-11/780	43	484.00	22	12,760.00	13,244.00
GSC-12783	TRASYS II	5	390.00	3	12,300.00	12,690.00
ERL-10013	ELAS (PERKIN-ELMER)	6	409.50	3	11,425.00	11,834.50
GSC-12758	APT	5	1,691.00	3	7,500.00	9,191.00
LAR-12404	APAS	2	141.00	2	7,800.00	7,941.00
MSC-13805	SINDA (UNIVAC)	6	1,010.00	1	6,800.00	7,810.00
ARC-11144	FLEXSTAB (IBM)	1	227.00	3	7,500.00	7,727.00
NPO-15862	SOFTCOST	40	1,558.00	21	6,100.00	7,658.00
LAR-12299	NSEG	1	102.00	1	7,550.00	7,652.00
MSC-18597	SINDA (CDC)	4	750.00	2	6,800.00	7,550.00
LEW-13293	TACT1	2	112.00	2	7,200.00	7,312.00
MFS-22672	MARSYAS	0	-0-	1	6,900.00	6,900.00
LEW-12966	MERIDL	6	328.00	2	5,400.00	5,728.00
LAR-12011	POST3D	1	78.50	1	4,950.00	5,028.50

TABLE IX

MOST ACTIVE SOFTWARE PACKAGES BY VOLUME OF PUBLIC PROGRAM SALES

PROGRAM NUMBER	PROGRAM ACRONYM/TITLE	PROGRAM DISTRIBUTIONS	DOCUMENT DISTRIBUTIONS	PROGRAM SALES VALUE
ARC-11446	Hidden Line Computer Code	70	98	$ 23,500.00
HQN-10952	NASTRAN (IBM)	60	287	244,895.00
GSC-12600	NASTRAN (DEC VAX)	25	0	107,800.00
MSC-20423	A Computer Security Package for the DEC VAX-11/780	22	43	12,760.00
NPO-15862	SOFTCOST	21	40	6,100.00
GSC-12671	SINDA (DEC VAX)	14	29	51,000.00
HQN-10953	NASTRAN (CDC)	13	0	52,920.00
HQN-10967	STAGSC-1 (DEC VAX)	6	3	24,000.00
GSC-12833	NASTRAN NASTPLT Plotting Post Processor	6	7	1,950.00
DOD-00065	NRLXRF	6	9	1,350.00
LEW-11740	Computer Program for Calculation of Complex Chemical Equilibrium Compositions, Rocket Performance, Incident and Reflected Shocks, and Chapman-Jouguet Detonations	5	9	3,600.00
LEW-10977	TSONIC	5	6	2,925.00
LAR-12953	ORACLS (IBM)	4	8	3,700.00
LAR-12623	Three-Dimensional Potential-Flow Program with Geometry Package for Generation of Input Data	4	6	19,200.00
HQN-10960	STAGSC-1 (CDC)	4	2	18,000.00
HQN-10954	NASTRAN (UNIVAC)	4	0	15,960.00
DOD-00019	FLOBOL	4	7	3,300.00
LEW-13392	PRESTO	4	6	1,725.00

TABLE X

MOST ACTIVE SOFTWARE PACKAGES BY VOLUME OF PUBLIC DOCUMENT SALES

PROGRAM NUMBER	PROGRAM ACRONYM/TITLE	DOCUMENT DISTRIBUTIONS	PROGRAM DISTRIBUTIONS	DOCUMENT SALES VALUE
HQN-10952	NASTRAN (IBM)	287	60	$14,430.00
ARC-11446	Hidden Line Computer Code	98	70	1,173.00
MSC-20423	A Computer Security Package for the DEC VAX-11/780	43	22	484.00
NPO-15862	SOFTCOST	40	21	1,558.00
GSC-12671	SINDA (DEC VAX)	29	14	1,711.00
NPO-14892	MINI/VICAR	27	1	735.00
NPO-16201	SSDL	19	3	760.00
ARC-11398	PANAIR	16	3	2,499.00
GSC-12710	CAT	15	0	712.50
GSC-12708	MARS	15	2	465.00
NPO-16234	CRISP80	13	3	312.00
NPO-16274	ARCH	12	2	150.00
MSC-18178	MATHPAC	11	2	576.00
MFS-25352	DDL	11	1	542.50
LAR-12943	RIM5	11	0	275.00
LAR-12919	PPARS	10	0	319.00
GSC-12162	NASTRAN Thermal Analyzer	10	0	1,020.00

active packages in terms of public document sales. Table IX lists 18 packages for which four or more distributions of program code occurred. The Hidden Line Computer Code and NASTRAN dominate this group of most active program packages. A Computer Security Package for the DEC VAX-11/780, SOFTCOST (Deep Space Network Software Cost Estimation Model), and SINDA (Systems Improved Numerical Differencing Analyzer with Sinflo) are also in this group of popular programs.

To summarize invoiced sales, COSMIC processed 568 program orders, including 161 lease distributions during 1983, and 1,720 document orders. Excepting lease distributions, 407 program orders were filled at an average value of $1,027 for each distributed program. This compares with 506 program orders filled at an average value of $819 for 1982. These figures indicate that during 1983, COSMIC sold a lower number of programs at a higher average price when compared to 1982. The number of distinct packages involved in all distributions was 582 for 1983.

The leading software packages distributed to NASA facilities for which no charge was made are listed in Table XI. The total number of programs distributed to NASA centers in 1983 was 118 (including leased programs) with 324 documents supplied, and 156 miscellaneous sales (including catalogs), having a combined total value of $250,012.00. When compared with 1982, the volume of programs distributed to NASA decreased by 19% and the total value of all items distributed to NASA increased by 9% in 1983.

Characterization of the software packages disseminated during 1983 shows that 24 packages were distributed to NASA only and 473 to the public only with a total distribution of 582 different packages. This represents 43% of the

approximately 1,348 items in the inventory. The published inventory is not static because of additions and deletions. One hundred ten (110) different packages were distributed to NASA sites, 85 of which were common to both the NASA and non-NASA distribution lists (Table XII).

Comparisons of 1983 invoiced sales by state are shown in Figure 2. The states with the greatest dollar value of sales were California ($160,267.00), New York ($96,565.00), Texas ($56,354.00), Ohio ($53,206.50), and Massachusetts ($52,451.50).

Comparisons of the invoiced sales by year since charges were instituted in 1968 are shown in Table XIII and Figure 3. The peak for 1971 occurred when NASTRAN Level 12 was released, with some sales of this version carrying over into 1972. The peak in 1973 can be attributed to the release of Level 15.1 of NASTRAN. Some sales of NASTRAN Level 15.5 are included in 1974 and 1975, although sales were lower than for previous releases of NASTRAN, apparently

TABLE XI

MOST ACTIVE SOFTWARE PACKAGES BY SALES VALUE DISTRIBUTED TO NASA

PROGRAM NUMBER	PROGRAM ACRONYM/TITLE	DOCUMENTS VOLUME	DOCUMENTS VALUE	PROGRAMS VOLUME	PROGRAMS VALUE	TOTAL VALUE
HQN-10952	NASTRAN (IBM)	171	$10,593.00	9	$34,600.00	$45,193.00
GSC-12600	NASTRAN (DEC VAX)	0	-0-	10	38,920.00	38,920.00
HQN-10954	NASTRAN (UNIVAC)	0	-0-	5	20,320.00	20,320.00
HQN-10953	NASTRAN (CDC)	0	-0-	3	12,600.00	12,600.00
LAR-12747	DYLOFLEX	2	452.00	1	10,000.00	10,452.00
MSC-20448	TRASYS II	2	219.00	2	8,200.00	8,419.00
LAR-12371	SPAR (DEC VAX)	1	110.00	2	8,200.00	8,310.00
HQN-10962	STAGSC-1 (UNIVAC)	0	-0-	2	8,000.00	8,000.00
GSC-12827	SAMSAN	6	600.00	5	6,000.00	6,600.00
LAR-12953	ORACLS (IBM)	5	180.00	5	5,625.00	5,805.00
NPO-14892	MINI/VICAR	2	49.00	2	4,360.00	4,409.00
MFS-25058	PR2D	1	50.50	1	3,775.00	3,825.00
NPO-13716	JPLDIS	1	51.00	1	3,450.00	3,501.00
GSC-12671	SINDA (DEC VAX)	0	-0-	1	3,400.00	3,400.00
GSC-12846	NBOD2	4	196.00	2	3,150.00	3,346.00
LAR-12623	Three-Dimensional Potential-Flow Program with Geometry Package for Generation of Input Data	1	61.50	1	3,200.00	3,261.50
MFS-25464	PWB	1	36.50	1	2,600.00	2,636.50
MFS-23449	META ASSEMBLER	0	-0-	1	2,300.00	2,300.00
LAR-11891	A Computer Code for Calculating the Super/Hypersonic Inviscid Flow Around Real Configurations	1	44.00	1	2,200.00	2,244.00

TABLE XII

NUMBER OF DIFFERENT COSMIC SOFTWARE PACKAGES DISTRIBUTED

DISTRIBUTION	NUMBER OF COSMIC ITEMS
NASA Sites Only	24
NASA and Public	85
Public Only	473
	582

due to delays in obtaining documentation and to a premature announcement of Level 16 release. Distributions in 1976 include the value of 16 leases of Level 15.9 NASTRAN at a value of $43,800 and of 3 leases of Level 16 NASTRAN at a value of $11,200. Fiscal year 1977 was for a period of eighteen months, but when adjusted to twelve months 1977 was another peak year. This corresponds to the release and market adoption of NASTRAN Level 16. The figures for 1977 include the value of one lease of Level 15.9 NASTRAN at a value of $3,000, the value of 38 leases of 16 NASTRAN at a value of $135,100,

TABLE XIII

COSMIC TOTAL SALES

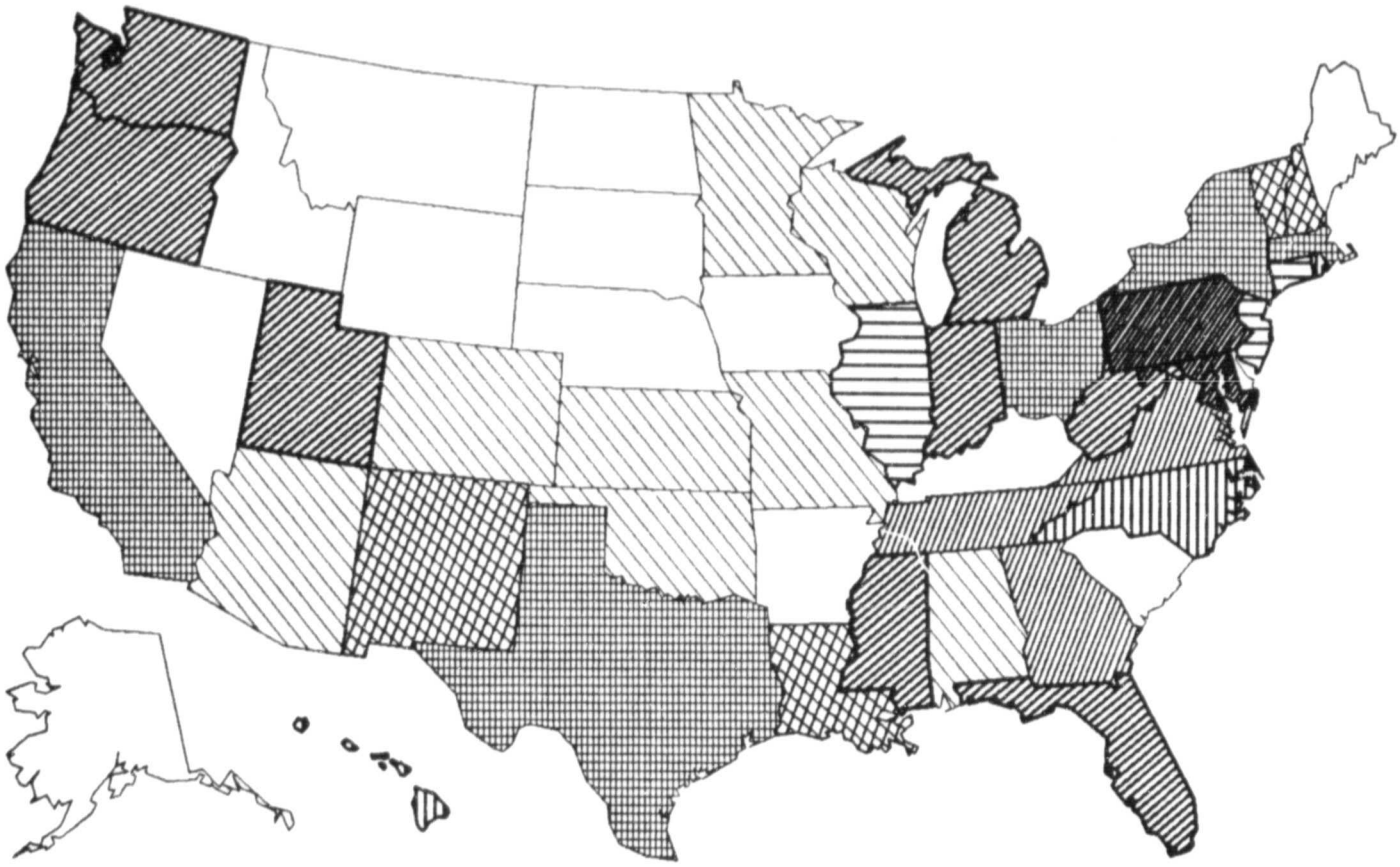
	ITEMS INVOICED					NASA DISTRIBUTIONS (No Charge)				
FISCAL YEAR	PROGRAMS VALUE	PROGRAMS VOLUME	DOCUMENTS VALUE	DOCUMENTS VOLUME	TOTAL VALUE	PROGRAMS VALUE	PROGRAMS VOLUME	DOCUMENTS VALUE	DOCUMENTS VOLUME	TOTAL VALUE
1967-68	$ 29,802	423	$ 8,735	2567	$ 38,537	$ 5,250	182	$ 318	92	$ 5,568
1968-69	52,785	177	16,205	2506	68,990	16,450	110	1,974	159	18,424
1969-70	87,641	216	18,814	1754	106,455	16,045	114	4,212	262	20,257
1970-71	162,746	310	25,309	1925	188,055	25,060	135	2,995	196	28,055
1971-72	101,560	277	30,292	1813	131,872	30,630	143	6,069	258	36,699
1972-73	160,137	335	61,393	5903	221,530	48,915	101	3,616	273	52,531
1973-74	140,228	298	42,992	4844	183,220	34,261	89	5,735	543	39,996
1974-75	101,899	207	38,584	3479	140,483	40,023	71	3,636	259	43,659
1975-76	164,217	172	39,374	3327	203,591	54,710	50	5,109	286	59,819
1976-77*	357,260	344	67,751	3872	425,011	56,860	66	15,222	582	72,092
1977-78	377,832	343	56,360	2681	434,192	62,560	62	5,372	209	67,932
1978-79	396,319	359	89,725	3118	486,044	74,145	67	7,508	332	81,653
1979-80	460,618	400	78,056	3385	538,674	68,790	70	7,253	232	76,043
1980-81	643,027	404	99,215	3392	742,242	121,675	68	7,238	260	128,913
1981-82	829,067	623	92,974	2819	922,041	223,400	145	11,378	307	234,778
1982-83	1,001,317	568	110,029	3169	1,111,346	231,095	118	18,917	480	250,012

*FY 77 was an eighteen-month period, July 1, 1976, through December 31, 1977.

COSMIC SALES BY STATE

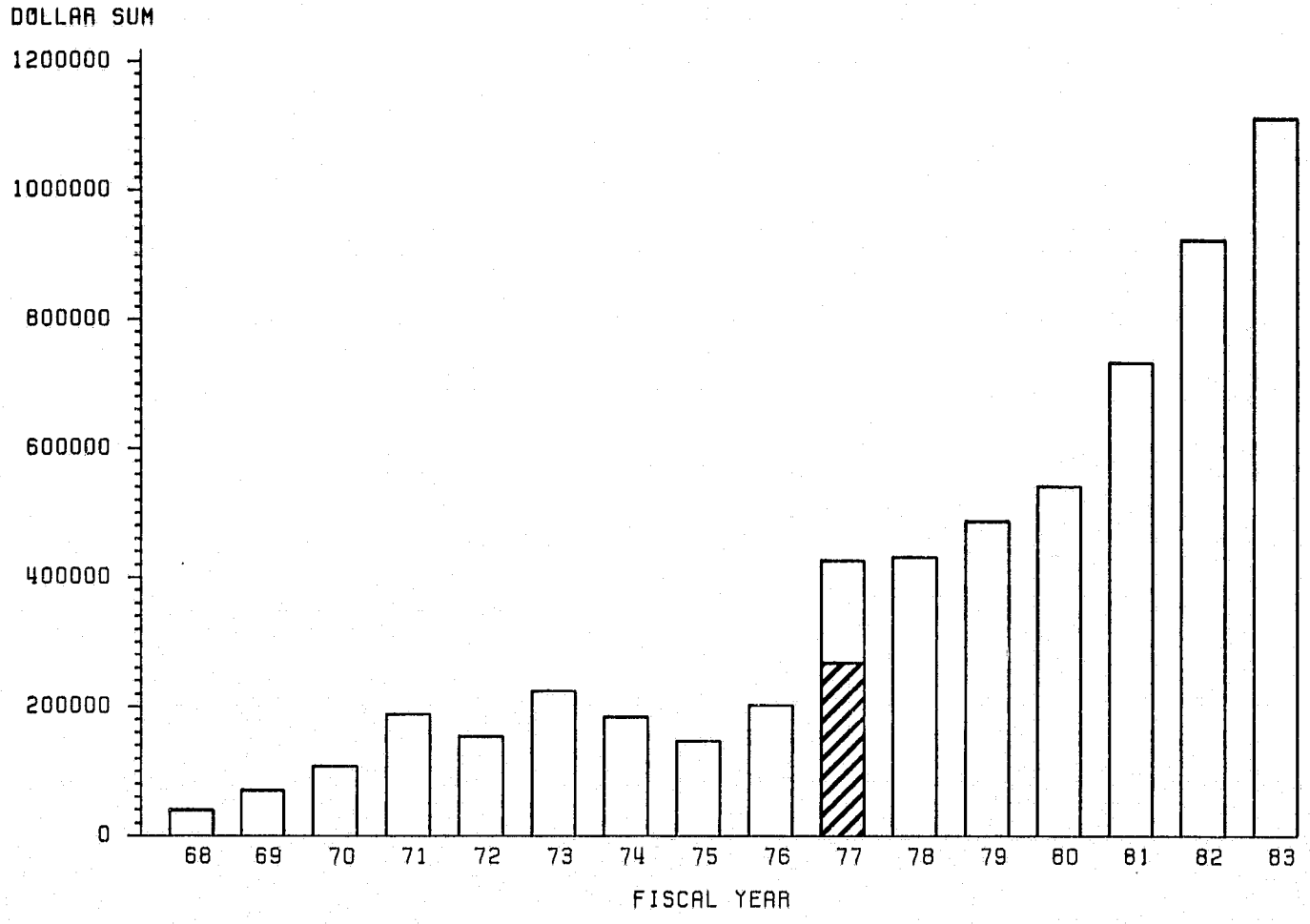
1983 ANNUAL SALES

FIGURE 2



LEGEND: SALES

- UNDER $500
- $501-1,000
- $1,001-5,000
- $5,001-10,000
- $10,001-20,000
- $20,001-30,000
- $30,001-40,000
- $40,001-50,000
- OVER $50,000



*EIGHTEEN-MONTH REPORTING PERIOD, JULY 1, 1976, THROUGH DECEMBER 31, 1977. SHADED AREA REPRESENTS COMPARABLE TWELVE-MONTH DATA.

FIGURE 3

COMPARISON OF INVOICED SALES BY YEAR

and the renewal value of 17 Level 16 NASTRAN leases at a value of $187,900. 1978 was by far the best year for total sales value for COSMIC up until that time, even better than the eighteen-month period of 1977. 1979 showed an increase in COSMIC sales, even above 1978. The largest single influence in these figures again was NASTRAN. Total lease distributions (which included a small amount derived from program products other than NASTRAN), amounted to $244,778, all other sales (including programs, documents, and miscellaneous items) amounted to $241,256. Thus, lease distributions accounted for approximately 51% of the total COSMIC sales value in 1979. Sales continued to increase during 1980. As in previous years, NASTRAN was the largest single influence in COSMIC sales. Lease distributions were $268,011 of a total sales figure of $538,674. As in 1979, total lease distributions accounted for approximately 50% of the total COSMIC sales value for 1980. Sales value for 1981 increased at a greater level than the increase for all previous years, excluding the eighteen-month reporting period of 1977. Again the largest single influence in COSMIC sales was NASTRAN. Total lease distributions amounted to $347,467.50, all other sales totaled $394,774.88. Thus, lease distributions accounted for approximately 47% of the total COSMIC sales value in 1981. Sales continued to increase during 1982. As in previous years, NASTRAN was the largest single influence in COSMIC sales. Lease distributions were $414,690.50 of a total sales figure of $922,041.11. Thus, lease distributions accounted for approximately 45% of the total COSMIC sales value in 1982. In 1983, sales increased over 1982. The largest single influence in these figures again was NASTRAN, which accounted for approximately 38% of total sales. Lease distributions were $583,501.14 of a total sales figure of $1,111,346.66. Thus, approximately 53% of the total COSMIC sales value in 1983 was derived from lease distributions.

4

CUSTOMER SERVICES AND MARKETING ACTIVITIES

CUSTOMER SERVICES AND MARKETING ACTIVITIES

CUSTOMER SERVICE

During 1983, the total number of customer searches performed (in response to letters, TECH BRIEFS, and telephone inquiries) was 6,833 (up from 6,235 in 1982). This is divided into domestic inquires (6,476) and foreign inquires (357). In addition, 43 customer problems were handled during 1983. These problems ranged from needing a replacement tape to requiring a person at a NASA site to answer questions on a particular package.

The purchasers of COSMIC program products in 1983 represented 28 non-communist countries in addition to the United Sates. As a matter of policy, all inquiries from communist bloc countries are forwarded to NASA Headquarters for response and are not included in our statistics. The 2,058 United States purchasers of COSMIC products represented 1,540 different companies or organizations from 49 states plus Washington D.C. Most of these purchasers, as expected, were concentrated in the more industrialized areas of the country.

Also in 1983, Customer Service began using newly designed customer support telephone forms and reviewing all customer searches. The new customer support forms gather more search information and more market analysis information. A search review team was established during 1983 as part of Customer Service. This team reviews on a daily basis all searches conducted by COSMIC staff for customers. This process has helped to standardize all searches performed by COSMIC staff.

MARKETING

Marketing functions include the pricing, promotion, distribution, and planning of the product. COSMIC's marketing concept is: A total system of interacting activities designed to plan and review the implementation of pricing, promotion, and distribution activities of NASA software and selected services to present and potential customers. The area discussed in this section of the annual report will be promotional activities.

The role of promotion is to communicate ideas and information about a company and its products. There are two types of promotion: institutional promotion and product promotion. In COSMIC's case, institutional promotion involves promoting our link with NASA and the technology transfer program. Product promotion involves promoting specific software products.

The promotion mix for a product or organization consists of three major promotional methods: advertising, publicity, and sales promotion.

During 1983, COSMIC has continued many of the promotional activites initiated previously with increased emphasis. The primary thrusts of these activities were:

The continued solicitation of gratis publicity of computer programs available from COSMIC in the technical press and trade journals.

The increased attendance at trade shows and professional society meetings to promote the services and software available from COSMIC.

The preparation of abstract collections from groups of programs in the same general subject category and the updating of program summaries.

The use of various media for the general promotion of COSMIC.

The use of Benefits Analysis to highlight COSMIC's end results and to assist in marketing decisions.

ADVERTISEMENTS. Advertising is a paid form of communication about an organization and its products. It is transmitted to a target audience through a media such as newspapers or magazines, trade shows, and direct mail. During 1983, COSMIC placed its first ad in the December issue of Hardcopy magazine, which is targeted toward users of DEC computers. The ad referenced COSMIC and its connection with NASA, and announced that "more than 35 NASA developed computer programs are available for use on DEC hardware."

Conferences and Meetings. COSMIC staff members participated in professional meetings or trade conferences during 1983 to promote software and services available through the center. Typically, participation included informal presentations describing particular packages of interest to the attendees and the distribution of promotional material (brochures, catalogs, and abstracts). In March, delivery of the COSMIC trade show booth occurred. A list of the meetings attended is provided below:

Design Engineering Show, Chicago, March 28-31
Brochures on NASTRAN and other CAD programs were distributed to more than 1,000 design engineers. Over 200 of these requested further information on NASA software.

DEXPO East '83, St. Louis, May 22-24
700 attendees received a special catalog of NASA software for DEC computers. 88 individuals requested their name be placed on a mailing list to receive information on new programs.

In addition, COSMIC promotional material was distributed at the following conference, although COSMIC personnel were not in attendance:

"International Symposium on Image Processing",
Purdue University
Laboratory for Applied Remote Sensing
Lafayette, IN

Attendance at conferences and trade shows continues to be an excellent way for COSMIC to gain wide public exposure and acceptance.

Direct Mail. In 1983, COSMIC used direct mail to 1) notify current customers of program corrections, 2) notify current customers of program updates, and 3) notify potential customers of new COSMIC software.

The following mailing campaigns were initiated in 1983:

(Jan.) A mailing to 800 subscribers of the NASTRAN Newsletter and NASTRAN lessees announcing the 11th NASTRAN Users' Colloquium.

(Jan.) Announcements and order forms for the 1983 COSMIC Software catalog were mailed to 2,350 previous catalog purchasers.

(April) A mailing went to all previous customers who had purchased DEC PDP or DEC VAX software, for a total of 86 individuals. The mailing was to notify them of COSMIC's presence at the DEXPO trade show.

(July) In cooperation with NERAC, COSMIC supplied 1,000 brochures to notify NERAC clients about the availability of NASA software.

(Aug.) Abstracts and ordering information on 2 new programs, TAE (GSC-12881) and ARCH (NPO-16274) were mailed to 250 previous customer contacts.

(Oct.) A letter, a titles list of COSMIC turbomachinery software, and a response card were mailed to 62 companies involved in the design or manufacture of turbomachinery. Seventeen of these companies returned the response card requesting further information.

PUBLICITY. Publicity is communication in a news story form regarding an organization and its products that is transmitted through a mass medium at no charge.

News Releases: COSMIC has continued efforts to solicit gratis publicity in the technical journals and trade magazines. The level of activity in the marketing area is reflected in Table XIV and Table XV which list the announcements that appeared in various publications, and the number of information requests resulting from these announcements. The 54 announcements

TABLE XIV

ANNOUNCEMENTS PUBLISHED

PUBLICATION	DATE	ARTICLE
Computers for Design & Engineering	Winter 1983	NASTRAN, HQN-10952
Computerworld	Feb. 7, 1983	MSC-20423, VAX Security
Computerworld	Feb. 14, 1983	1983 Catalog
ICP INTERFACE (DP)	Jan./Feb. 1983	NPO-15862, SOFTCOST
Hardcopy	March 1983	1983 Catalog
Newsletter of Eng. Analysis Software	Feb. 1983	GSC-12669, SEL/DBAM 1983 Catalog
Miami Herald	Mar. 17, 1983	General Information
CP/M Review	March 1983	Microcomputer Software
Indianapolis Star	March 18, 1983	General COSMIC
C^2MUG Newsletter	Jan. 1983	General COSMIC
Computer Graphics World	Feb. 1983	General COSMIC
Datamation	April 1983	MSC-20423, VAX Security
Astronautics & Aeronautics	April 1983	LEW-12761, SHABERTH LEW-13393, CYBEAN LEW-13626, SPHERBEN
Hardcopy	April 1983	MSC-20423, VAX Security
Computers in Mechanical Engineering	April 1983	1983 Catalog
IEEE Computer Magazine	May 1983	NASA Software Tools, General
Electronic Design	April 1983	GSC-12827, SAMSAN
Computer Products	April 1983	DEC Software, Variety
Hardcopy	May 1983	SAP, GSC-12693 MARS, GSC-12708 SFORT, GSC-12688 RMS2, MSC-20433
Newsletter of Eng. Analysis Software	June 1983	SPHERBEAN, LEW-13626
Computer Decisions	June 1983	MSC-20423, VAX Security
Computer World	July 11, 1983	CRISP80, NPO-16234
Orlando Sentinel Star	July 25, 1983	General COSMIC
Hardcopy	Aug. 1983	NPO-16202, SDDL NPO-15862, SOFTCOST
LIST Magazine	Sept. 1983	NPO-16202, SDDL
Hardcopy	Sept. 1983	SINDA, GSC-12671 TRASYS, GSC-12783
Aerospace Daily	Aug. 1983	PASCO, LAR-13164
Turbomachinery International	July/Aug. 1983	Turbomachinery 1983 Catalog
Datamation	Sept. 1983	CRISP80, NPO-16234
S. Klein Newsletter	Sept. 26, 1983	SHADE, ARC-11496
NEAS	Aug. 1983	PASCO, LAR-13004
Computerworld	Oct. 17, 1983	ARCH, NPO-16274
Mechanical Engineering	Oct. 1983	PASCO, LAR-13004
Compressed Air	Oct. 1983	General COSMIC
Electronic Design	Oct. 27, 1983	DDL, MFS-25352
NEAS	Sept. 1983	NASTRAN Colloquium
NERAC Newsletter	Oct. 1983	General COSMIC
Hardcopy	Nov. 1983	ARCH, NPO-16274
Atlanta Constitution	Nov. 20, 1983	General COSMIC
Data Communications	Nov. 1983	STACOM, NPO-14486
NEAS	Nov. 1983	SAMSAN/DMAP Bridging, GSC-12902
CIME	Nov. 1983	DISCOS, GSC-12422
EDP Performance Review	Dec. 1983	STACOM, NPO-14486 MPSS, GSC-12333
Computer Graphics World	Dec. 1983	SHADE, ARC-11496
ICP Software Business Review	Dec. 83/Jan.	General

TABEL XV

INFORMATION REQUESTS RECEIVED

REQUESTS

Publication	Total Number
Tech Briefs	
Spring/Summer 82	100
Fall 82	444
Winter 82	742
Spring 83	481
	1,767
Control Engineering	1
AEC Automation Newsletter	9
Systems & Software	2
MBS Software Tools	1
Computers For Design & Engineering	53
Computerworld	72
ICP Interface	30
CP/M Review	6
Hardcopy	50
Computers In Construction	26
Aeronautics & Astronautics	3
CIME	114
IEEE	3
Electronic Design	34
Computer Products	64
Datamation	264
Computer	15
Computer Decisions	59
LIST	4
S. Klein Newsletter	45
NERAC Newsletter	45
Datapro	9
Mechanical Engineering	3
Digital Image	2
Compressed Air	1
Electronics News	1
Data Decisions	1
Data Communications	1
Mechanical Design	1
Computer Graphics World	1
Atlanta Journal & Constitution	63
Orlando Sentinel Star	78
	1,061

listed (excluding NASA publications) were carried in 45 magazines, newsletters, or journals resulting in a total of 1,061 reported requests. NASA publications, primarily TECH BRIEFS, generated 1,767 requests. As new programs are added to COSMIC's inventory, an attempt is made to locate journals in those fields which are not already on our mailing list. They are then added and attempts are made to contact by phone to determine which staff member should receive news releases. A general release on COSMIC and the specific program news release are then mailed. A reply card asking whether the release will be published, and in which issue, and whether the editor wishes to remain on our mailing list is also included with the initial news release and with all ongoing contacts. Currently 87 journal titles are included on the mailing list. They represent the following seven categories of programs: aeronautics, energy, engineering, data processing, computer graphics, heat transfer, and turbomachinery.

Those publications which showed the greatest response were Datamation and CIME. Table XV may understate the true value of these announcements because many customer inquiries do not actually reference the publications which prompted their inquiry.

Although direct contact is usually made with a magazine before any announcement is published, some abstracts and general information articles are published in magazines or journals without COSMIC's prior knowledge. Although problems sometimes do arise when inaccurate information is printed, COSMIC welcomes this unsolicited promotion.

Software Directories/Databases: COSMIC continually updates program abstracts which appear in software directories or software databases. Compilations of abstracts representative of the COSMIC program library have appeared in the following directories or databases:

* NASA RECON Systems
* DATAPRO Software Directory
* EDP Performance Review
* ICP Interface
* ICP Software Directory
* 11th DEC Engineering Software Catalog
* CDC TECHNOTEC
* Computers for Design and Construction Directory
* International Directory of Software
* SOFTSEARCH
* IMPRINT SOFTWARE
* IBM Software from non-IBM Sources Directory
* Data Decisions Directory
* Engineering and Scientific Programs Available from non-IBM Sources
* CDC Applications Directory
* DEC PDP-11 Software Source Book
* DEC LCG Software Referral Catalog
* Data Decisions Software Service
* Directory of Robotics/CAD/CAM Products
* Guide to Software Productivity Aids
* Software News/Software Search
* EDP Performance Management Handbook

Typically, the abstracts which appear in these publications pertain to several different application areas which are determined by the publisher.

SALES PROMOTION. Sales promotion is an activity and/or material that acts as a direct inducement offering added value or incentive for the product to re-sellers, salespeople, or consumers.

Program Summaries and Abstract Collections: The program abstracts that are written for each computer program available from COSMIC attempt to provide sufficient information for a prospective customer to make a decision concerning the appropriateness of the purchase of the documentation or program code. Some programs, however, are so complex and the supporting documentation so voluminous that an abstract is inadequately descriptive. For these systems, COSMIC has prepared more extensive technical synopses, called program summaries, which are distributed at no cost. The program summaries are generally ten to twenty page condensations of the program documentation.

Usually, these summaries include a description of the program's application and design as well as a discussion of the system requirements for implementation and use.

Abstract collections contain approximately fifteen to twenty abstracts of programs in the same general subject area. These are distributed when customers request program abstracts in one particular category such as image processing.

A total of 19 program summaries and abstract collections have been prepared to date. The software packages for which program summaries have been prepared are: DYLOFLEX - Dynamic Loads Analysis of Flexible Aircraft with Active Controls; NASTRAN - NASA Structural Analysis Program; VICAR/IBIS - Video Image Communication and Retrieval System; SPAR - Structural Performance and Redesign Program; and PANAIR - A Computer Program For Predicting Subsonic or Supersonic Linear Potential Flows about Arbitrary Configurations Using a Higher Order Panel Method. Abstract collections are in the areas of Structural Analysis, Domestic Image Processing, Energy Conservation, International Image Processing, System Development and Programming Aids, Heat Transfer and Fluid Flow, Project Management, Ship Design, Aerodynamics, Data Management and Analysis, Trajectories and Orbital Mechanics, Turbomachinery, CAD/CAM, and Electronic Circuit Design.

During 1983 the CADAT summary and Software for the VAX User collection were removed and the CAD/CAM and Electronic Circuit Design collections were added. Also, the NASTRAN Summary was completely redesigned this year. The summary material for NASTRAN was totally rewritten and packaged in a custom presentation folder.

COSMIC Catalog: The COSMIC catalog continues to be the basis of the COSMIC sales promotion function. The 1983 version of the catalog (both domestic and international) was available in two formats: a computer magnetic print tape for $50.00 ($100.00 International) and a set of 24x or 48x microfiche for $10.00 ($25.00 International). In addition to the abstracts, both versions contained a brief introduction to COSMIC, a Subject Category Index, and a Keyword Index, a Titles Index, and an Author Index.

The number of sales for both the domestic and international versions of the catalog during 1983 were:

	Domestic	International
Microfiche	825	106
Tape	287	52
	1,112	158

During 1983 the 1984 version of the COSMIC catalog was initiated. Re-titled as the COSMIC Software Catalog, 1984 Edition, this version has an entirely rewritten set of instructions (both tape and microfiche) which will better aid individuals in understanding and using the catalog. The 1984 version is available for the same cost as the 1983 version.

In 1983, work began on a printed, hardcopy edition of the COSMIC Software Catalog. The price was set at $25.00 per copy. A mass mailing was prepared to notify all previous purchasers of the COSMIC catalog that a 1984 version will be available in early 1984, and that a printed version will also be available in the Spring of 1984. This mailing also included people from the COSMIC Customer Contact File and the NASA Tech Brief mailing list. This direct mailing, totaling over 67,000, will be sent in early January 1984.

GENERAL PROMOTION. The marketing activities previously mentioned are those carried out on a regular yearly basis. Some activities are initiated because of a particular need or with a particular promotion goal in mind.

Twice in 1983 foreign naval officers on temporary duty at the Naval Supply Corps School in Athens were visitors at COSMIC. These officers (2 groups of 20 each) were given a tour of COSMIC and the University's computing facility. Each officer was also given a COSMIC brochure, a SPINOFF 83, and information on the catalog. The officers were mostly from European and Far Eastern countries.

COSMIC has also made an effort to join organizations which will help COSMIC's overall promotional activities. Two such organizations of which COSMIC is now a member are the Technology Transfer Society (T^2S) and the Southeastern Direct Mail Marketing Association.

During the summer of 1983, COSMIC produced a preliminary marketing plan, based on the six marketing plans submitted by the University of Georgia marketing department the previous year, and COSMIC's own marketing information. This plan will provide COSMIC with a starting point, as it will be continually updated and expanded as COSMIC's market information gathering techniques become more sophisticated.

In November, a marketing manager position was created, separating the functions of Customer Service and Marketing. This was done to allow each group to concentrate on their respective tasks, as the sales of COSMIC increase. Also, this freed the marketing staff from customer support, allowing it to spend the majority of its resources on developing and implementing continued marketing plans and support the distribution of

software through marketing channels, such as direct mail, trade shows, and paid advertising. Mr. Clinton Cowan was hired by COSMIC in mid-November as the Manager of Marketing. He holds an M.B.A. in marketing and has previous marketing management experience.

BENEFITS IDENTIFICATION TASK

The benefits analysis activity involves contacting users of COSMIC - supplied programs in order to record the benefits or value these programs provide to industry. When sufficient information can be provided by the company, written reports are prepared, describing their application(s) of the particular code. If the company can determine savings in time or dollars or if particular new capabilities are provided by using NASA sponsored software, this information is included in the reports.

A section in SPINOFF 1983 reviewed "Computer Technology Twice Used" including eight benefits reports and accompanying photos relating to COSMIC clients. Photos and authorized releases were secured for six additional benefits reports that are scheduled for publication in SPINOFF 1984.

During 1983, COSMIC continued the policy of sending copies of authorized benefits reports to the center where the program originated. This feedback to the TU officers and program authors is an attempt to increase their awareness that the programs have provided benefits to industry beyond the original NASA project use. During the year, five benefits reports were forwarded to the various centers.

During 1983, a new approach to combining benefits information for marketing plans was added. In May, COSMIC staff met with the Director of the

University's Survey Research Center (SRC) concerning the telephone questionnaire form used in benefits interviews. SRC developed a new form with questions that relate not only to actual use of the program, but also request information that should be useful for marketing plans. The Benefits Analyst now routinely asks the interviewee: 1) What professional journals do you read? 2) What professional meetings or trade shows do you attend? 3) What professional associations or organizations do you belong to? This information gathered from the user/client has already helped COSMIC to determine that the journal Computers in Mechanical Engineering is widely read and respected. Plans were made to begin paid advertising in this journal to reach the engineering target market.

During 1983, a total of 33 benefits interviews were completed. Eleven of these interviews included sufficient information to prepare written reports. These were submitted to the interviewee for editing and signed authorization from the appropriate company representative, granting permission for COSMIC to release the report. Two of these reports were returned to COSMIC with a letter stating that company policy prevented authorizing release; two reports are currently on hold waiting for company action. Seven reports were authorized for release by various companies during 1983.

These seven companies reported a variety of applications for the NASA sponsored software - from Stone & Webster's thermal analysis of equipment for the design of nuclear power plants to Rowland Institute's chemists who use a program to generate three-dimensional drawings of molecule structures. Three companies were able to determine time or dollar savings that resulted from the availability of a specific program:

United Technologies NPO-14892	$50,000
Lockheed-Georgia	$1,000 per week
Systems Research and Development	87.5% reduction in software development time

The report from Systems Research and Development is included as an example of the benefits activity.

COSMIC
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NASA software for industry

National Aeronautics and Space Administration

COSMIC SOFTWARE BENEFITS REPORT

IDENTIFICATION

Respondent Name: Richard H. Bennett

Organization Name: Systems Research and Development Corporation (SRD)

Computer Program Title: Contouring Randomly Spaced Data

DISCLOSURE RESTRICTION

This report, and any reproduction thereof, is given to COSMIC with the restriction that COSMIC will not publicly disclose any privileged or confidential information so marked or identified. It is understood that the National Aeronautics and Space Administration may use this report, excluding any confidential or privileged information, to assist in announcing and justifying its Technology Utilization Program efforts.

Authorized Signature

Title _____

BENEFITS REPORT (draft for editing)

Systems Research and Development Corporation (SRD) is a full line computer services company headquartered in Research Triangle Park, North Carolina. A minority owned and operated small business, SRD provides contract software and data base development services, time-sharing services, and technical assistance in research design and evaluation for government agencies, and private industry. The company carries out projects in diverse fields, including energy, health, and environmental concerns.

One project, for the Environmental Protection Agency, involved developing the software for computing a national Pollution Standard Index for the President's Council on Environmental Quality. During this project, levels of air pollution concentration were measured at selected time intervals to determine whether the pollution was increasing or decreasing. To graphically depict theses varying levels into overlays for map of the area, SRD used a computer program called Contouring Randomly Spaced Data which was developed at the NASA Langley Research Center.

SRD had initially projected that to develop necessary contouring software would require four computer professionals - two analysts and two programmers. The availability of this program from COSMIC, NASA's software dissemination center, allowed SRD to complete the task in six months using one programmer and one analyst. This represents, an 87.5% reduction in development time, the key factor in obtaining and completing the contract for EPA.

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5

MAINTENANCE AND SUPPORT OF SELECTED COMPUTER PROGRAMS

MAINTENANCE AND SUPPORT

OF SELECTED COMPUTER PROGRAMS

NASTRAN

COSMIC began maintaining and providing support to the NASTRAN® Structural Analysis Program in May, 1979. Prior to that time, the NASTRAN System Maintenance Office (NSMO) at the NASA Langley Research Center, Hampton, Virginia, was responsible for maintaining NASTRAN. In June, 1979, the University of Georgia issued a Request for Proposal (RFP) to obtain support for maintaining NASTRAN. A subcontract was awarded to the Computer Sciences Corporation in November, 1979, to provide support for the maintenance of the NASTRAN system. In May, 1982, Sperry Systems Division in Huntsville, AL became the NASTRAN maintenance subcontractor. Also in May, 1982, RPK in Athens, GA received a subcontract to manage the maintenance of NASTRAN and provide special maintenance services. COSMIC's main contact at Sperry is Mr. Horrace Turner and at RPK is Dr. Robert Brugh.

In 1983, the April 1983 release of NASTRAN was distributed in five versions: 1) IBM, 2) CDC, 3) DEC VAX, 4) UNIVAC FORTRAN V, and 5) UNIVAC ASCII FORTRAN. There were 72 SPR corrections incorporated into the April 1983

release along with the following new capabilities: 1) BANDIT, 2) Stress Averaging, 3) Hydroelastics, 4) Hidden Line Removal, and 5) Elbow Element.

In May, 1983, the 11th NASTRAN Users' Colloquium was held in San Francisco. Approximately 90 attendees were present for the 19 technical papers and the maintenance progress report. For the first time, the NASTRAN Users' Colloquium offered a series of short courses to attendees. The eight courses covered: 1) Introduction to NASTRAN, 2) DMAP Programming, 3) Thermal Analysis with NASTRAN, 4) Checkpoint/Restart in NASTRAN, 5) Symmetry in NASTRAN, 6) Automated Multi-Stage Substructuring, 7) Transient Analysis Capabilities, and 8) Enhancements to NASTRAN. These short courses were well received by the user community and will become a regular part of the annual Users' Colloquium.

In the past year, RPK was subcontracted to bring the NASTRAN User's Manual up-to-date and prepare the copy for publication. The updating work has been completed and the manual should be printed by May, 1984. Since the April 1983 release of NASTRAN, Sperry has corrected 47 SPR's for the April 1984 release and has worked on improving the structural optimization capability, improving several elements, and improving the plotting capability. RPK was subcontracted to developed a Rigid Format database system for incorporation in the April 1984 release.

Preparations have already been made for the 12th NASTRAN Users' Colloquium to be held in Orlando, FL in May, 1984. So far, 16 technical papers and 10 short courses are planned for the colloquium.

STAGS

COSMIC began maintaining and providing support for the STAGSC-1 structural analysis program in April, 1981, with the awarding of a subcontract to Lockheed Missiles and Space Company in Palo Alto, CA. The subcontract with Lockheed provided for Lockheed to be paid a share of the lease fee collected from each STAGSC-1 installation site. Since Lockheed has an interest in increasing the number of STAGSC-1 users, they also do some promotional work on STAGSC-1 outside of the contract. The arrangements with Lockheed provide for users with STAGSC-1 problems to contact Lockheed maintenance personnel directly. COSMIC's main points of contact at Lockheed are Mr. Tom Gears and Mr. Jorgen Skough.

In 1983, the April 1983 release of STAGSC-1 on the CDC, UNIVAC, and DEC VAX was distributed to the STAGSC-1 user community. Lockheed requested a change in the previous distribution procedure (Lockheed distributed the program tape and COSMIC distributed the document) so that COSMIC now distributes both the program tape and the documentation.

6

SPECIAL PROJECTS

SPECIAL PROJECTS

During this year, three special tasks received significant effort. The first task was the continued development of the COSMIC Abstract Recording System (CARS) Project; the second was continuation of the Microfiche Project; and the third was the Customer Information System Project. Each of these tasks is discussed in the following paragraphs:

ABSTRACT RECORDING PROJECT

The purpose of the COSMIC Abstract Recording System (CARS) Project is to develop and maintain a data base containing machine-readable copies of COSMIC program abstracts. There are three basic reasons for developing and maintaining an abstract recording system. First, it will serve as a permanent, single storage repository for all program abstracts; therefore, the currency of these recorded copies of program descriptions can easily be maintained. Second, it will naturally augment the controlled data elements previously generated in the Program Inventory Indexing Project by providing machine search access not only through assigned index terms and subject classifications but also through free text expressions. Third, it will provide an extremely convenient data source for the computerized production of formatted print tapes and listings which can be used to prepare hardcopy catalogs and announcements.

During previous contract periods, the abstract data base was designed and created. The process of maintaining this data base continued during 1983. New program abstracts were added to the data base as they entered the COSMIC inventory and existing program abstracts were edited as required. As a result

of this updating process during the contract year, the COSMIC abstract data base currently contains 2,795 abstracts. Of this total, 748 abstracts describe Class 1 programs, 601 abstracts describe Class 2 programs, 20 abstracts describe Class 3 programs, 2 abstracts describe Class 4 programs, and 670 abstracts have been archived.

The management of this computer-readable abstract data base requires a software system which is capable of maintaining the data base with a minimum of human effort and which can be used in conjunction with the COSMIC Library Management and Reporting (CLMR) System. Maintenance, report, and utility programs have been developed to manage the computer-readable abstract data base. At the present time, the software developed to support CARS provides the following functions:

a. Accounts for all abstracts written to describe NASA developed software in the COSMIC inventory.

b. Allows convenient access to current information on all recorded COSMIC program abstracts.

c. References the New Technology (NT) number used in the CLMR system to maintain the uniqueness of each abstract.

d. Records the history of the abstract updating process such that both active and archived abstracts are available.

In addition to these functions, support software has been developed to create and maintain an on-line searchable abstract data base. This data base is used by COSMIC staff to retrieve abstracts pertinent to customers needs in a timely fashion. Searching the on-line data base is performed interactively and in real-time.

Another area of development concerning the CARS project is the computerized production of formatted computer magnetic tapes to be used in

generating promotional material. During this contract period, COSMIC produced a complete, comprehensive listing of all published COSMIC program abstracts. This comprehensive listing, which contains program abstracts, a keyword index, subject category index, a title index, and an author index was made available to the general public in two distribution formats: microfiche and half-inch computer magnetic tape.

In November, work was begun on the 1984 COSMIC Software Catalog. This edition will include a new distribution format. Along with the microfiche and half-inch computer magnetic tape, the catalog will be available in printed hardcopy form. Other enhancements will also be initiated, such as the magnetic tape format will be easier to use for customers who use computerized databases.

MICROFICHE PROJECT

In 1983, the effort to record the entire active COSMIC program documentation library on microfiche was continued. These documents are the original documentation for the program products distributed by COSMIC. Since these documents are all stored in one location, they are vulnerable to destruction by fire or other disaster. It is therefore the primary purpose of the Microfiche Project to provide for the secure and safe storage of the COSMIC program documentation library.

During 1983, the process of recording 86 new technology (NT) items on microfiche was completed. There were 29,334 document pages recorded on 144 microfiche at 48x reduction. One diazo copy was produced for each original microfiche. Since the recording process was performed off-site, COSMIC maintained strict shipment, receipt, and quality control procedures. COSMIC

staff continuously maintained quality control by viewing every fiche using microfiche readers located at COSMIC. Each package was considered acceptable only after inspection of both the original and the diazo duplicate. Unacceptable microfiche were returned for further processing. The original microfiche and the diazo duplicate are stored in separate off-site locations as a security measure. A history of the microfiche processing for each NT item is recorded on the COSMIC Library Management and Reporting (CLMR) System.

CUSTOMER INFORMATION SYSTEM PROJECT

The COSMIC Customer Record System was initiated as a special project under contract NASW-2820 in order to more easily respond to the increasing reporting and analyses requirements resulting from expanded COSMIC dissemination services. This system of programs currently has the following capabilities:

a. The capability to differentiate in generated reports between foreign and domestic requestors.

b. The capability to report lease distributions separately from one-time final sale distributions.

c. The ability to maintain billing schedules for leased programs.

d. The capability to maintain customer name and distribution data on devices and in file formats that can be easily accessed using modern file management facilities for special reporting purposes such as generating tailored customer name listings, including address labels, by geographical location, or by particular program or groups of programs purchased or leased.

e. The capability to report sales data by time periods not necessarily identical to established COSMIC reporting periods.

All of the features listed above have been designed and implemented during previous contract periods as part of the Customer Record System. In an effort

to further the development of the Customer Record System, the Customer Information System Project was continued during this calendar year. An analysis of the Customer Record System and the proposed Customer Information System was performed and an initial design of an integrated system was developed. This design is being reviewed in terms of present and projected system requirements. Software has been developed to provide interim processing of income data along with limited reporting of invoice and income activity. The development of the Customer Information System will be continued during the next year. With the installation of the DEC VAX 11/780 occurring late in 1983, COSMIC will base the majority of this system on the VAX.

7

OPERATING COSTS

OPERATING COST

The distribution of costs for the operation of COSMIC for 1983 and the two preceding years is shown in Table XVI. The cost element for subcontracts represents the amount expended on the NASTRAN and STAGSC-1 maintenance subcontracts during the year. The table details the costs and estimates reported as of the end of December, 1983. Not included are costs which were accrued but not reported; also, the overhead item is only an estimate, the final value to be determined at the close of the contract.

While the magnitude of the expenditures cannot be compared for all three years (due to rise in cost of each element), the percentage expenditure on individual cost elements, when based on the total cost minus subcontract cost, can be compared. Overall, this percentage expenditure on each cost element has remained relatively constant throughout the years.

TABLE XVI

OPERATIONAL COSTS

COST ELEMENT	1981 COST	1981* PERCENT	1982 COST	1982* PERCENT	1983 COST	1983* PERCENT
Salaries and Wages	$245,631.24	39%	$263,102.11	34%	$266,464.26	31%
Staff Benefits	51,611.75	8%	59,009.45	8%	64,906.95	8%
Overhead	146,680.46	23%	241,534.80	31%	286,797.99	34%
Computer Costs	63,056.95	10%	53,690.23	7%	56,019.72	7%
Operating Expense	102,989.17	17%	131,728.15	17%	129,660.79	15%
Equipment Purchase	6,464.76	1%	3,759.63	1%	26,224.66	3%
Travel	13,145.34	2%	14,637.65	2%	15,072.56	2%
Subtotals	$629,579.67	100%	$767,462.02	100%	$845,146.93	100%
Subcontracts	268,434.00		318,386.00		369,154.32	
TOTALS	$898,013.67		$1,085,848.02		$1,214,301.25	

*Percentage based on total costs minus subcontracts.