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JUNE MONTHLY REPORT

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COMPUTER SOFTWARE MANAGEMENT AND INFORMATION
CENTER (COSMIC) Monthly Progress Report,
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Computer Software Management and Information Center
112 Barrow Hall - University of Georgia - Athens, Georgia 30602

UNIVERSITY OF GEORGIA
COMPUTER SOFTWARE MANAGEMENT
AND
INFORMATION CENTER

MONTHLY PROGRESS REPORT

June, 1983

UNDER CONTRACT

NASW-3247

July 15, 1983

PREPARED FOR
TECHNOLOGY UTILIZATION OFFICE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON, D. C.

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1. GENERAL INFORMATION

The Director presented a paper entitled "Industrial Applications of NASA Developed Computer Programs" at the 8th Annual Technology Transfer Society Meeting and International Symposium held in Chicago on June 20-22. There were approximately 70 attendees at the presentation.

During the month of June, the Survey Research Center (SRC) at the University of Georgia designed new benefits questionnaires for COSMIC. As a test of their utility, these questionnaires are now being used in the benefits identification process.

2. INVENTORY

The current inventory of programs available from COSMIC is the sum of the Class 1 and Class 2 programs in TABLE 1. "Issuability Status Summary." The total number of items submitted from each source since COSMIC began is given in the right hand column of TABLE 1. Numbers listed under the "Withdrawn" column reflect those packages for which return or discard authorization has been provided by the appropriate Technology Utilization Office.

TABLE 1. ISSUABILITY STATUS SUMMARY
July 1966 to Date

<u>Center Mnemonic</u>	<u>Class 1</u>	<u>Class 2</u>	<u>Class 3</u>	<u>Class 4</u>	<u>In Process</u>	<u>With- drawn</u>	<u>Total</u>
ARC	33	10	4	2	0	34	83
COS	0	17	0	1	0	65	83
DOD	0	49	4	1	1	30	85
ERC	0	0	0	0	0	13	13
ERL	6	7	0	0	0	1	14
FRC	5	6	0	0	0	4	15
GSC	82	41	2	2	2	224	353
HQN	15	7	0	3	0	72	97
KSC	5	22	0	1	0	81	109
LAR	172	60	0	4	1	81	318
LEW	139	77	0	4	1	87	308
MFS	96	109	1	6	2	1125	1339
MSC	88	141	3	1	7	793	1033
NPO	83	50	0	1	4	254	392
NUC	9	6	0	0	0	60	75
WLP	0	0	0	0	0	11	11
WSO	0	0	0	0	0	3	3
Totals	733	606	14	26	18	2938	4331

The number of submittals for the current month is below average. COSMIC received four initial packages (program and documentation). Also, COSMIC received three update packages, and one update program. The total number of receipts for this month is eight. A summary of the total number of receipts by submittal site is shown in TABLE 2.

TABLE 2. SUMMARY OF TOTAL RECEIPTS 1983

<u>Submittal Site</u>	<u>This Month</u>	<u>Year to Date</u>
ARC	1	1
COS	0	0
DOD	1	4
ERL	0	1
GSC	1	11
HQN	1	9
KSC	1	1
LAR	0	12
LEW	0	15
MFS	0	4
MSC	1	14
NPO	<u>2</u>	<u>7</u>
Total	8	79

3. EVALUATION AND PUBLICATION

The program processing activities can be viewed as a three step process, although the steps are not necessarily done in sequence. These steps are program verification, program evaluation, and abstract preparation and publication.

Program verification represents the machine processing phase of evaluation and typically includes the compilation or assembly of supplied code using standard programming language translators followed by loading or linkage editing of the generated object code to insure completeness of the submitted code. This month COSMIC processed twelve programs through verification.

Program Evaluation 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. Prices for distributed materials are also established during package evaluation. Factors considered in establishing the price charged for program code include the program source instruction counts as a gross measure of development effort, the 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.

The program evaluation activity for the current month totaled 11 packages; four Class 1, one Class 2, one Class 3, and five Class 4.

A cumulative tabulation of COSMIC evaluations since January 1, 1983, is given in TABLE 3.

TABLE 3. SUMMARY EVALUATION TOTALS
January 1983 to Date

<u>Submittal Site</u>	<u>Class 1</u>	<u>Class 2</u>	<u>Class 3</u>	<u>Class 4</u>
ARC	1	0	4	0
COS	0	0	0	0
DOD	0	2	3	1
ERC	0	0	0	0
ERL	1	0	0	0
GSC	8	0	4	2
HQN	9	0	0	3
KSC	0	1	0	1
LAR	10	0	0	0
LEW	9	0	0	6
MFS	2	0	4	2
MSC	4	2	3	1
NPO	5	0	4	0
NUC	0	0	0	0
WLP	0	0	0	0
Totals	49	5	22	16

Publication activities carried out by COSMIC include the preparation of descriptive abstracts for all new submittal and updated Class 1 and 2 items evaluated each month as well as the preparation of Tech Briefs for the Class 1 packages for publication in the NASA Tech Brief Journal.

Publication category codes and index terms are assigned to abstracts prepared by the activity. This month COSMIC prepared one abstract and one Tech Brief. A list of the titles for which Tech Briefs were prepared is given below:

TECH BRIEF ITEMS

MFS-25352 - DDL - Digital Design Language and Design Synthesis of Digital Systems

COSMIC PROGRAM ABSTRACT

MFS-25352

DDL - DIGITAL SYSTEMS DESIGN LANGUAGE
(University of Alabama in Huntsville)

Just as software designers use high-level languages to express algorithms in terms of concise language statements, digital hardware designers use hardware description languages to describe the system they are designing. Hardware description languages have proven to be valuable tools in such applications as hardware design, system documentation, and logic design training. The Digital Systems Design Language (DDL) is a hardware description language which provides a convenient medium for developing and testing digital designs and for inputting design details into a design automation system. A set of computer programs have been developed which provide the designer with an automatic synthesis system based on DDL. The set includes a DDL translator program, a simulation program, two synthesis programs, and a logic minimization program. These DDL based programs are being used by NASA as part of an integrated circuit design and fabrication system for Large Scale Integration (LSI) and Very Large Scale Integration (VLSI) technologies.

DDL is highly suitable for describing digital systems at the gate, register transfer, and major combinational block level. DDL is a block structured register transfer language where the blocks usually correspond to the natural divisions of the hardware being described as well as allowing a nested view of the hardware. For example, a computer may have a major block called an "ALU", which contains a block called "ADDER" which in turn consists of interconnected logic blocks called "FULL-ADDERS". Each block becomes an automation where the statements describe the state transitions of a finite state machine controlling the processes of the intended algorithm. The DDL language can be used to describe parallel operations as well as both synchronous and asynchronous behaviors.

The DDL translator program, DDLTRN, compiles the DDL description into a Facility table, a set of Boolean equations (BEs) (corresponding to the combinational logic portion), and a set of Register Transfer equations (RTEs) (corresponding to the sequential logic portion). The BEs and RTEs are arranged so as to eliminate duplicate expressions and Boolean constants. The DDL simulation program, DDLSIM, is a register-transfer level simulator. It uses the output of the system description and simulates the system according to commands provided by the designer. A simulation performance list is provided as the output. DDLSIM enables the designer to thoroughly test and verify the design of the digital system.

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Computing and Information Services The University of Georgia
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DDLSYN is a hardware synthesizer. Input to DDLSYN consists of the BEs and RTEs output by DDLTRN and a user supplied standard cell library. For a modular synthesis, each module can be translated separately and synthesized individually by DDLSYN. A DDLSYN synthesis generates a list of the standard cells, a cell interconnection list, a cross reference list, and, for modular synthesis, a module interconnection list. PLASYN is a Programmed Logic Array (PLA) synthesizer which uses the output from DDLTRN to produce a PLA program that implements the combinational logic portion of the system in the DDL description. The PLA program generated is simply a coded representation of the connections on the AND and OR gates of a PLA. The multiple-output minimization program, MOMIN, is included in the DDL system for optional use by the designer. The BEs and RTEs as generated by DDLTRN are not completely minimized. Although minimization may not be required during the initial phase of the design cycle, it is usually desirable to apply formal minimization techniques before the design is finalized.

These DDL based programs are written in FORTRAN IV for batch execution and have been implemented on an SEL-32 computer. The largest program has a central memory requirement of approximately 35k of 32 bit words. These digital systems design aids were developed in 1983.

LANGUAGE: FORTRAN IV

MACHINE REQUIREMENTS: GOULD SEL-32

PROGRAM SIZE: Approximately 24,000 Source Statements

DISTRIBUTION MEDIA: 9 Track 800 BPI ASCII Card Image Format
Magnetic Tape

PROGRAM NUMBER: MFS-25352

DOCUMENTATION PRICE: \$54.50

PROGRAM PRICE: \$2,400.00

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4. MARKETING

The marketing activities performed by COSMIC involve: solicitation of gratis advertisement of computer programs available from COSMIC in the technical press and trade journals; attendance at trade shows and professional society meetings to promote the services and software available from COSMIC; utilization of various media for the general promotion of COSMIC; utilization of benefits analysis reports to highlight COSMIC's technology transfer function; and preparation of abstract collections and program summaries.

A continuing marketing activity emphasized by COSMIC is the solicitation of gratis announcements of selected COSMIC programs in trade and technical publications. In June, announcements about COSMIC products were published in:

Hardcopy	GSC-12693 SAP, GSC-12688 SFORT, GSC-12708 MARS
Newsletter of Engineering Analysis Software	MSC-20433 RMS-2, LEW-12761 SHABERTH, LEW-13393 CYBEAN, LEW-13626 SPHERBEAN

A news release for NPO-16234 CRISP80 was sent to the following publications:

- Software News
- Computer Products
- Infosystems
- Micro-Line
- Mini-Micro Systems
- ICP Software Business Review
- Systems and Software
- CP/M Review

Since January 1, 1983, sixteen product announcements have appeared in various publications. A total of 549 customer requests for additional information can be traced directly to these announcements. The publications and the total number of requests are listed below.

<u>Publication</u>	<u>Requests</u>
Computers for Design & Engineering	51
Computerworld (2 announcements)	61
ICP Interface	30
Hardcopy (2 announcements)	30
Newsletter for Engineering Analysis Software	3
Various Newspapers (syndicated column)	25
CP/M Review	6
Computer Graphics World	3
Datamation	183
Aeronautics and Astronautics	3
Computers in Construction	23
IEEE Computer Magazine	2
Computers in Mechanical Engineering	109
Electronic Design	20

5. CUSTOMER SERVICE

Customer Service provided by COSMIC, in addition to the distribution of program code and documentation, includes responding to requests for information. These requests may be in the form of telephone calls, letters, TECH BRIEF cards, mini-brochure cards, or trade show return cards. Generally the requested information concerns the services provided by COSMIC, or information on specific programs or groups of programs which may be available from COSMIC. During June, a total of 336 information requests were processed. This was divided into 304 domestic requests and 32 international requests.

One other area of Customer Service is the response to requests for information relevant to problems associated with a particular program product installation. These requests are usually handled jointly with the Technical Service Staff. After the customer problems have been resolved, a Problem Report Sheet is processed and added to the program package file for future reference. Six problem reports were processed this month.

During the month of June, a total of 196 customers representing 178 organizations received materials (programs, documentation, or catalogs) from COSMIC. Customers represent individuals, whereas, organizations represent corporations or institutions. These customers are located in 34 different states or territories. Both NASA and non-NASA disseminations are reflected in these statistics.

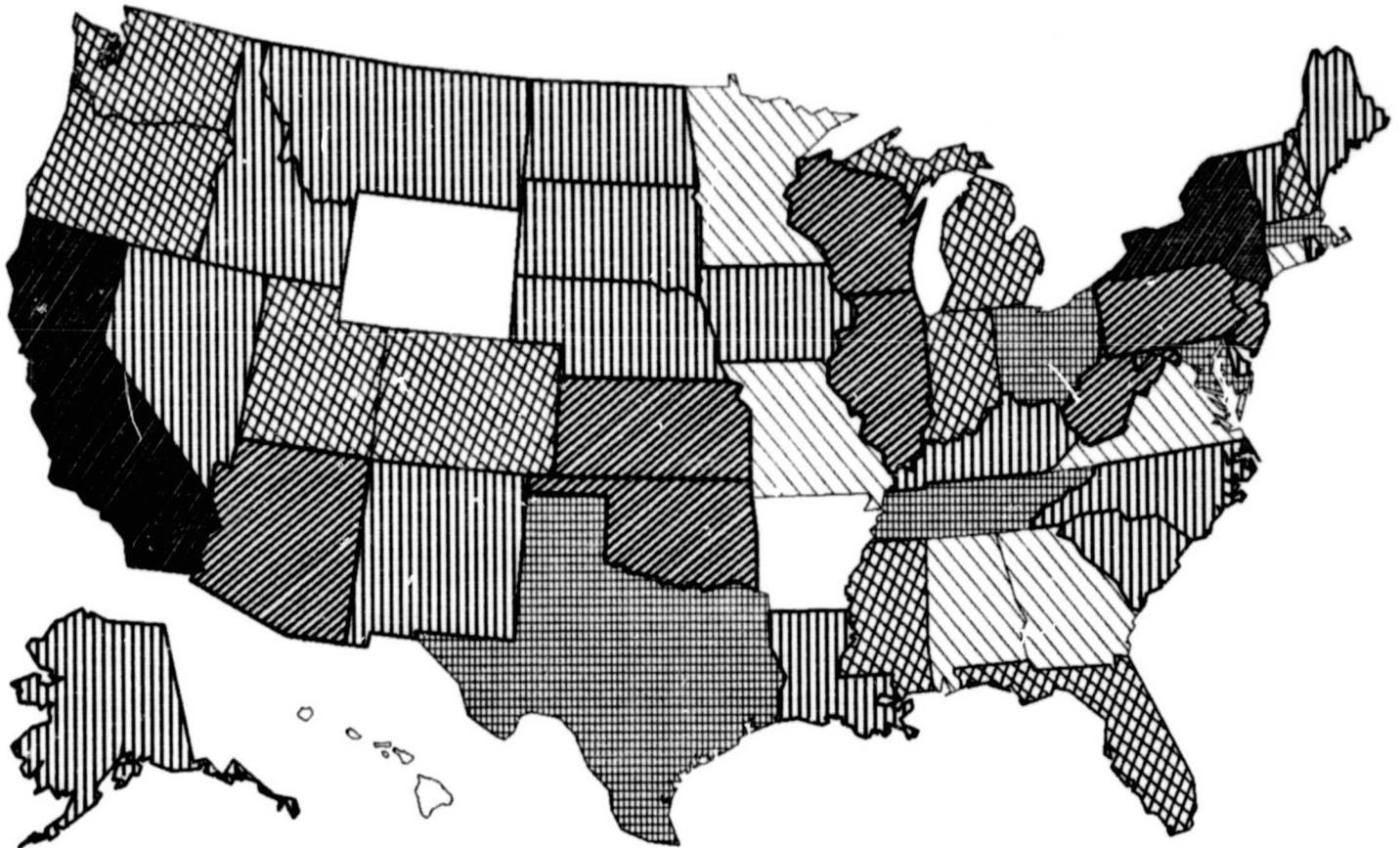
The latest updates to ARC-11446 Hidden Line Code were mailed to all 242 previous customers. An announcement concerning the availability of an updated program tape was also sent at the same time.

The following map graphically illustrates the COSMIC first and second quarter sales by state. It represents only the continental U. S. domestic sales for the period of January 1, 1983 through June 30, 1983. Dollar amounts for each state are the sum of all program, document, and catalog sales, plus all leases (both initial and renewal).

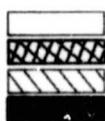
COSMIC SALES BY STATE

1983 SEMI-ANNUAL SALES

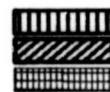
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LEGEND: SALES



\$0
\$1,001-5,000
\$10,001-20,000
OVER \$30,000



\$1-1,000
\$5,001-10,000
\$20,001-30,000

6. BENEFITS IDENTIFICATION

COSMIC follows an active campaign of interviewing previous customers in order to ascertain the utility of distributed programs and identify specific benefits accruing to users of these programs. Additionally, contact with customers is used to evaluate the services provided by COSMIC. When notable benefits are identified, they are documented in reports written by COSMIC staff which are then approved for public release by the customers. No benefits reports were released for publication this month.

The Survey Research Center (SRC) at the University of Georgia has re-designed the Benefits Questionnaires used when contacting COSMIC customers. These questionnaires are currently being tested at COSMIC in the actual Benefits Identification activity.

7. MAINTENANCE AND SUPPORT

Sperry continued to test the ASCII UNIVAC version of NASTRAN. This is scheduled for completion during July. All other versions of NASTRAN have been completed and shipped to current lessees. Sperry continued the task of editing the documentation of the new enhancements incorporated into the April 1983 version of NASTRAN. Sperry is scheduled to complete during July, the documentation of all SPR's incorporated in the 1983 release. After receipt of this documentation, the SPR LOG will be updated and mailed to all current lessees.

The next release of NASTRAN is scheduled for April 1984. The following items are being considered for emphasis on this release:

- a. Efficiency improvements of the DEC VAX Version
- b. Improvements to the structural optimization capability
- c. Improvements to the piece-wise linear capability
- d. Improvements to several elements

During the month, assistance was given to several lessees on problems encountered with NASTRAN.

TABLE 4 TOTAL DISSEMINATIONS

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ITEM	Current Month		Year to Date	
	VOLUME	VALUE	VOLUME	VALUE
A. ITEMS INVOICED				
1. Programs	49	\$86,250.00	235	\$248,731.25
2. Documentation	162	9,139.00	843	35,293.50
3. Leases (Initial)	7	31,400.00	31	123,070.00
4. Leases (Renewals)	7	24,710.00	33	123,480.00
5. Leases (Misc.)	-	-	10	2,951.14
6. Catalogs	93	2,560.00	805	19,125.00
7. Miscellaneous	12	727.00	86	3,535.99
TOTAL INVOICED		\$154,786.00		\$556,186.88
B. NASA (No Charge)				
1. Programs	7	\$ 9,030.00	31	\$ 35,230.00
2. Documentation	89	4,156.50	203	11,064.00
3. Leases (Initial)	1	3,400.00	7	26,880.00
4. Leases (Renewals)	4	15,600.00	16	56,940.00
5. Leases (Misc.)	-	-	-	-
6. Catalogs	4	40.00	53	610.00
7. Miscellaneous	-	-	1	100.00
TOTAL NASA		\$32,226.50		\$130,824.00
C. OTHER (No Charge)				
1. Catalogs	1	\$ 50.00	18	\$ 350.00
2. Replacements	-	-	4	1,608.00
3. Miscellaneous	-	-	-	-
TOTAL OTHER		\$ 50.00		\$ 1,958.00
GRAND TOTAL DISSEMINATION		\$187,062.50		\$688,968.88

TABLE 5 NASTRAN DISSEMINATIONS

Item	Current Month		Year to Date	
	VOLUME	VALUE	VOLUME	VALUE
A. ITEMS INVOICED				
1. Leases Initial	1	\$ 5,600.00	14	\$ 58,520.00
2. Leases Renewals	7	24,710.00	29	114,870.00
3. Leases Misc.	-	-	5	1,843.03
4. Documentation	33	1,600.00	124	6,515.00
5. Miscellaneous	-	-25.18	3	136.02
TOTAL NASTRAN INVOICED		\$31,884.82		\$181,884.05
B. NASA (No charge)				
1. Leases Initial	-	-	3	\$ 14,880.00
2. Leases Renewals	3	\$12,600.00	14	51,240.00
3. Leases Misc.	-	-	-	-
4. Documentation	60	3,410.00	131	8,255.00
5. Miscellaneous	-	-	-	-
TOTAL NASA NASTRAN		\$16,010.00		\$ 74,375.00
GRAND TOTAL NASTRAN		\$47,894.82		\$256,259.05

TABLE 6 DISSEMINATION OF DOD SUBMITTALS

Item	Current		Year to Date	
	VOLUME	VALUE	VOLUME	VALUE
1. Programs	1	\$ 510.00	14	\$ 8,880.00
2. Documentation	4	85.00	33	774.00
TOTAL DISSEM. DOD SUBMITTALS		\$ 595.00		\$ 9,654.00

TABLE 7 FOREIGN DISSEMINATIONS

Item	Current		Year to Date	
	VOLUME	VALUE	VOLUME	VALUE
1. Programs	26	\$65,780.00	60	\$118,900.00
2. Documentation	41	3,313.00	118	9,014.00
3. Leases Initial	1	6,800.00	2	13,800.00
4. Leases Renewal	-	-	-	-
5. Leases Misc.	-	-	1	35,70
6. Catalogs	12	750.00	101	4,925.00
7. Miscellaneous	10	636.46	50	1,946.71
TOTAL FOREIGN DISSEM.		\$77,279.46		\$148,621.41

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9. BUDGET SUMMARY

CONTRACT NASW-3247

JUNE 1983

	ESTIMATED EXPENDITURES		ACTUAL EXPENDITURES	
	Current Mo.	Cumulative	Current Mo.	Cumulative
PERSONNEL	20,673.00	124,038.00	20,410.59	126,980.43
OVERHEAD	19,584.00	117,504.00	38,773.68	101,506.39
STAFF BENEFITS	4,942.00	29,652.00	5,056.91	31,004.28
TRAVEL	1,719.00	10,314.00	2,089.16	10,930.33
EQUIPMENT PURCHASE	400.00	2,400.00	1,040.00	14,466.86
EQUIPMENT RENTAL				
Computer Usage	8,000.00	48,000.00	4,404.39	29,384.04
Misc. Equipment	1,853.00	11,118.00	416.30	4,537.35
MATERIALS & SUPPLIES	6,421.00	38,526.00	5,934.40	42,615.59
COMMUNICATIONS	1,206.00	7,236.00	1,500.50	8,546.21
OTHER				
Duplicating Expenses	-0-	-0-	-0-	-0-
Promotional Expenses	688.00	4,128.00	625.82	13,098.26
Microfiche Expenses	599.00	3,594.00	-0-	1,133.05
TOTALS	66,085.00	396,510.00	80,251.75	384,202.79
MAINTENANCE & SUPPORT EXPENSE	27,448.00	164,688.00	17,422.51	172,512.73
GRAND TOTALS	93,533.00	561,198.00	97,674.26	556,715.52

	ESTIMATED		ACTUAL	
	Current Mo.	Cumulative	Current Mo.	Cumulative
INCOME	65,145.00	390,870.00	166,601.82	576,994.24