NASA NEW TECHNOLOGY IDENTIFICATION AND EVALUATION

1983 Final Report

December 1983

Prepared for:

National Aeronautics and Space Administration
Technology Utilization and Industry Affairs
Code: LGT-1
Washington, D.C. 20546

Attention: Leonard A. Ault

Contract NASW-3444

SRI International
333 Ravenswood Avenue
Menlo Park, California 94025
(415) 326-6200
TWX: 910-373-2046
Telex: 334 486

SRI International

NASA NEW TECHNOLOGY IDENTIFICATION AND EVALUATION

1983 Final Report

December 1983

Prepared by:

Ruth M. Lizak
Technology Consultant

Prepared for:

National Aeronautics and Space Administration
Technology Utilization and Industry Affairs
Code: LGT-1
Washington, D.C. 20546

Attention: Leonard A. Ault

Contract NASW-3444

SRI Project 2393

SRI International®

CONTENTS

INTRODUCTION

In accordance with the U.S. Space Act of 1958, the National Aeronautics and Space Administration (NASA) provides for "the widest practicable and appropriate dissemination of information concerning its activities and the results thereof." The purpose of this mandated dissemination is the transfer of technology--the reuse of the technology in nonaerospace products and procedures. For some technology items, the potential users number in the thousands and hundreds of thousands.

To reach these potential users, NASA devised NASA Tech Briefs, a compilation of about 150 abstracts describing new technology items. This widely distributed publication has disclosed new technology developments to all sectors of the economy. Each Tech Brief is an expanded abstract on a NASA-developed material, tool, scientific instrument, industrial process, laboratory technique, or computer program, accompanied by a drawing or diagram. According to a study by the Denver Research Institute,* an average of 26,000 inquiries are received annually in response to Tech Brief publications.

By widely distributing technology transfer information, NASA has reduced the average transfer cost, according to the Denver Research Institute study. Each transfer results in cost savings and other economic benefits worth more than $10 for each service dollar spent.

To ensure that the technologies disclosed in NASA Tech Briefs are transferrable, NASA has instituted an evaluation process. New technology reports are transmitted to the cognizant NASA Field Center Technology Utilization Office (TUO). The new technology items are evaluated for novelty, technical validity and significance, and nonaerospace utility. If uncertainty exists regarding these criteria, the TUO may forward the documentation to SRI International for evaluation before recommending publication as a Tech Brief. At SRI, a special team of 110 senior scientists and engineers has been organized to identify and evalute the new technologies. The core team consists of six principal evaluators and a project leader who is assisted by a research analyst. On the basis of its assessment of the novelty and significance of each technology item, the team recommends whether or not the abstract should be published in NASA Tech Briefs.

During the past 3 years (November 10, 1980, to November 30, 1983), SRI has evaluated 3,103 technologies. This report summarizes SRI's activities and the progress that has been made.

---

*F. Douglas Johnson et al., NASA Tech Brief Program: A Cost Benefit Evaluation, Denver Research Institute, May 1977.

QUANTITATIVE REVIEW OF PROGRESS

SRI has completed its third year of new technology identification and evaluation for NASA's Technology Utilization program. During the contract period, SRI received 3,291 documented technologies from the NASA TUOs. Evaluations were completed for 3,103. Table 1 provides a breakdown of the new technology reports sent by each NASA Center. Also provided in this section are data on levels of significance and on the average time required for evaluation.

Technology Documentation Received

As Table 1 indicates, the number of documents received from the NASA Center TUOs has remained relatively constant. The monthly average for 1981, 1982, and 1983 was 74 reports. Monthly fluctuations in the number of reports received were primarily attributable to batch mailings.

Of particular note is an annual trend. Each year, the volume of transmittals has been high during the first quarter and has decreased as the year progressed. This trend is shown graphically in Figure 1.

A Center-by-Center examination of the data revealed that the report volume from Langley Research Center, Lewis Research Center, Kennedy Space Center, and the combined Ames Research Center/Flight Research Center has remained constant over the 3 years. A decrease was seen at Goddard Space Flight Center, Johnson Space Center, and the Jet Propulsion Laboratory, whereas Marshall Space Flight Center increased its reporting of new technologies.

Technology Evaluations

SRI has completed evaluations on 3,103 technologies in the past 3 years--approximately 30 more evaluations than were required under contract. That is, the SRI team contracted to evaluate, between November 1980 and November 1983, approximately 2,700 new technology items under the base contract and approximately 370 under contract modifications.

Table 1

NEW TECHNOLOGY REPORTS
RECEIVED FROM NASA CENTERS

1981

Ctr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ttl	Avg
ARC	6	4	3	3	6	3	5	0	1	4	4	9	48	4
FRC	0	0	0	0	0	0	0	0	0	0	1	8	9	1
GSC	2	3	2	3	2	1	4	0	2	0	10	0	29	2
KSC	2	0	0	1	2	1	0	0	3	2	0	6	17	1
LAR	7	9	3	6	9	6	5	6	3	0	7	6	67	6
LEW	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MSC	0	30	28	17	27	26	23	31	0	10	13	9	214	18
MFS	40	14	15	11	6	8	7	12	11	13	14	16	167	14
NPO	71	41	28	32	7	30	48	16	4	29	17	16	339	28
Ttl	128	101	79	73	59	75	92	65	24	58	66	70	890	74

1982

Ctr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ttl	Avg
ARC	0	6	3	2	2	2	3	3	6	6	0	0	33	3
FRC	0	0	0	1	0	0	0	2	0	0	0	0	3	0
GSC	0	2	0	0	0	1	0	4	0	0	0	0	7	1
KSC	0	6	5	4	13	2	1	3	1	1	6	0	42	4
LAR	0	9	24	1	1	6	6	2	6	5	3	2	65	5
LEW	0	2	0	0	3	0	0	0	1	0	0	9	15	1
MSC	21	24	33	1	23	12	18	0	10	9	13	0	164	14
MFS	20	27	32	37	16	30	8	19	23	20	12	9	253	21
NPO	51	20	13	23	35	14	32	7	31	45	18	14	303	25
Ttl	92	96	110	69	93	67	68	40	78	86	52	34	885	74

Note: ARC, Ames Research Center; FRC, Flight Research Center; GSC, Goddard Space Flight Center; KSC, Kennedy Space Center; LAR, Langley Research Center; LEW, Lewis Research Center; MSC, Johnson Space Center; MFS, Marshall Space Flight Center; NPO, NASA Pasadena Office (Jet Propulsion Laboratory); HQN, NASA Headquarters.

Table 1 (concluded)

	1983												
Ctr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Ttl	Avg
ARC	1	11	13	9	5	3	2	1	9	4	0	58	5
FRC	0	0	1	0	0	0	0	0	0	0	0	1	0
GSC	0	0	0	1	1	0	0	1	1	1	0	5	0
KSC	6	2	2	0	0	5	0	1	2	2	1	21	2
LAR	5	8	9	5	4	10	1	7	14	2	9	74	7
LEW	0	0	0	0	0	0	0	0	0	0	0	0	0
MSC	18	16	9	21	4	15	14	14	12	10	20	153	14
MFS	31	2	13	14	21	13	17	15	21	43	25	215	20
NPO	41	18	36	21	18	17	25	39	26	17	19	277	25
HQN	0	9	0	0	0	0	1	0	0	0	0	10	1
Ttl	102	66	83	71	53	63	60	78	85	79	74	814	74

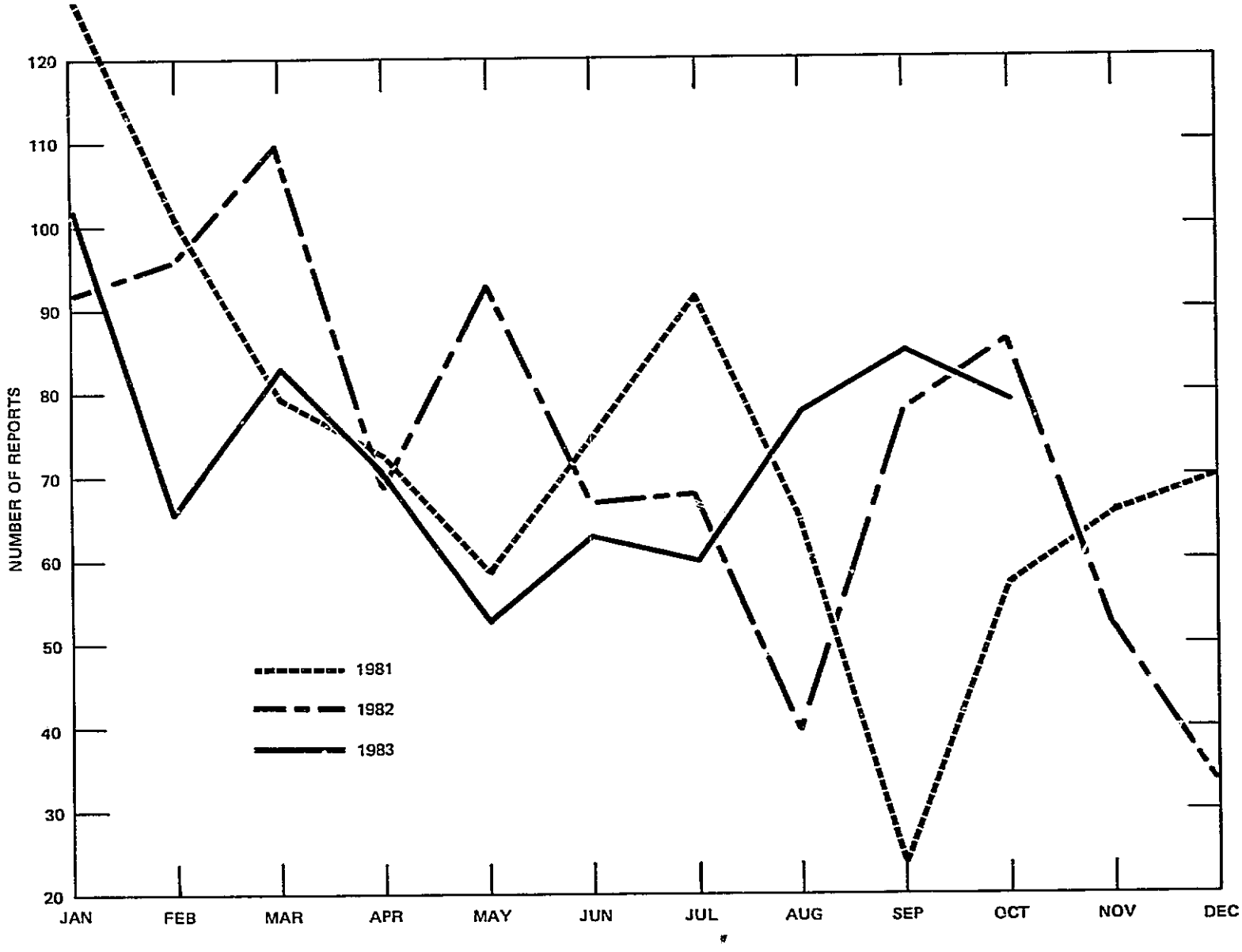

FIGURE 1 NEW TECHNOLOGY REPORTS RECEIVED FROM ALL NASA CENTERS

Table 2

NEW TECHNOLOGY EVALUATIONS
RETURNED TO NASA CENTERS

1981

Ctr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ttl	Avg
ARC	2	8	6	6	2	2	6	8	4	0	1	8	53	4
FRC	1	0	1	0	0	0	0	0	0	0	0	0	2	0
GSC	7	5	5	2	2	7	1	2	0	1	0	1	33	3
KSC	9	4	9	1	1	4	0	0	0	6	2	0	36	3
LAR	8	3	12	6	10	13	8	7	0	2	2	3	74	6
LEW	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MSC	0	0	31	26	14	21	33	17	19	35	20	6	222	19
MFS	27	19	39	24	31	7	17	21	32	12	14	16	259	22
NPO	43	39	32	36	21	49	65	38	65	56	52	39	535	45
Ttl	97	78	135	101	81	103	130	93	120	112	91	73	1213	101

1982

Ctr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ttl	Avg
ARC	1	1	5	10	6	7	7	2	5	3	8	1	56	5
FRC	0	0	0	5	1	1	2	0	1	0	0	0	10	1
GSC	0	4	3	4	1	2	2	0	1	2	1	0	20	2
KSC	3	3	8	2	10	1	3	6	6	4	2	1	49	4
LAR	8	2	5	6	6	9	13	2	11	5	7	2	76	6
LEW	0	0	0	2	0	0	0	0	3	0	1	0	6	1
MSC	26	11	9	11	10	9	41	19	12	23	9	7	187	16
MFS	13	11	19	19	11	16	22	21	20	43	57	18	270	23
NPO	28	50	36	49	43	45	27	16	9	24	32	21	380	32
Ttl	79	82	85	108	88	90	117	66	68	104	117	50	1054	88

Table 2 (concluded)

	1983												
Ctr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Ttl	Avg
ARC	0	0	4	11	8	5	10	4	1	3	11	57	5
FRC	0	0	0	0	0	0	1	0	0	0	0	1	0
GSC	0	1	0	0	0	1	1	0	1	0	0	4	0
KSC	0	7	2	1	4	1	1	3	0	1	0	20	2
LAR	5	4	5	11	7	6	5	6	10	5	4	68	6
LEW	0	2	4	3	0	0	0	0	0	0	0	9	1
MSC	9	8	12	11	19	12	17	14	17	6	8	133	12
MFS	21	32	12	8	15	24	11	22	11	13	14	193	18
NPO	37	31	39	37	32	22	29	28	27	34	30	346	31
HQN	0	0	3	3	1	0	0	0	2	0	0	9	1
Ttl	82	85	81	85	86	71	75	77	69	62	67	840	76

Under a contract time extension in 1983, an additional 64 technologies were evaluated. The total number of evaluated technologies for the extended contract period (37.5 months) was 3,167. The sizable fluctuations in the monthly totals during 1981 and 1982 were caused primarily by the SRI team's concerted efforts to reduce the backlog in accordance with contract modifications.

Documentation Backlog

During the contract period, SRI significantly reduced the backlog of technology items awaiting evaluation. From a high of 625 in November 1980, the backlog decreased rather steadily to lows of 188 and 189 in July and August 1983. This accomplishment is shown graphically in Figure 2. After an upward trend in September and October, the backlog returned to 188 documents in November 1983.

Table 3 provides the total volume of technology documentation received from each NASA Center and the number of reports evaluated as of November 30, 1983.

Table 3

NEW TECHNOLOGY EVALUATIONS AND DOCUMENTATION BACKLOG,
BY NASA CENTER
November 30, 1983

Center	Received at SRI	Evaluated	Remainder
ARC	170	166	4
FRC	15	15	0
GSC	59	58	1
KSC	109	105	4
LAR	232	216	16
LEW	15	15	0
MSC	574	542	32
MFS	789	724	65
NPO	1,318	1,252	66
HQN	10	10	0
	3,291	3,103	188

Technology Classification

Technology items are evaluated for novelty, technical validity and significance, and nonaerospace utility. NASA defines these criteria as follows:

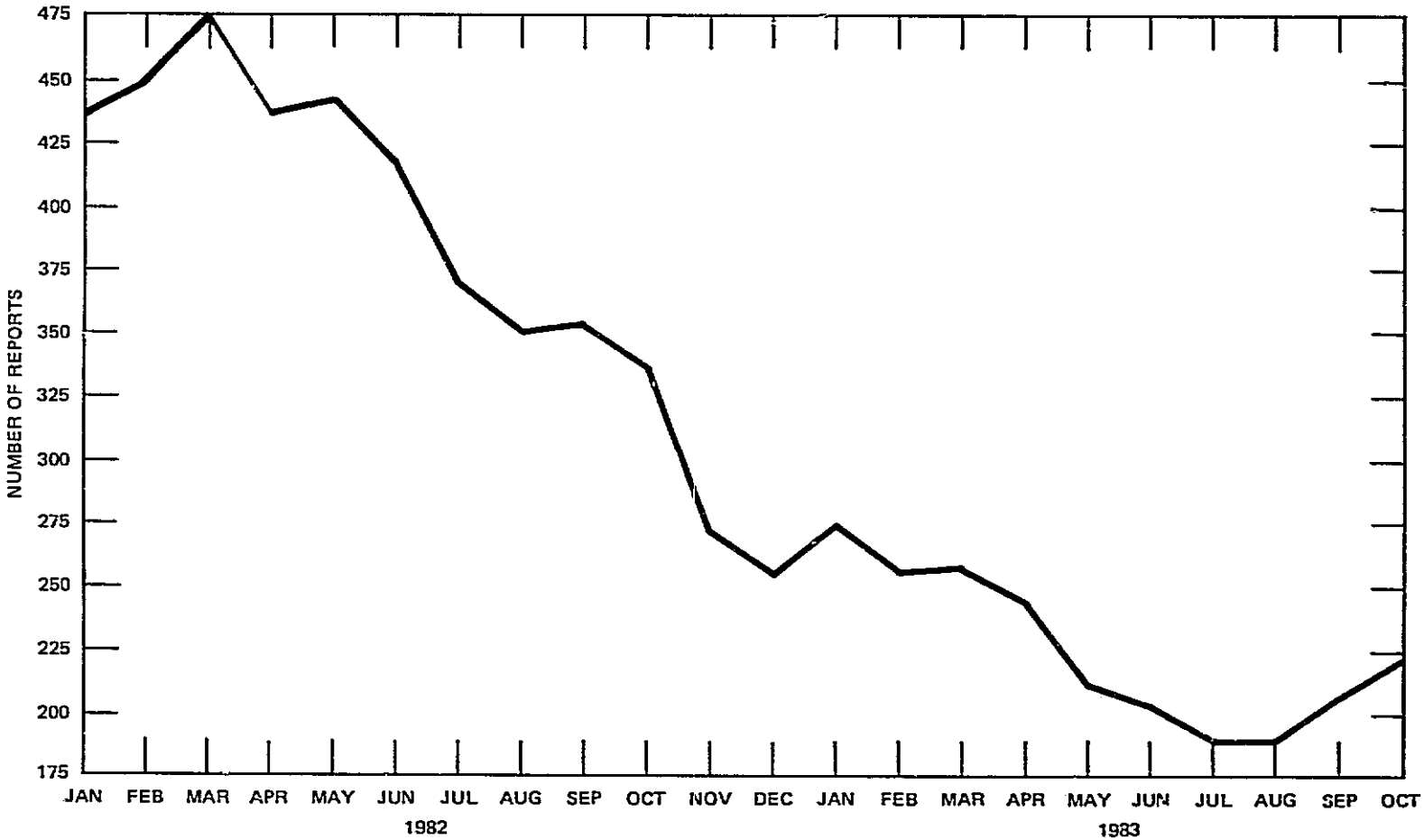

FIGURE 2 REDUCTION IN BACKLOG OF NASA NEW TECHNOLOGY EVALUATIONS

- Novelty--An item must exhibit a new design, including a new combination of existing designs, or a new application.

- Technical Significance--An item must solve an important problem or add to the general body of knowledge in the subject area or a related area.

- Utility--An item must be transferrable; that is, it must be cost-effective and potentially beneficial to identifiable user groups.

The rating system used by SRI has evolved over the years, but the basic classifications defined by NASA remain:

1.1 The technology may have a notable effect on society and/or the economy and will significantly affect performance, cost, or quality standards. Items that are evaluated in depth often fall within this category because of the relevance to public sector problems.

1.2 A new or improved product or technique of interest to a significant group probably will result. Usually, however, it will be only moderately applicable to the public sector.

2.0 The technology may be of interest to certain groups in science or industry (i.e., it relates to a specific problem), but probably is not the basis for a new or improved product. It may be an extension of previous work. This technology may be more suitable for publication in a compilation. This classification will result from either a normal or an in-depth evaluation.

3.1 Technical significance is insufficient for publication in NASA Tech Briefs. Perhaps the problem that the technology purports to solve is small, the improvement represents good engineering practice, or the technology exceeds the limits of current capabilities. Items in this classification result from normal evaluations.

3.1a Technical significance is insufficient for publication in NASA Tech Briefs. The item is unlikely to function as stated or implied.

3.2 Novelty is insufficient for publication in NASA Tech Briefs. That is, similar devices or techniques have been designed and are described in the literature. (If available, that literature is attached.) Usually this classification will result from normal evaluations.

3.3 Utility is insufficient for publication in NASA Tech Briefs. Either it is highly specialized or it is limited to aerospace applications. A more appropriate mode of publication may be suggested. Evaluations may be normal or in depth.

3.4 Publication is not recommended for a reason other than insufficient novelty, technical significance, or utility. Evaluations may be normal or in depth.

4.0 The report does not contain sufficient information for a thorough evaluation. (Specific information is requested.) This classification will usually be determined during the preliminary evaluation.

4.1 This classificaton is the same as classification 4.0 except that the information required is more detailed than could be determined from a preliminary review, and so the classification results from a normal evaluation.

5.0 The reported technology is not substantiated. This classification will result from a normal evaluation.

We took a sample of technology evaluations to determine the percentage of technology items placed in each classification between November 1981 and November 1983. The breakdown of classifications was recorded for every fourth month and is presented in Table 4. Classifications of 1.1 and 1.2 represented 33% to 44% of the total throughout the 3-year period, and the classification of 2 represented 19% to 29%. Notably, whenever the 1.1 and 1.2 classifications decreased, the 2 classification increased and vice versa. Thus, 60%, plus or minus 5%, of NASA new technology items were consistently judged by SRI to be novel, technically valid and practicable, technically significant, and potentially useful to the nonaerospace community. The percentages for classifications of 3 and 4 ranged from 29 to 38 and from 5 to 7, respectively. In all cases, the fluctuations were random.

Table 5 provides comparative data on classifications between the first two years of the contract and the third year. After adjusting for the contract modifications in 1981 and 1982, the comparison reflects a slight decrease in the total number of items placed in classification 1, whereas classifications 2 and 3 remained constant. The percentage of items categorized in classification 4 decreased significantly, as expected. (SRI made an effort to contact the innovators directly to obtain additional information and thereby circumvent the time-consuming resubmittals attendant with classification 4.)

A comparison of data at the more active Centers reveals that the percentage of 1 classifications remained approximately constant at the Johnson Space Center and Marshall Space Flight Center, whereas a decrease occurred at the Ames Research Center, Kennedy Space Center, Langley Research Center, and Jet Propulsion Laboratory. Classification 2

Table 4

BREAKDOWN OF CLASSIFICATIONS OF
NASA NEW TECHNOLOGY ITEMS

Center	1981 Jan	1981 May	1981 Sep	1982 Jan	1982 May	1982 Sep	1983 Jan	1983 May	1983 Sep
Classification 1									
ARC		2	2	2	3	2		3	1
FRC									
GSC					1	1			1
KSC				1	2	1		1	
LAR	3	3		3	4	5	1	2	3
LEW						1			
MSC		3	3	13	6	5	1	3	8
MFS	3	8	8	7	4	8	4	7	6
NPO	20	6	25	14	22	6	15	4	8
HQN									1
Ttl	26	22	38	40	42	29	21	20	28
Classification 2									
ARC	1		1		2			3	
FRC						2			
GSC	1	2							
KSC	1			1	1				
LAR	1	1		1		3	2		5
LEW									
MSC		2	2	5	2	3	4	9	3
MFS	9	14	5	1	4	5	10	1	2
NPO	8	4	7	2	9	2	8	14	5
HQN								1	
Ttl	21	23	15	10	18	15	24	28	15

Table 4 (concluded)

Center	1981 Jan	1981 May	1981 Sep	1982 Jan	1982 May	1982 Sep	1983 Jan	1983 May	1983 Sep
Classification 3									
ARC			2		1	2		2	
FRC					1				
GSC	2								
KSC	2	1		1	6	4		3	
LAR	2	4		2	2	2	2	5	2
LEW						1			
MSC		9	3	7	2	4	3	6	5
MFS	8	7	11	3	3	6	15	5	2
NPO	12	10	22	8	7	2	9	12	13
HQN									1
Ttl	26	31	38	21	22	21	29	33	23
Classification 4									
ARC	2								
FRC									
GSC									
KSC	1				1				
LAR		1		2		1			
LEW						1			
MSC			2				1	1	1
MFS	1	3	1	2	1	1	2	2	1
NPO	1	1	9	2	4			2	1
HQN									
Ttl	5	5	12	6	6	3	3	5	3

Table 5

RATING BREAKDOWN BY NASA CENTER
FOR NEW TECHNOLOGY EVALUATIONS

Center	Classification 1		2		3		4		Ttl
November 1980-November 1982									
ARC	55	(53%)	26	(25%)	18	(17%)	5	(5%)	104
FRC	4		4		3		1		12
GSC	21		16		12		5		54
KSC	18	(23%)	17	(21%)	39	(49%)	6	(7%)	80
LAR	61	(43%)	29	(20%)	41	(29%)	11	(8%)	142
LEW	2		1		1		1		5
MSC	143	(37%)	82	(21%)	143	(37%)	23	(6%)	391
MFS	151	(34%)	97	(22%)	149	(34%)	43	(10%)	440
NPO	359	(41%)	182	(20%)	252	(29%)	88	(10%)	881
Ttl	814		454		658		183		2,109

Center	Classification 1		2		3		4		Ttl
November 1982-November 1983									
ARC	26	(40%)	15	(23%)	18	(23%)	3	(5%)	65
FRC	0		0		1		0		1
GSC	1		1		0		0		2
KSC	5	(18%)	12	(43%)	10	(36%)	1	(4%)	28
LAR	25	(35%)	15	(21%)	28	(39%)	4	(6%)	72
LEW	3		0		5		2		10
MSC	52	(37%)	38	(27%)	47	(33%)	5	(3%)	142
MFS	67	(28%)	48	(20%)	104	(44%)	19	(8%)	238
NPO	115	(30%)	96	(25%)	142	(37%)	32	(8%)	385
HQN	4		2		3		0		9
Ttl	298		227		361		66		952

percentages increased at the Johnson Space Center and Kennedy Space Center and remained stable at the Ames Research Center, Langley Research Center, Marshall Space Flight Center, and Jet Propulsion Laboratory. Percentages for classification 3 increased at the Ames Research Center, Langley Research Center, Marshall Space Flight Center, and Jet Propulsion Laboratory. Almost all Centers experienced a decrease in classification 4, Ames Research Center being the exception. As noted previously, the decrease in classification 4 accounted to some degree for the increase in classification 3.

Evaluation Time Requirements

The average time required for evaluation of the NASA new technology items was reduced by approximately 65% in the last 2 years, from 94 to 34 working days. These periods include the time required for positioning, computer logging, assignment of the documentation to an expert evaluator, editing and typing, as well as the technology evaluation. This downward trend in turnaround time is shown graphically in Figure 3. The acceleration of the slope in the latter part of 1982 resulted from a contract modification, which enabled the SRI team to increase its efforts. Only 21 of the current backlog of 188 reports have been retained at SRI more than 2 months.

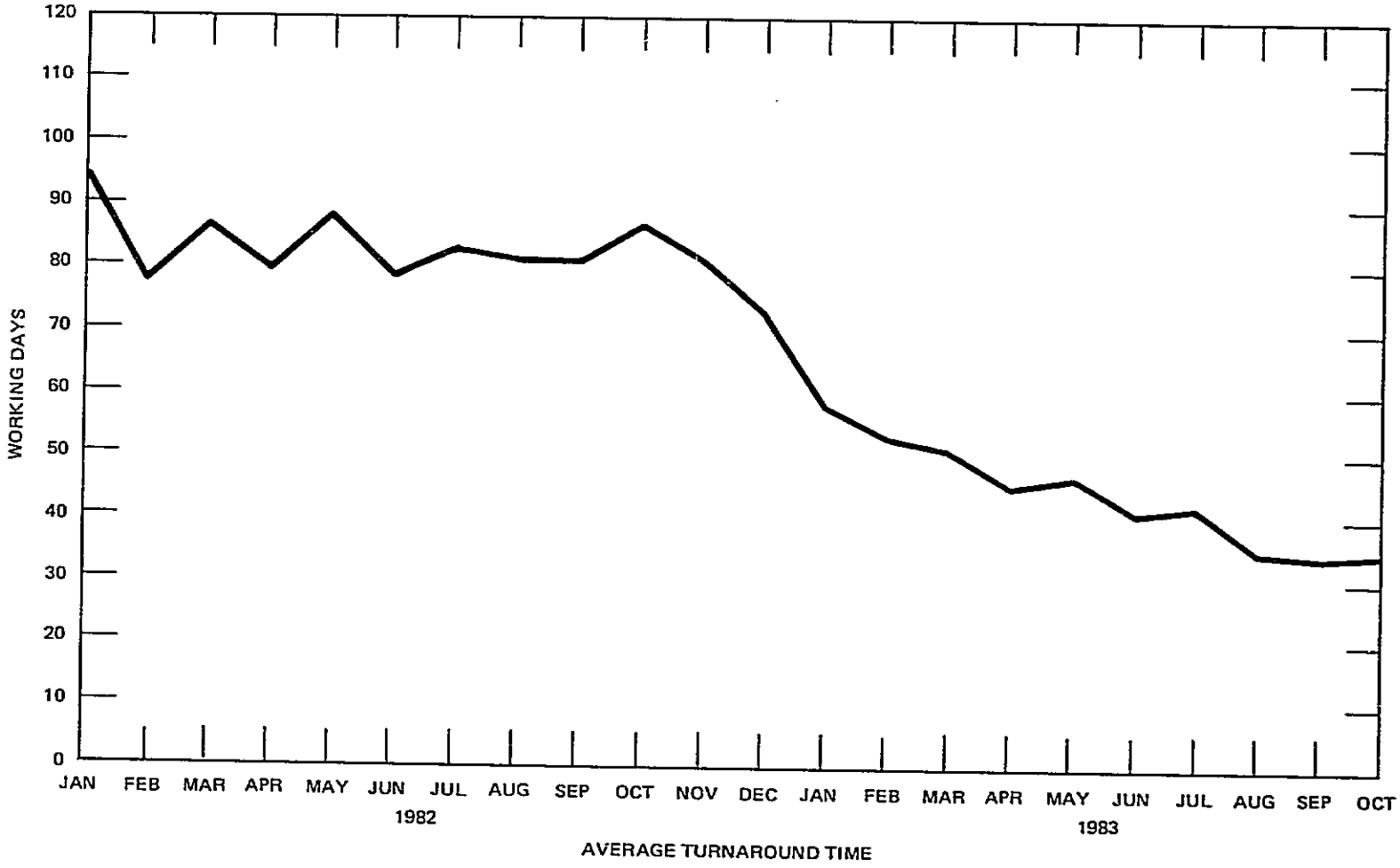

FIGURE 3 TIME REQUIRED FOR NASA NEW TECHNOLOGY EVALUATIONS

ANALYSES AND RECOMMENDATIONS

The preceding quantitative review of SRI's efforts indicates that SRI has fulfilled the contractual requirements and has reduced significantly the average evaluation time. A qualitative analysis has also been made. Specifically, we addressed three questions:

- Have the technology subjects varied and, if so, how?
- Has the significance of the NASA technology changed?
- Has the quality of the evaluations improved over time?

Technology Subjects

As stated, part of this analysis was to determine whether the technology subjects covered in the evaluated NASA documents have varied. NASA Tech Briefs covers nine subject categories: electronic components and circuits, electronic systems, physical sciences, materials, life sciences, mechanics, machinery, fabrication technology, and mathematics and information sciences. Each year, the quantitative distribution of reportable technology among the categories has changed, reflecting NASA's varying concentration of effort. The change is reflected in Table 6, which shows the distribution of technology subjects for the past 3 years. Of particular interest are the trends that are revealed: a gradual increase in electronic components, circuits, and systems over the 3-year period and an emphasis on thermal barriers in 1981, on tile-bonding techniques in 1982, and on telescopes and acoustic levitation in 1983. Technologies of continuing interest have included space structures, heat exchangers, crystal growth, aerodynamics, composite materials, special tools, and welds. Subjects that were covered by two or more items of technology in 1 month are identified by an asterisk in Table 6.

Technology Significance

As indicated by the classification data provided in the preceding section, the volume of publishable technology has remained relatively constant. Although a slight decrease in 1.1 classifications was noted in 1983, the number of technologies receiving a 1.2 rating was stable. (The volume of classification 2 also remained stable.) Thus, significance may have changed to a very small degree. Technologies that may have a major effect on industry or society are a few less, whereas new or improved product opportunities continue to flourish, as do technologies that represent extensions of previous efforts.

Table 6

SUBJECTS OF NASA NEW TECHNOLOGIES
1981 - 1983

Subject Category	1981			1982			1983	
	Jan	May	Sep	Jan	May	Sep	Jan	May
Electronics (includes components, circuits, and systems)	Avionics Integrated circuits (IC)* Microcomputers Tracking	Avionics Robotics Tracking	Amplifiers Antenna* Fiber optics IC Oscillators Semiconductors* Tracking	Antenna* Code/Encode Fiber optics Interface Robotics* Semiconductors Tracking*	Antenna Avionics Data Process Encoder* IC Semiconductors	Avionics Components* Interface IC* Microcomputer* Semiconductors*	Amplifiers* Antenna Components Fiber optics Imagery IC Robotics Semiconductors Tracking	Avionics* Components Controls Converter Imagery IC Microcomputers Oscillators Robotics
Atmospheric science	Asteroids Lasers Particles		Analysis Lasers*	Instruments* Lasers Optics Telescope	Lasers Optics* Telescope	Analysis* Lasers	Optics	Lasers Optics
Physical sciences	Batteries Combustion Composites Fuel* Metallurgy Polymers* Textiles	Coatings Crystals Fuel* Heat transfer* Metallurgy* Polymers* Silicon products*	Batteries* Coatings Combustion Fire retardants* Fuel* Glass* Metallurgy Silicon products*	Analysis* Batteries* Coatings Composites* Glass Metallurgy Polymers Silicon products	Batteries* Crystals* Fuel Glass Polymers* Silicon products	Adhesives* Analysis Coatings* Fire retard. Glass Heat transfer* Insulation* Nondestructive testing*	Composites Crystals* Fire retardants Glass Heat transfer* Insulation*	Adhesives Batteries Chem. products* Coatings* Crystals* Fuels Heat transfer* Polymers Silicon products
Life sciences		Bacteria		Biochemistry				Biochemistry Vision
Mechanics	Aerodynamics* Dynamic loads* Solar energy*	Aerodynamics Solar energy Structures*	Dynamic loads* Fluid flow Propulsion* Pumps Solar energy* Structures*	Aerodynamics Dynamic loads* Fluid flow Structures* Turbulence Valves	Dynamic loads* Solar energy* Structures* Thermodynamics* Vacuum	Aerodynamics* Solar energy Valves	Aerodynamics* Solar energy Structures* Thermodynamics Valves	Aerodynamics Electromagnetics* Flow Friction Structures Thermodynamics
Fabrication	Fasteners	Plating Tools Welds	Fasteners* Tools* Welds*	Fasteners Tools* Welds	Tools* Welds*	Assembly Fasteners Tools*	Acoustic levitation* Welds	Automation Fasteners Metalworking Tools*
Mathematics		Models		Models Statistics	Models	Models	Models* Statistics	Algorithms

*More than one technology was received for this subject.

Evaluation Quality

This analysis revealed a notable increase in the length and substance of the evaluations as the expert reviewers gained experience. The evaluators offered technical suggestions, as appropriate, to further the transfer potential. For example, substitutions of material have been suggested to lower costs, mechanical modifications have been outlined to accommodate a particular nonaerospace industry, and chemical alternatives have been suggested to reduce radiation. For classification 2 evaluations, appropriate professional journals have been suggested for publication in addition to or in lieu of NASA Tech Briefs.

In this qualitative analysis, we also examined evaluations that did not conclude with a recommendation to publish (i.e., evaluations receiving a 3 classification). We found that the primary rationale for the negative decision was the improbability of nonaerospace utility. Although not appropriate for publication in NASA Tech Briefs, many documents were considered publishable in a specialized professional journal. Two additional rationales for rejection were cited frequently. The innovation was deemed to represent good engineering practice rather than novelty if it reflected an obvious conclusion and hence was inappropriate for publication. A surprising number of innovations were categorized by the specialist evaluators as clever manufacturing aids, rather than new technologies to transfer. SRI believes that these items of technology warrant publication, albeit not in NASA Tech Briefs. These tools and techniques represent the type of information formerly included in NASA Special Publications. SRI recommends that a means for publishing these items be reestablished, such as a manual of manufacturing aids.

ACKNOWLEDGMENTS

The author expresses appreciation for the valuable contributions made on this 3-year program by the principal evaluators:

Mr. Milton B. Adams
Dr. Gerry B. Andeen
Mr. Dean F. Babcock
Dr. Dale M. Coulson
Dr. Norman R. Nielsen
Mr. Russell C. Phillips

Also acknowledged are the efforts of Messrs. Jeffrey H. Barber, Steven E. Taglio, and Kenneth E. Winn for literature research and logistics.