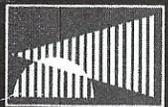
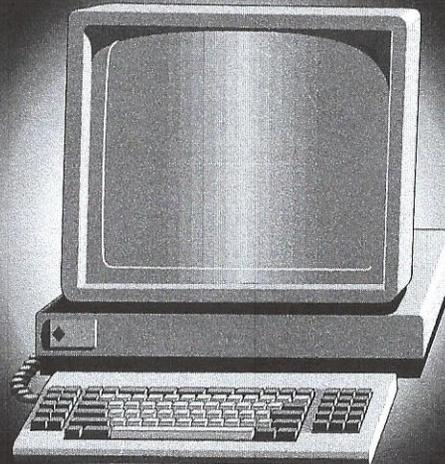


Small Business Innovation Development Act



SBA
OFFICE OF TECHNOLOGY

11th Annual Report

U. S. Small Business Administration



U.S. SMALL BUSINESS ADMINISTRATION
WASHINGTON, D.C. 20416

OFFICE OF THE ADMINISTRATOR

APR 25 1995

**The Honorable Christopher S. Bond
Chairman, Committee on Small Business
United States Senate**

**The Honorable Jan Meyers
Chairwoman, Committee on Small Business
House of Representatives**

This report, prepared pursuant to Public Laws 102-564, 99-443, and 97-219 provides the eleventh year results of the Small Business Innovation Development Act of 1982.

The accomplishments and progress of the participating Federal agencies under the Small Business Innovation Research (SBIR) Program are presented in this report. The report also details the achievement of small business goals in research and research and development acquisition and includes an update on the commercialization of SBIR efforts.

During fiscal year 1993 the eleven Federal participating agencies awarded 4,039 SBIR funding agreements totaling nearly \$698 million. These figures are significantly greater than fiscal year 1992 totals.

We continue to depart from the traditional fiscal reporting for awards. The report includes awards of procurements initiated in FY 1993, but which were made after the close of the fiscal year. This more accurately reflects the program's FY 1993 activity.

Copies of this report have been provided to the Office of Federal Procurement Policy and the General Accounting Office. The review and analysis were made by the Office of Technology of this Agency.

Sincerely,

Philip Lader
Administrator

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OVERVIEW

The Small Business Innovation Research (SBIR) Program in fiscal 1993 celebrated its 11th year of operation and continued to show that the nation's small hi-tech enterprises, with federal government help, can to a significant and important degree turn basic ideas and research into commercial products which add to the nation's productivity and help the U. S. maintain its competitive leadership in the international marketplace. The lesson of the SBIR Program is simple: It works!

In those 11 years, the SBIR Program directed nearly 29,000 awards worth almost \$4 billion to thousands of small hi-tech companies. As this report shows, small enterprises which turned their ideas and research into viable and profitable commercial successes are engaged in a wide variety of industries and technologies, from the mundane to the exotic.

On Oct. 28, 1992, the President signed legislation extending the SBIR Program to be in effect until Oct. 1, 2000 and increasing the percentage of research and development funds that must be directed to small hi-tech firms by the major agency participants. Congressional re-authorization of the program illustrated broad bipartisan support and reflected the program's continuing success.

There is no doubt about the talents and determination among entrepreneurs. But there also is no doubt that in many cases, small hi-tech companies could not have turned their ideas into profitable products without the assistance received from the SBIR Program. As this annual report for fiscal 1993 shows, through program statistics and stories of awardee successes, an ever-increasing number of SBIR Program participants are succeeding in commercializing their new products, processes and services—and in so doing are helping to boost our nation's competitiveness in world markets and improve our environment and physical well-being. Surveys by the Small Business Administration (SBA) and the General Accounting Office show that at least one in four—and perhaps even more—SBIR participants have recorded commercial sales success within six years of receiving their Phase II awards.

It also is encouraging that an increasing number of small firms headed by minorities are winning SBIR awards and proving their own technical and innovative talents.

In administering and supervising the SBIR Program, the Small Business Administration and its Office of Technology continues efforts to encourage more and more small hi-tech enterprises to respond to agency award solicitations. It has been noted that a number of program participants are winning multiple awards; this is an understandable development in view of the firms' abilities and past successes. Such multiple award winners, along with their fellow small hi-tech managers, recognize the value of the time-old advisory, "innovate or stagnate."

The SBIR Program began in fiscal 1983. In its 11 years, SBIR can list these highlights and accomplishments:

In response to 144 solicitations, the 11 federal agencies involved in the program, have received 189,465 proposals from small hi-tech firms, resulting in 28,941 awards worth more than \$3.98 billion.

In fiscal 1993, 4,039 awards were made, worth \$698 million.

More than 50,000 names and addresses of small firms are now recorded on SBIR's fully automated outreach system mailing list, and thus receive current information on SBIR programs and policies and useful information on agency solicitations for proposals.

The increasing number of commercial sales successes have come in a wide area of technologies and industries—everything (as the success stories in this report show) from superconductors, filter technology and automatic speech recognition to pharmaceuticals, gas purification and optics.

The new products and new technologies resulting from SBIR awards are helping to maintain and improve America's world competitiveness and to improve the life of millions in our country and abroad.

INTRODUCTION

The basic purpose of the Small Business Innovation Development Act was to strengthen the role of small innovative enterprises in federally funded research and development and thus help the nation develop a stronger base for technical innovation and wider commercialization of the ideas generated in the laboratories, research facilities and factory floors of small hi-tech companies.

The act, signed into law by the President on July 22, 1982, was re-authorized in fiscal 1986 and again in fiscal 1992, to be in effect until October 1, 2000.

The original statute, Public Law 97-219, also was enacted with the growing realization and appreciation that small businesses—especially small hi-tech businesses—are responsible for most of our new products, processes and technologies, and are particularly capable of turning research and development into commercial and profitable successes. In many cases, all these small innovators needed was an infusion of Small Business Innovation Research (SBIR) Program assistance. The small hi-tech businesses' commercial successes to date, and those successes anticipated in the future, have created many new jobs, have added to the nation's tax base and have helped the country's economic viability and productivity.

This report is the 11th in a series of annual reports pursuant to the act and reflects and summarizes, among other things, SBIR Program results and activities during fiscal 1993 (the year ended September 30, 1993). The report is presented by the Small Business Administration, which is directed by the act to set program policy and to monitor, evaluate and report the progress of the SBIR Program.

Findings and Purposes of the Act

The President signed the Small Business Innovation Development Act—the act that created the Small Business Innovation Research (SBIR) Program—on July 22, 1982. The act originally was set to expire on Oct. 1, 1988. During fiscal 1986, Congress enacted legislation extending the act through September 30, 1993, and in so doing said it found that technological innovation creates jobs, increases productivity and economic

growth, and serves as a valuable counterforce to inflation and the U. S. balance of payments deficit. Congress also noted that while small business is the nation's principal source of significant innovations, the vast majority of federally funded research and development had heretofore been conducted by large businesses, universities and government laboratories.

In 1992, Congress once again extended the life of the program, through enactment of the Small Business Research and Development Enhancement Act, Public Law 102-564. The extension is now set for expiration on October 1, 2000. The President signed this legislation on October 28, 1992. The extension increased, on an incremental basis, the percentage of research and development funds which the participating federal agencies must direct to small hi-tech firms—from 1.25 percent to 2.5 percent—and raised the thresholds of Phase I awards from \$50,000 to \$100,000 and Phase II awards from \$500,000 to \$750,000.

The purposes of the act are to:

1. Expand and improve the Small Business Innovation Research Program;
2. Emphasize increased private sector commercialization of technology developed through federal SBIR research and development;
3. Increase small business participation in federal research and development; and
4. Improve the federal government's dissemination of information concerning the SBIR Program with regard to participation by women-owned and socially and economically disadvantaged small business concerns.

Two Distinct Programs

The law created two distinct programs and directed that the programs be implemented by SBA. The primary program is the Small Business Innovation Research Program. The secondary program is the Research and Research and Development (R&R&D) Goaling Program. Under the

SBIR Program, each federal agency with an extramural budget for research or research and development in excess of \$100 million for fiscal 1982, or any fiscal year thereafter, must establish an SBIR Program. The program is funded by setting aside a set percentage of the participating agency's extramural research or research and development contracting dollars during each fiscal year. Each participating federal agency will expend with small business concerns not less than 1.5 percent of their R&D budget in fiscal years 1993 and 1994; not less than 2 percent in fiscal years 1995 and 1996 and not less than 2.5 percent thereafter.

There were 11 participating federal SBIR agencies during fiscal 1993:

Department of Agriculture
Department of Commerce
Department of Defense
Department of Education
Department of Health and Human Services
Department of Transportation
Environmental Protection Agency
National Aeronautics & Space Administration
Department of Energy
National Science Foundation
Nuclear Regulatory Commission

SBIR is a Three Phase Program

- Phase I: Phase I awards are funded for up to \$100,000 and are made for research projects to evaluate the scientific and technical merit and feasibility of an idea.
- Phase II: Phase I projects with the most potential are funded to further develop the proposed idea for one or two years. Most Phase II awards are funded for \$750,000 or less.
- Phase III: An innovation is brought to market by private sector investment and support. No SBIR funds may be used in Phase III. When appropriate, Phase III may involve follow-on production contracts with a federal agency for future use by the federal government.

The Goaling Program

The law requires federal agencies with a budget for research or research and development in excess of \$20 million for any fiscal year to establish small business goals for awarding R&R&D funding agreements to small companies. The annual goal to be set cannot be less than an agency's achievement during the previous fiscal year. In addition to the 11 SBIR agencies, seven other agencies participate in the goaling program.

Department of Interior
Department of Justice
Department of Treasury
Department of Veteran Affairs
Agency for International Development
Smithsonian Institution
Tennessee Valley Authority

SBA Authorities and Responsibilities

The law designated SBA as the agency for program implementation, governing policy and monitoring and analysis. The SBA's authorities and responsibilities are:

1. Developing, coordinating, issuing and updating a policy directive for the federal government-wide conduct of the SBIR and goaling programs.
2. Developing and administering an SBIR Program information and outreach program.
3. Developing and maintaining a mailing list of interested small business concerns.
4. Developing, coordinating, publishing and disseminating SBIR Pre-Solicitation Announcements.
5. Surveying, monitoring and reporting on agency SBIR Programs.
6. Reporting at least annually to Congress on the two programs and on SBA monitoring activities.

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7. Private sector coordination on the commercialization aspects of SBIR innovations.
 8. Obtaining information on the current National Critical Technologies.

Agency SBIR Program Authorities and Responsibilities

The authorities and responsibilities of the participating agencies are to:

1. Determine categories of projects to be in the agency's SBIR Program.
2. Issue SBIR solicitations in accordance with a schedule determined cooperatively with SBA.
3. Unilaterally determine research topics within their SBIR solicitations giving special consideration to broad research topics and to topics that further one or more National Critical Technologies.
4. Receive and evaluate proposals resulting from SBIR solicitations.
5. Select awardees for SBIR funding agreements.
6. Ensure that funding agreement under the SBIR Program include provisions setting forth respective rights of the United States and small business concerns with respect to intellectual property rights and any right to carry out follow-on research.
7. Administer SBIR funding agreements (or delegate such administration to another agency).
8. Make payments to SBIR award recipients on the basis of progress toward or completion of the funding agreement requirements.
9. Submit annual reports on the SBIR and goaling programs to SBA.

SBIR PROGRAM SERVICES

In setting SBIR Program policy and in monitoring and evaluating the program, SBA acts to keep contract award procedures simple and standardized, to keep paperwork to a minimum and to encourage small companies owned by minorities and the disadvantaged to participate in the program. SBA also conducts an ongoing national information and outreach campaign and makes sure the agencies conform with SBIR policy directives.

As required by law, the solicitation process minimizes regulatory burdens and mandates timely receipt and review of proposals, peer review, proprietary information guidelines, selection of awardees, data rights retention, title to government property, cost sharing and cost principles.

Automated Outreach System

SBA, in carrying out a major responsibility, initiates programs and policies to make sure that all interested small businesses are provided with current program and solicitation information and opportunities available in the SBIR Program. Toward this end, SBA has developed a mailing list of those individuals and small firms that have requested to be included. This list was converted to a fully computerized process nine years ago.

In the last year, SBA worked to improve and update this informational mailing list, to ensure the current interest of small firms represented—and thus the accuracy of the listing. Another SBA objective was to save taxpayer paperwork and mailing costs. The result was that at fiscal 1993's end, the automated outreach list contained 50,000 names and addresses, which are continuously updated to minimize expense and maximize outreach.

Pre-Solicitation Announcements

SBA's SBIR Pre-Solicitation Announcements to small businesses present basic program solicitation information in a succinct and understandable manner. Each publication provides complete information on all quarterly SBIR activity and eliminates the need for small businesses to track the activities of each participating agency.

The Pre-Solicitation Announcements are published and distributed prior to the time of agency solicitations. The announcements provide small businesses with a brief statement of each agency research topic, the opening and closing dates of each solicitation, an estimate of the number of awards to be made under each solicitation, who to contact for a copy of the agency solicitation and a master schedule of agency opening and closing dates. The response from the public to these Pre-Solicitation Announcements has been excellent.

During fiscal 1993, SBA published four Pre-Solicitation Announcements. For the 11 years of the program, over 2.8 million announcements have been distributed.

SBIR Seminars and Conferences

During fiscal 1993, SBA cooperated with numerous organizations that conducted SBIR seminars and conferences. This cooperation included providing information, materials and speakers. SBA field representatives and public and private organizations have become a significant part of the information dissemination process.

SBA continues to publish a special SBIR Program pamphlet which in addition to providing program information also serves as a mechanism for mailing list development. SBA field offices have been furnished a supply of the pamphlets for speakers throughout the country. SBA utilized an audio-visual program which presents a detailed explanation of the SBIR Program. The audio-visual program is available on video tape.

Another form of outreach used by SBA are briefings to officials of foreign governments. During fiscal 1993, foreign interest in the SBIR Program grew even stronger and SBA's staff briefed a number of foreign government officials. SBIR-type programs are in place in Europe and the United Kingdom.

The European Community has coordinated its R & D program through three multi-annual framework programs. The fourth program (Brite Euram II) is effective from 1991-94 and has a total funding of 660 million



ECU. (ECU is the European Currency Unit and currently equates to U. S. dollars at \$1.11 per ECU). The community's first program, 1985-88, was for 180 million ECU.

The community's program is open to industrial enterprises, universities, research institutes and other interested organizations. Small and medium-sized enterprises are particularly encouraged to participate.

SBIR PROGRAM DATA

Fiscal Year 1993 SBIR Agency Obligations Summary (Dollars in Thousands)

	DOA	DOC	DOD	DOE	DOT	ED	EPA	HHS	NASA	NRC	NSF	Total
Agency Extramural Budget	\$467,784	129,930	25,537,617	3,315,517	283,024	171,052	326,967	8,116,637	6,588,350	99,793	1,782,100	46,818,771
Agency SBIR Budget	\$7,017	1,949	384,821	49,733	4,245	2,566	4,904	121,750	98,825	1,497	26,731	704,038
Dollars Obligated	\$7,017	2,255	384,821(a)	49,815	4,371	2,993	4,848	125,602(b)	86,008	1,581(c)	28,653(d)	697,964
Percent of SBIR To Extramural Budget	1.50%	1.73%	1.50%	1.50%	1.54%	1.75%	1.48%	1.55%	1.30%	1.58%	1.61%	1.49%
Deficit/Surplus	0	+306	0	+82	+126	+427	-56	+3,852	-12,817	+84	+1,922	-6,074

Fiscal Year 1993 Award Profile (Dollars in Thousands)

	DOA	DOC	DOD	DOE	DOT	ED	EPA	HHS	NASA	NRC	NSF	Total
Total Phase I Awards	53	19	1,285	168	49	29	34	654	346	8	253	2,898
Minority/Disadvantaged Phase I Awards	6	5	258	20	6	4	3	37	45	0	31	415
Total Phase II Awards	23	8	535	70	6	9	21	251	150	8	60	1,141
Minority/Disadvantaged Phase II Awards	1	0	94	7	2	1	1	17	14	0	5	142
Total Phase I Dollars Awarded (\$)	2,604	661	69,620	12,528	3,418	1,141	1,699	32,312	17,087	396	12,561	154,027
Minority/Disadvantaged Phase I Dollars Awarded (\$)	298	172	14,386	1,488	439	160	150	1,815	2,229	0	1,526	22,663
Total Phase II Dollars Awarded (\$)	4,413	1,594	263,236	37,287	953	1,852	3,148	92,260	68,921	1,172	15,839	490,675
Minority/Disadvantaged Phase II Dollars Awarded (\$)	200	0	45,241	3,464	554	200	150	5,722	6,815	0	1,252	63,598
Average Amount for Phase I Awards (\$)	49	35	54	75	70	39	50	49	49	50	50	53

Fiscal Year 1993 Agency Solicitation Profile

	DOA	DOC	DOD	DOE	DOT	ED	EPA	HHS	NASA	NRC	NSF	Total
Number of Solicitations Released	1	1	2	2	1	1	1	2	1	1	1	14
Number of Research Topics in Solicitations	8	7	968	45	38	10	8	193	15	9	25	1,326
Number of Copies Distributed	15,000	8,000	100,000	60,000	17,000	2,200	5,000	23,883	27,000	800	50,250	309,133
Number of Phase I Proposals Received	383	240	11,276	2,509	701	366	442	2,544	2,880	98	2,201	23,640
Number of Phase II Proposals Received	35	16	1,144	180	21	20	41	561	354	19	141	2,532
Number of Phase I Awards	53	19	1,285	168	49	29	34	654	346	8	253	2,898
Number of Phase II Awards	23	8	535	70	6	9	21	251	150	8	60	1,141

(a) 311K modifications to non FY 93 Awards plus 59,285K total agency FY dollar amount set-aside for select proposals in negotiation, but not obligated.

(b) 1,030K modifications to non FY 93 Awards

(c) 13K in modifications to non FY 93 Awards

(d) 252K in modifications to non FY 93 Awards

SBIR PROGRAM DATA

Commercialization Matching System

A major goal of the SBIR Program is to bring research and development results to the marketplace. The SBIR Program therefore not only encourages more research and development, but it also encourages commercialization by offering the possibility of economic reward for innovations successfully marketed by SBIR firms.

At each stage of a small firm's progress through this program, there are policies and incentives to promote research work with commercial potential and to encourage the availability of the completed research in the marketplace.

Recognizing that most small firms with innovative products have difficulty finding the financing required for the final development, manufacture, and marketing of their product, SBA has developed a Commercialization Matching System. The system maintains information on all SBIR awards including the company name and address, principal investigator, and information about the innovation to be commercialized. The system also includes information on financing sources that have requested inclusion and will provide information on the type of investment opportunities they are seeking.

From this data base, the Commercialization Matching System provides technical abstracts of SBIR projects to possible investors, and provides SBIR firms with information on sources of capital that might consider investing in their innovations. Matching selections from the data base are made on the basis of technology and industry preferences, geographic preferences, and dollar thresholds. Over 17,000 SBIR projects and nearly 500 capital sources are currently listed in the data base. In order to provide accurate information to SBIR awardees, the data on sources of capital were updated in fiscal 1992.

SBIR Reporting Requirements

Beginning with fiscal 1983, each agency establishing an SBIR Program set aside a set percentage of its extramural R&R&D budget for award to small businesses. Through a phased-in process over a four-year period, civilian agencies were required to increase the percentage of their set

asides, from 0.2 percent in fiscal 1983 to 1.25 percent in fiscal 1986. The Department of Defense was allowed five years to phase in the program and was required to set aside 0.01 percent in fiscal 1983 and reach 1.25 percent in fiscal 1987.

Each agency required by Sections 4(f) and 4(h) of Public Law 97-219 to establish an SBIR Program for research and research and development (R&R&D) was required to report annually to SBA on the number of grant, contract and cooperative agreement awards over \$10,000 and to report the dollar value of all such awards, identifying SBIR awards and comparing the number and amount of such awards with awards to other than small business.

To properly monitor and report on the participating agencies' SBIR Programs, SBA established a reporting base to compare against each agency's budget data. In determining extramural R&R&D obligations as a base for the size of the SBIR Programs, the act provided a definition of research and development identical to that in the Office of Management and Budget (OMB) Circular A-11 on the "Preparation and Submission of Budget Estimates."

Agencies submit to the National Science Foundation (NSF) breakdowns of their total R&R&D obligations into intramural and extramural R&R&D obligations, which are published in "Federal Funds for Research and Development."

For agencies with SBIR Programs, SBA reviews the NSF data and uses as an extramural base for SBIR that amount determined by the agency to be its extramural budget. A distinction between intramural and extramural is not made for agencies participating in the R&R&D goaling program, since the agency goal is based upon total R&R&D budget obligations.

Because of the three-year budget cycle in estimating extramural R&R&D obligations, and consequent changes in the SBIR bases, some differences between SBIR required expenditures and actual obligations are to be expected. Because of these obligations and the base reporting

arrangement, SBA uses a system of deficits and credits for adjusting future years. Thus SBIR agencies proceed on the best available estimates and ultimately, through adjustments, achieve the percentages specified by law.

SBIR Agency Total Obligation Summary

The number of proposals received from small hi-tech enterprises has increased steadily over the years—a trend which illustrates the past award successes and the ever-growing awareness and acceptance of the SBIR Program within the small business community. There also have been year-to-year increases in the dollar value of awards made.

In fiscal 1993, 26,172 Phase I and Phase II proposals were received. A record 4,039 awards were made. Since the program was first implemented, there have been 28,941 awards to qualified small businesses. The awards were worth almost \$4 billion.

During fiscal 1993, the 11 participating SBIR agencies awarded \$698 million through the SBIR Program; the total represented, a 37 percent increase over the approximately \$508.4 million obligated in fiscal 1992. Phase I awards were worth \$154 million in fiscal 1993. Phase II awards totaled \$490.7 million. The overall award dollar total includes \$61 million in modifications to non-FY 1993 awards.

In awarding Phase II two-year funding agreements, agencies utilize various acquisition methods of obligation and funding. For purposes of consistency in our reporting, the acquisition data in this report reflect only actual obligations during fiscal 1993.

As in prior years, SBA continues to use a system of deficits and credits to evaluate agency SBIR budgets to actual amounts obligated. At the beginning of each fiscal year, SBA provides each agency with estimates (based upon NSF data) of the agency's extramural and SBIR budget. These estimates change during the year to reflect congressional action on a participating agency's R&R&D budget. Thus to ensure proper implementation, each agency establishes a budget and proceeds during the year on that budget. Adjustments may then be made in the following year.

SBIR AWARDS

<i>Fiscal Year</i>	<i>Phase I</i>	<i>Phase II</i>	<i>Totals</i>
83	686	—	686
84	999	338	1,337
85	1,397	407	1,804
86	1,945	564	2,509
87	2,189	768	2,957
88	2,013	711	2,724
89	2,137	749	2,886
90	2,346	837	3,183
91	2,553	788	3,341
92	2,559	916	3,475
93	2,898	1,141	4,039
Total	21,722	7,219	28,941

Solicitation Profile

Fourteen Phase I SBIR solicitations were released by the 11 participating agencies in fiscal 1993; DoD, DOE and HHS each released two solicitations; the other eight agencies released one each.

As a result of the solicitations, 23,640 Phase I proposals were received from small businesses. A total of 2,898 Phase I awards were made in fiscal 1993. Phase I awards represented 12 percent of proposals received.

During fiscal 1993, a total of 2,532 Phase II proposals were received and resulted in 1,141 new awards. The fiscal 1993 awards represented 45 percent of all Phase II proposals received.

Minority/disadvantaged-owned firms received 415 Phase I awards in fiscal 1993, worth \$22.7 million, and 142 Phase II awards worth \$63.6 million. Since the program's inception, minority/disadvantaged-owned firms have received 3,271 awards, representing 11.3 percent of all SBIR awards; the value of these awards totaled \$405 million, representing 10.2 percent of all dollars awarded.

R&R&D Goaling Agencies

During fiscal 1983 and 1984, agencies required to submit annual R&R&D goaling reports often submitted inaccurate data or incomplete reports. As a result, the General Accounting Office recommended that SBA change reporting requirements to obtain additional data from reporting agencies; that all agencies be required to submit accurate or revised reports for fiscal 1983 and 1984, and that SBA change the due dates for R&R&D goaling reports to ensure that budget data were consistent with data reported to OMB. Consistent with these recommendations, SBA required all R&R&D goaling agency annual reports to include the following information:

1. Previous fiscal year's total R&R&D obligations.
2. Previous fiscal year's total R&R&D-obligated dollars to small businesses, minority and disadvantaged small businesses, and women-owned small businesses under funding agreements, and the percentage to the agency's total R&R&D obligations. (Women-owned small business data are not required by law to be collected by the agencies; therefore the data are incomplete.)
3. Current fiscal year's total R&R&D budget.
4. Current fiscal year's total R&R&D small business goal based on the percentage of obligations to small businesses made the previous fiscal year.
5. Current fiscal year achievement of the singular small business R&R&D goal and the dollars obligated through prime funding agreements by categories of small business, minority and disadvantaged small business and women-owned small business.

VALUE OF SBIR AWARDS

(in millions of dollars)

Fiscal Year	Phase I	Phase II	Totals
83	\$44.5	\$ -	\$44.5
84	48.0	60.4	108.4
85	69.1	130.0	199.1
86	98.5	199.4	297.9
87	109.6	240.9	350.5
88	101.9	284.9	389.1*
89	107.7	321.7	431.9*
90	118.1	341.8	460.7*
91	127.9	335.9	483.1*
92	127.9	371.2	508.4*
93	154.0	490.7	698.0*
Total	\$1,107.2	\$2,776.9	\$3,971.6**

EST: Fiscal 94

*includes awards modifications

**contains all \$ expended and/or obligated

6. The total number and dollar value of R&R&D awards to small business for contracts, grants and cooperative agreements over \$10,000 and a comparison of such awards to awards made to non-small businesses for the same categories.

To evaluate the agencies' R&R&D Goaling Program, SBA uses a final budget report from OMB entitled "Conduct of R&D by Agency." This report details the agencies' total R&R&D obligations for the reported fiscal year and provide R&D budget estimates for future years. SBA then computes the agencies' total R&R&D obligations to small business, as reported to SBA, to determine the actual percentage of the R&R&D obligations awarded to small business.

As in prior years, there was some difference between each agency's total R&R&D obligations reported to SBA as compared to data reported to OMB. Since SBA uses the OMB data as an actual base, the agency percent awards to small business may be higher or lower in this report compared to that percentage as reported by the agency to SBA.

In fiscal 1993, \$3 billion was awarded to small business under the R&R&D Goaling Program, representing 4.5 percent of the total R&D obligations for 18 reporting agencies.

R&R&D awards to minority/disadvantaged-owned firms totaled \$897 million in fiscal 1993, representing 13 percent of all agency R&R&D obligations to small businesses.

Cumulative Data

Since the SBIR Program's start, nearly \$4 billion has been awarded to small businesses; \$405 million was awarded to minority/disadvantaged-owned small businesses.

In accordance with the law, each participating agency will continue to award at least 1.5 percent in fiscal years 1993 and 1994; not less than 2.0 percent in fiscal years 1995 and 1996 and not less than 2.5 percent thereafter.

A total of 21,722 Phase I and 7,219 Phase II awards have been made since the program's beginning. The agencies received 172,368 Phase I proposals and 17,097 Phase II proposals responding to 144 SBIR solicitations. Several participating agencies have allocated more for this program than required by law. Awards have been made to firms in 50 states, Puerto Rico and the District of Columbia. The SBIR Program continues to receive national acceptance and international recognition for quality performance.

SBA requires, through its SBIR Policy Directive, that each participating agency list the number of Phase I awards made within six months and beyond six months of the closing date of the agency's solicitation announcement.

FISCAL YEAR 1993 PHASE I TIME FRAME

<i>Agency</i>	<i>Total FY 93 Phase I Awards</i>	<i>Number Within Six Months of Solicitation Close</i>	<i>Number Over Six Months of Solicitation Close</i>
DOA	53	0	53
DOC	19	19	0
DOD	1,285	610	675
DOE	168	168	0
DOT	49	49	0
ED	29	24	5
EPA	34	34	0
HHS	654	37	617
NASA	346	211	135
NRC	8	8	0
NSF	253	253	0
Total	2,898	1,413	1,485

RESEARCH GOALS

AGENCY RESEARCH AND RESEARCH AND DEVELOPMENT DATA (dollars in thousands)

<i>Agency</i>	<i>Agency % Goal FY '93</i>	<i>Total R&D Budget</i>	<i>\$ Goal</i>	<i>Agency Reported \$ To Small Business</i>	<i>% Awarded To Small Business</i>	<i>\$ Awarded To Minority/ Disadvantaged</i>	<i>% Awarded To Minority Disadvantaged</i>
DOA	0.0	\$1,134,783	NR	NR	NR	NR	NR
DOC	1.0	473,520	4,735	5,976	1.2	2,526	0.5
DOD	4.8	36,155,100	1,721,000	1,890,000	5.2	497,000	1.4
DOE	1.2	6,133,517	76,056	99,531	1.6	16,648	0.3
DOI	0.2	613,137	1,227	1,044	0.2	40	0.4
DOT	13.0	461,714	60,023	95,945	21.0	60,389	13.1
ED	1.0	102,635	1,026	1,335	1.3	705	0.7
EPA	7.0	499,100	34,900	40,000	8.0	7,700	1.5
HHS	1.5	10,344,875	154,139	184,484	1.8	44,055	0.4
NASA	8.1	6,958,600	563,600	578,300	8.3	255,000	3.7
NSF	1.2	1,930,720	22,400	16,020	0.8	10,260	0.5
NRC	2.0	99,793	1,996	2,813	2.8	1,138	1.1
AID	0.7	141,700	992	5,000	3.5	0	0.0
DOJ	15.4	39,597	6,098	6,653	16.8	1,694	4.2
DVA	NR	NR	NR	NR	NR	NR	NR
SI	0.4	102,000	408	53	0.5	0	0.0
TR	NR	NR	NR	NR	NR	NR	NR
TVA	NR	NR	NR	NR	NR	NR	NR
Total	-	65,190,791	2,648,600	2,927,154	4.5	897,155	1.3

NR = Not reported

RESEARCH GOALS

(dollars in thousands)

Agency	SMALL BUSINESS						NON-SMALL BUSINESS					
	Number of Contracts Awarded	Dollar Amount Of Contracts	Number of Grants Awarded	Dollar Amount of Grants	Number of Co-op Agreements	Dollar Amount of Co-op	Number of Contracts Awarded	Dollar Amount of Contracts	Number of Grants Awarded	Dollar Amount of Grants	Number of Co-op Agreements	Dollar Amount of Co-op
DOA	NR	NR	76	7,027	NR	NR	33	1,990	1,690	413,687	1,484	58,244
DOC	88	5,976	NR	NR	26	18,812	16	6,096	555	134,682	401	168,631
DOD	26,908	2,279,000	NU	NU	NU	NU	16,346	17,281,000	NU	NU	NU	NU
DOE	92	99,531	11	173,201	NR	NR	283	6,033,986	NR	NR	NR	NR
DOI	65	1,627	NR	NR	NR	NR	85	4,182	NR	NR	NR	NR
DOT	1,804	103,106	4	540	NR	NR	1,832	215,919	186	245,077	29	22,346
ED	45	4,329	NR	NR	NR	NR	192	16,922	668	134,598	NR	NR
EPA	77	12,400	NR	NR	NR	NR	50	50,800	NR	NR	NR	NR
HHS	609	109,300	1,082	134,072	37	11,641	2,564	640,724	29,821	6,691,184	3,051	971,248
NASA	2,350	664,300	NR	NR	NR	NR	2,570	5,719,400	5,145	477,600	696	97,300
NSF	170	13,630	370	31,040	NR	NR	111	156,700	17,856	2,564,900	NR	NR
NRC	53	4,394	0	0	0	0	29	8,970	15	1,133	0	0
AID	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
DOJ	60	3,404	7	506	17	2,741	11	6,458	44	7,771	54	10,999
DVA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
SI	2	53	0	0	0	0	0	0	0	0	0	0
TR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
TVA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NR = Not reported

NU = Not used by reporting agency

SHARED CARE AND CONSULTING, INC.

Shared Care and Consulting, Inc. of Rancho Palos Verdes, California, with vital assistance from the SBIR Program, has become a leader in the critical area of health care training. Founded in 1985, the firm uses state-of-the-art materials and computer software to teach patients, professionals and researchers to accurately measure blood pressure in order to meet today's exacting medical requirements.

The SBIR and Shared Care, Inc. began their dynamic partnership in 1986 with a Phase I Award of \$47,000. Phase II, in the amount of \$304,000, followed in 1987. The result has been dramatic growth and a commercial success that gives clear illustration to the strength of the SBIR Program.

Shared Care and Consulting, Inc. maintains a data base of over 2,000 individuals and approximately 400 investigator sites. The data base registers, documents and certifies researchers in trials where precise blood-pressure measurement is required.

Included among Shared Care, Inc.'s clients are pharmaceutical companies who require participation in the Blood Pressure Measurement and Standardization Program as part of their clinical trials, professional schools and government agencies, health care providers—including hospitals—and equipment companies needing standardized measurement.

Shared Care, Inc.'s management understood the strength of audio-visual instruction in the medical field early-on and developed a video tape for training patients to measure their own blood pressure. Soon afterwards a Standardization and Certification project was initiated. One unique aspect of the effort was the creation of an 8-hour standardization/certification class with a "train-the-trainer" component that allowed the process to perpetuate itself.

1993 has been a year of planning and growth. Shared Care, Inc.'s management consolidated its base through general client growth and by expanding its product list. That was accompanied by targeted efforts to increase the number of clients in each product area. In that context, management increased its efforts to market Quality Assurance Blood Pressure programs to HMOs.



A second priority has been to work with research associates from other countries to adapt and develop blood-pressure measurement tools for their use.

Other priorities are: to market directly to consumers; to develop co-marketing strategies with blood-pressure equipment companies; to develop self teaching tapes for popular products like "A Skill for Life"; to look at franchising blood-pressure services outside the U.S.; and to continue to work with the American Society of Hypertension and other organizations in the co-marketing of training tapes.

Shared Care, Inc. today is a tightly run, efficient organization. Consistent with the ninety's "lean, mean and mobile" business format, Shared Care, Inc. has two full-time professionals and ten part-time professionals and staff.

Shared Care, Inc.'s business mix breaks down to 80 percent actual products and 20 percent research and development. Though Shared Care, Inc.'s success is due in large part to the SBIR Program, today most of Shared Care, Inc.'s work is done with the private sector.

Shared Care, Inc.'s management today is increasingly self-reliant. There are no venture capital firms, large corporations or joint-ventures behind the firm's success. In fact, Shared Care, Inc. manufactures its own product, markets it and finances it.

Today some 30 percent of Shared Care, Inc.'s revenue and 75 percent of its growth can be attributed to commercialized products developed under the SBIR Program (as distinguished from the R&D revenue mentioned above). Management points out they would not have pursued the development of these products without the SBIR Program. In the period since then "level of production" has been "steady" and sales have been just under \$1 million so far.



AGSCO INDUSTRIES, INC.

In what has been one of its most successful initiatives, the Small Business Innovation Research Program (SBIR), working with AGSCO Industries of Grand Forks, North Dakota, has funded two new agricultural products. Two new herbicide additives were created by AGSCO Industries, Inc. that will benefit the nation's farmers, ensure proper environmental conservation, and stimulate economic development.

The breakthrough, which has strong commercial potential, reflects a government-industry partnership that has, in effect, "built a better mousetrap." SBIR funding was the catalyst that facilitated AGSCO's acquisition of the technology.

The products in this case, called SCOIL and SUN-IT, are two oil-based products that, when combined with herbicides, fight weeds more effectively than the traditional petroleum-based products and are less damaging to the environment.

Founded in 1934, AGSCO began by manufacturing pesticide and fertilizer and expanded into the sale of agricultural chemicals. Between 1949 and 1968 plants were built for the production of fertilizers, fungicides, insecticides and the fabrication of steel for building siding and construction. AGSCO was created after four corporations handling different parts of the business—chemicals, steel buildings, seeds and distributors—were merged.

Over the years, AGSCO has been a strong, positive force in the region for farmers generally helping to improve production and market impact. AGSCO's main contribution has been in the chemical area which, in view of changing government regulations and public concern about hazardous waste, has presented numerous challenges. AGSCO's provision of safe, effective chemicals has helped to off-set the growing problems of land erosion, drought, falling commodity prices, and costly restrictions.

AGSCO's strong research and development effort led to Phase I and Phase II SBIR Program awards from the Department of Agriculture

which enabled the development of two important products, SCOIL and SUN-IT. These unique products serve both environmental and agricultural objectives. In particular, they enhance the effectiveness of certain herbicides while using fewer chemicals.

AGSCO has joined with American Cyanamid Company to ensure full, on-time distribution of these two new SBIR generated products. Research and development, product improvement and customer service are all handled by AGSCO.

The company today has 65 employees—and is growing. Some 98 percent of the firm's business is devoted to production; the other 2 percent is research and development. About 10 percent of the firm's total revenue is attributed by management to commercial products which were generated by the SBIR Program.

Production of the products has been a "success"; sales for SCOIL have been in the one million dollar range and sales for SUN-IT have been approximately \$10-\$15 million. In the case of the latter product, this is a dramatic improvement over last year when the sales were \$2 to \$5 million.

Officials at AGSCO confirm that the company would not have pursued the development of these products without the help and encouragement of the SBIR Program. In fact, AGSCO asserts that about 25 percent of its corporate growth is due to the company's participation in the SBIR Program and the follow-on product development and sales.

Finally, AGSCO is owned and operated by many of the same family who founded it during the depression. L. Russell Brown is the Chairman and Founder and, working with such creative managers as Orval Swenson—who has managed the SBIR award—has maintained corporate growth and quality.

AGSCO has annual sales today of about \$20 million. With a total of only \$259,000 in Phase I and Phase II funding, AGSCO has generated two products, with assistance from the SBIR Program, that will help the company to remain stable and competitive in its marketplace.



SBIR COMMERCIALIZATION PROGRESS AND SUCCESS

Commercialization of SBIR technology is what distinguishes the SBIR Program from other federal research and development, and SBA continues to monitor activity in this area. In 1990 we reported that our publication, "Results of Three-Year Study of the SBIR Program," had been distributed to Administration officials and members of Congress. In fiscal 1992, we published a more detailed version of this study, "Commercialization Activities in the SBIR Program (Parts 1 and 2)," in the *Journal of Technology Transfer*. We are currently compiling survey statistics to include in our publication, "Results of Six-Year Study of the SBIR Program," to be distributed to Congress in FY 96.

In fiscal 1992, we also began a new study of multiple awardees in response to questions raised in congressional hearings. We surveyed companies with five or more Phase II SBIR awards to identify commercialization activity using procedures similar to those described in the three-year study.

In preliminary analyses, conducted jointly with SBA's Office of Advocacy, it was found that there was no drop-off in commercialization activity as companies win more Phase II awards. In fact, there was a small but significant increase in commercialization activity.

A second analysis, independent of commercialization, found that SBIR awards should not be considered concentrated among a relatively small number of companies. A measure used by the Department of Justice, which quantifies the degree of market concentration among competing businesses, was applied to SBIR companies (who compete for the "market" of SBIR awards). The measure was much smaller than the threshold value for distinguishing between concentrated and unconcentrated markets.

In the rest of this section, we present examples of SBIR program participants to illustrate the types of commercialization activity that is now underway.

KALSI ENGINEERING, INC.

Kalsi Engineering, Inc. of Sugarland, Texas is a mechanical engineering firm that has developed and marketed products for nuclear utility companies and for the drilling industry.

Kalsi is an SBIR success story. The company has made a real contribution to increased safety at nuclear facilities by developing a product that can predict problems under operating conditions and inform management of the steps needed to ensure safe and proper operation.

Kalsi's management makes the point that more than 50 percent of the company's growth is due to the SBIR Program which has stimulated a broad range of follow-on products and sales.

On the drilling side Kalsi, with assistance from SBIR, has developed technology that improves the life of drill bits so that the actual cost of oil and gas drilling is reduced.

A breakdown of the firm's business shows that 30 percent of the output is research and development (mainly software) and 70 percent are products sold on the market. Ninety percent of Kalsi's business is with the private sector and about 25 percent of the company's revenue is attributable to commercial products developed under the SBIR Program. Kalsi has received SBIR awards from both the Nuclear Regulatory Commission and the Department of Energy.

Production has been steady with annual sales projected in the \$1-2 million range. The firm is involved with manufacturing, marketing and finances its own operations.

Kalsi Engineering received its first SBIR award in 1987. They have been an active and successful competitor for four more awards since then and expect to continue their positive endeavors in the SBIR Program and commercialization.



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BERKELEY SYSTEM DESIGN, INC.

Berkeley System Design is located in Berkeley, California. It is the story of dramatic growth through strong, positive interaction between the SBIR Program and a group of socially conscious private sector entrepreneurs.

Berkeley System Design produces software for the visually impaired. Through the use of magnified icons, they have developed ways of allowing those with limited vision to use their personal computers. Even more remarkable, the firm has developed a "mouse" that sees for the totally blind allowing them, through speech synthesis, to use computers.

The product is an inexpensive software accessory which enhances selected parts of the computer screen allowing the use of standard PC's and software packages without special equipment or modifications.

Making this available opens the doors for the partially sighted to the mainstream of personal, educational and employment opportunities.

About 95 percent of the firm's business is devoted to research and development with the same percent of the firm's business directed toward the private sector.

When Berkeley System Design entered the SBIR Program in 1985 with a \$50,000 award from the Department of Health and Human Services, it had approximately 10 employees. In what can only be described as spectacular growth, the firm has grown by a factor of twelve and now has 125 full-time workers. Products developed under the SBIR Program are an important contributor to the firm's annual revenue.

Production for the two products that have been developed with SBIR assistance is "steady" and with sales have been in the "under a million" range.

At the present time Berkeley Software Design is seeking a licensing agreement for the manufacture of these products. They are doing their own marketing and are financing themselves.

Management at BSD says that they would not have pursued the development of these products and technologies without the SBIR Program and believe about 10 percent of the company's growth is due to participation in the program. Moreover, they believe that 100 percent of the growth is due to follow-on product development and sales.

Berkeley Software Design has competed successfully for four Phase I awards and two Phase II awards. The awarding agencies were HHS (five) and DOE (one).

ADVANCED MAGNETICS, INC.

Advanced Magnetics, Inc. is located in Cambridge, Ma. where its principle business is in the research and development area.

The firm has more than doubled since first participating in the SBIR Program and now has 53 full-time employees. Unlike many other SBIR awardees, Advanced Magnetics devotes 100 percent of its effort to research and development; 98 percent of its business is with the private sector.

Under the SBIR Program, the firm has developed a tumor detection drug. It is licensed to a pharmaceutical house for sale in Europe where it has been shown to image the site of tumors with greater specificity than has been possible by other methods.

In the United States the firm has been collaborating with the Department of Radiology at the Massachusetts General Hospital where it has used "ferrite-based contrast agents" that act to provide powerful image contrast for tumor identification. Further, the improved magnetic resonance agents provide significant clinical advantages in studying the physiology and metabolism of organs.



SBIR SUCCESS STORIES

Production of the drug has just started and sales, at this point, are less than a million dollars. However, next year sales are expected to reach the \$5-10 million range.

Advanced Magnetics received its SBIR support from the Department of Health and Human Services in 1986.

At this point Advanced Magnetics is seeking a licensing agreement to help in further commercialization of the product. When U. S. Food and Drug Administration approval is obtained, marketing will begin in the United States. Meanwhile agreements have been signed for sales in Japan and Europe.

Jerome Lewis of Advanced Magnetics' management team says that the firm would not have pursued the development of this product without participating in the SBIR Program. Moreover, management believes that about 30 percent of the firm's growth is attributable to having participated in the SBIR Program and that although so far there has been no growth related to follow-on product development, "this will change in a few years".

Advanced Magnetics has received its SBIR awards from the Department of Health and Human Services. Phase I awards in 1986, 1988 and 1992 each totaled \$50,000. In 1992 a second Phase I award was made by HHS for \$49,997. Phase I awards totaled \$199,997.

Phase II awards were made by HHS in 1988 for \$494,000 and in 1991 for \$268,634 for a total of \$762,634. The total of Phase I and Phase II awards is \$962,631.

BROWN ASSOCIATES, INC.

Brown Associates, Inc. is located in Sterling, New Jersey. Headed by its founder and president Dr. John A. Brown, the company's main busi-

ness is contract research and development. Brown Associates has four full-time employees. Its SBIR Program awards were provided by the U.S. Army.

The current business mix between the firm's research and development, and products sales shows that about 95 percent of the firm's activity is in the R&D area. Further, the government rather than the private sector, purchases about 95 percent of what Brown and Associates produces.

The firm's management confirms that 80 percent of the business for the government is research and development and is funded by the SBIR Program. About 5 percent of the company's revenue is attributable to commercial products developed under the SBIR Program.

As a result of participation in the SBIR Program, Brown and Associates, Inc. has developed, financed and marketed a protective goggle for use in hazardous situations.

Production has just begun and have sales. Next year they are expected to increase to the \$1-2 million range. In this context, the firm is actively seeking a licensee to "ramp-up production and the marketing of the goggle".

Brown's main purchaser is the U.S. government where the firm expects to sell 90 percent of its product.

Management confirms that they would not have pursued the development of this technology without the SBIR Program award and that not only has the company grown, it "survived as a result". Dr. Brown goes further and says that 95 percent of the company's growth is due to having participated in the SBIR Program. About 5 percent of the growth is due to follow-on product development and sales.

Brown and Associates received an SBIR Phase I Program award in 1986 for \$48,834. In 1987, Brown received a Phase II award of \$75,000.



CONAX BUFFALO CORPORATION, INC.

Conax Buffalo is a hi-tech corporation located in Buffalo, N.Y. and has been a pioneer in optical fiber technology.

Now owned by IMI of Britain, Conax Buffalo employs some 180 people in a business that is split evenly between research and development and the manufacture of products. About 90 percent of the firm's business is done with the private sector.

Conax Buffalo developed two products with SBIR awards from the Navy, NASA and the Department of Transportation; the first is a temperature sensor probe, the second is a sealed fiber optic cable that can be maintained in a vacuum so that it is not subject to humidity or pressure. The purchasers of these products are aircraft developers and others needing a fast-response optical-fiber temperature gauge that is erosion resistant.

The temperature sensor probe has been "ruggedized" for use in gas turbines and provides a response in 10-100 milliseconds in sustained operations up to 1700 degrees Celsius. Among the results are advances in the ground testing of jet engines and fast-response temperature controllers for nuclear reactors and power generation transformers.

Production on both products is in the early stages and sales, so far, are less than a million dollars for each.

With the sale to IMI, financial decisions are, for the most part, made by IMI management in England. Conax Buffalo, however, remains heavily involved in marketing and manufacturing.

Management at Conax Buffalo asserts that they would not have pursued the development of these technologies and products without the SBIR Program. Moreover, according to management, the SBIR Program has been an important factor in sustaining Conax Buffalo's growth. Along these lines, about 40 percent of the company's growth is thought

to derive from the company's participation in the SBIR Program. About 50 percent of this growth is due to follow-on sales and product development.

Clearly the SBIR Program has had a substantial impact on research, development and the manufacture and marketing of new high technology products and is thus serving America's continued advance in the aeronautics and space arena.

RESERVOIR SIMULATION RESEARCH

Reservoir Simulation Research is located in Tulsa, Oklahoma where it produces and sells software to the petroleum industry.

Though the firm remains small, the number of full-time employees has increased fourfold from the time the firm first began its participation in the SBIR Program. At the present time, about 10 percent of the firm's activity is in the research and development area while the rest is in the production of items for sale.

One hundred percent of Reservoir Simulation Research's sales are to the private sector and management believes that more than 15 percent of the firm's revenue is attributable to products developed under the SBIR Program.

The firm's products are purchased by oil company geologists to help in the recovery of reserves. The SBIR generated product has proven to "work consistently" by improving the ability to predict petroleum reserves and reduce the risks associated with flooding in the field.

Production of the software has been generated with sales in the \$2-5 million range up from less than a million last year. SBIR support for this product came from the National Science Foundation.



SBIR SUCCESS STORIES

At this point, according to Larry Young, president of Reservoir Simulation Research, the firm is seeking purchasing or distribution agreements overseas. He adds, "We are manufacturing and marketing domestically, and financing ourselves."

Management asserts that they would not have pursued the development of this product without the SBIR Program. Moreover, the firm has grown as a result of its participation. More specifically, about 20 percent of the firm's growth is attributable to the SBIR Program and 100 percent of that is due to follow-on product development and sales. Reservoir Simulation Research received its first SBIR award in 1984 and has continued to succeed in achieving additional funds.

ROSS-HIME DESIGNS, INC.

Ross-Hime Design, Inc. of Minneapolis, Minnesota develops and manufactures state-of-the-art robotic devices for use in extreme environments.

The firm exemplifies SBIR at its best. The firm's six SBIR Program awards from NASA and the Department of Energy have been critical to Ross-Hime's development as a national leader in the field of applied robotics.

Today, Ross-Hime's robots are used in settings ranging from outer space to automobile painting facilities.

Key to the firm's success was SBIR support for the firm's development of a computer controlled "wrist" module for spray painting automobiles that allowed human beings to avoid the toxic environment, and the associated illnesses, that often accompany spray painting in closed areas.

NASA used the SBIR Program to encourage Ross-Hime's development of products to assist with space station construction, satellite maintenance

and interplanetary exploration. In particular, Ross-Hime's robots assist astronauts in hazardous extra-vehicular activities. And, of course, Ross-Hime also produces walking and industrial robots for use here on earth.

Some 70 percent of Ross-Hime's business is research and development and 90 percent of the firm's business is done with the government. About 15 percent of the firm's business is funded by SBIR, and 20 percent of the firm's revenue is attributed to commercial products like the wrist module and other robots developed under the SBIR Program.

Ross-Hime has successfully competed for over one million dollars in SBIR awards and will continue as an active participant.

ROBOCOM SYSTEMS, INC.

Robocom Systems, Inc. of Massapequa, N.Y., produces hardware and software for warehousing systems. The company's product provides warehouse management with a mechanized inventory system for use in outdoor areas and buildings at remote sites. It eliminates the problems inherent in a "paper-driven" system by using data terminals linked by radio that give "on-line" information. The result is that inventory control is increased and errors on what is "in stock, what isn't and where it is," are decreased.

Robocom's management stated they would not have developed these products without the SBIR Program.

SBIR has been central to Robocom's growth. Robocom has 50 full-time employees, up from 15 when it first received an SBIR Program award from the U.S. Navy. Some 90 percent of the company's business is in the sale of products rather than research and development. The firm is strongly oriented toward private-sector needs and developments.



DISTRIBUTION OF SBIR AWARDS

The maps on the following pages show the distributions of fiscal 1993 SBIR awards (Phase I plus Phase II) by state. For a more detailed look at the geographical distribution of SBIR awards, the amount of funding by metropolitan area (as defined by the Census Bureau) is shown in Exhibit 1. The metropolitan areas are listed in order of their population in millions (column 1).

The next two columns show the SBIR funding (Phase I plus Phase II) for fiscal 1993 and the number of awards made to that metropolitan area. The last two columns show the cumulative funding and SBIR awards per metropolitan area.

As reported last year, most SBIR awards in past years and also in fiscal 1993 go to large metropolitan areas. However, small towns and rural settings are major participants in the SBIR Program. Just over \$215 million have been awarded to communities with populations under 125,000. As a group, these communities would be in the top five of all metropolitan areas in terms of total cumulative dollars awarded. In fiscal year 1993, the following areas received their first SBIR awards: Kokomo, IN and Medford, OR

The metropolitan areas were also ranked by total SBIR funding, fiscal 1983–93. The top 50 areas are shown in Exhibit 2. Large metropolitan areas dominate the ranking: 17 of the first 25 have over one million population. The ranking is not very different from last year. The biggest gains were rendered by Albany-Schenectady, NY (from 45th place to 37th place) and Roanoke, VA (34 to 29). Poughkeepsie, NY and Madison, WI (49th place and 50th place respectively) were new to the list.

Lastly, the metropolitan areas were ranked by total number of cumulative awards. In this exhibit, localities that are not part of a Metropolitan Statistical Area (generally with population less than 500,000) rank 6th in total SBIR awards received. Many of the communities with a large number of SBIR awards, are located near major universities or government laboratories.

Technology investment policies followed by SBIR participating agencies are reflected in the amount of funding for awards made in various technology areas. Those areas are described and listed in Exhibit 4.

Exhibit 5 summarizes, by participating agency, the dollar amount of fiscal 1993 funding made in each technology area. The accompanying graph in Exhibit 6 illustrates the fiscal 1993 technology distribution for all agencies combined. Exhibits 7 and 8 show corresponding distributions for the entire program to date—that is, fiscal 1983–93.

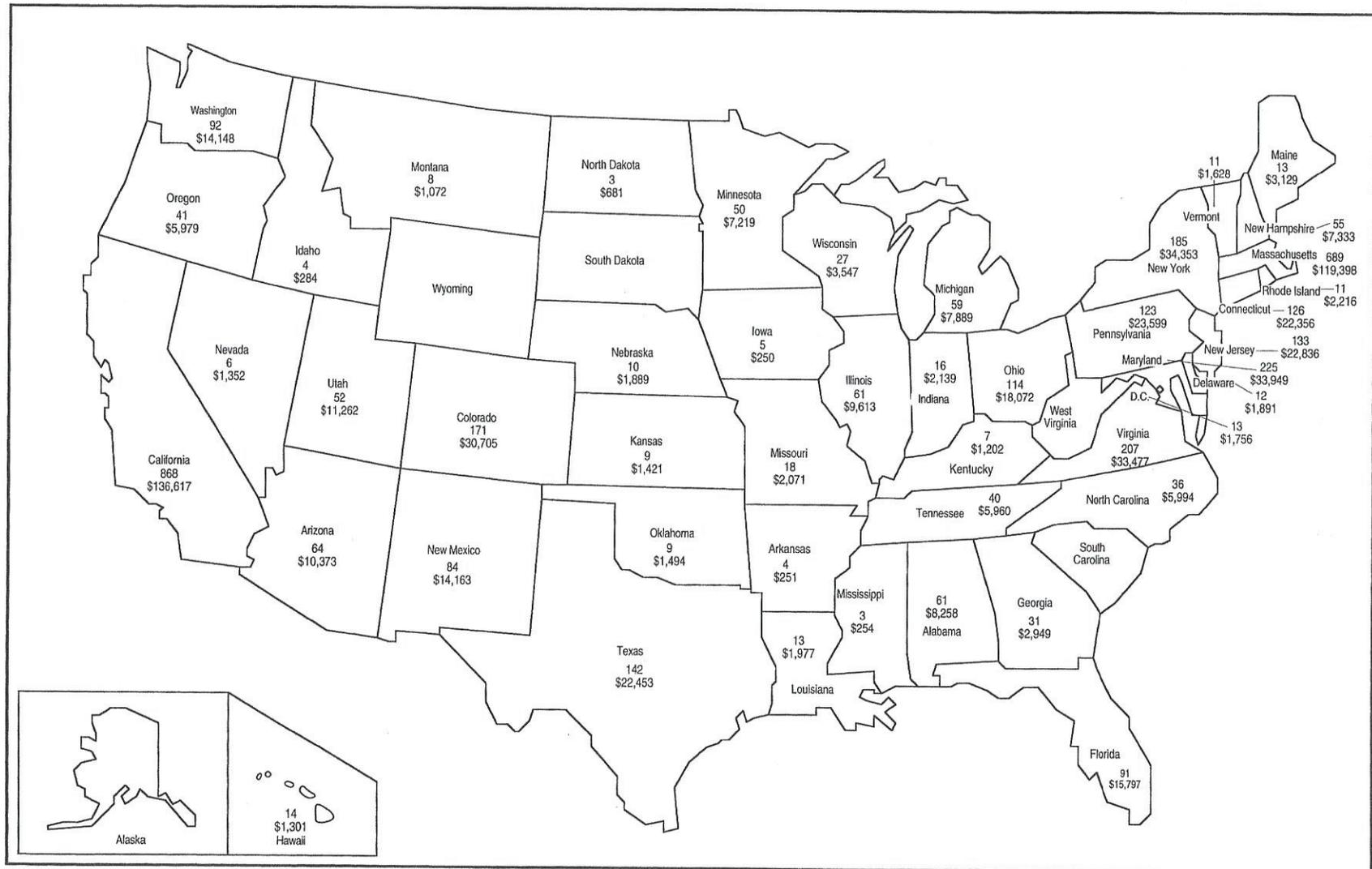
In fiscal 1993, the Optical Devices and Lasers leads the way in funding with \$70 million in awards. Electronic Device Performance shows the most significant increase in funding with awards totaling more than \$37 million. Other technology areas that have significant increases in funding are, Computer and Communication Systems, Microelectronics, Electronic Equipment and Instrumentation, Aerodynamics, Mechanical Measurements, Medical Instrumentation and Biotechnology and Microbiology. With regard to the cumulative funding in Exhibit 7, the Information Processing and Management area still maintains a slight lead over Optical Devices and Lasers.



GEOGRAPHIC DISTRIBUTION

FISCAL 1993 PHASE I AND PHASE II AWARDS

(value in thousands)



GEOGRAPHIC DISTRIBUTION

FISCAL 1993 PHASE I AND PHASE II AWARDS TO MINORITY COMPANIES

(value in thousands)

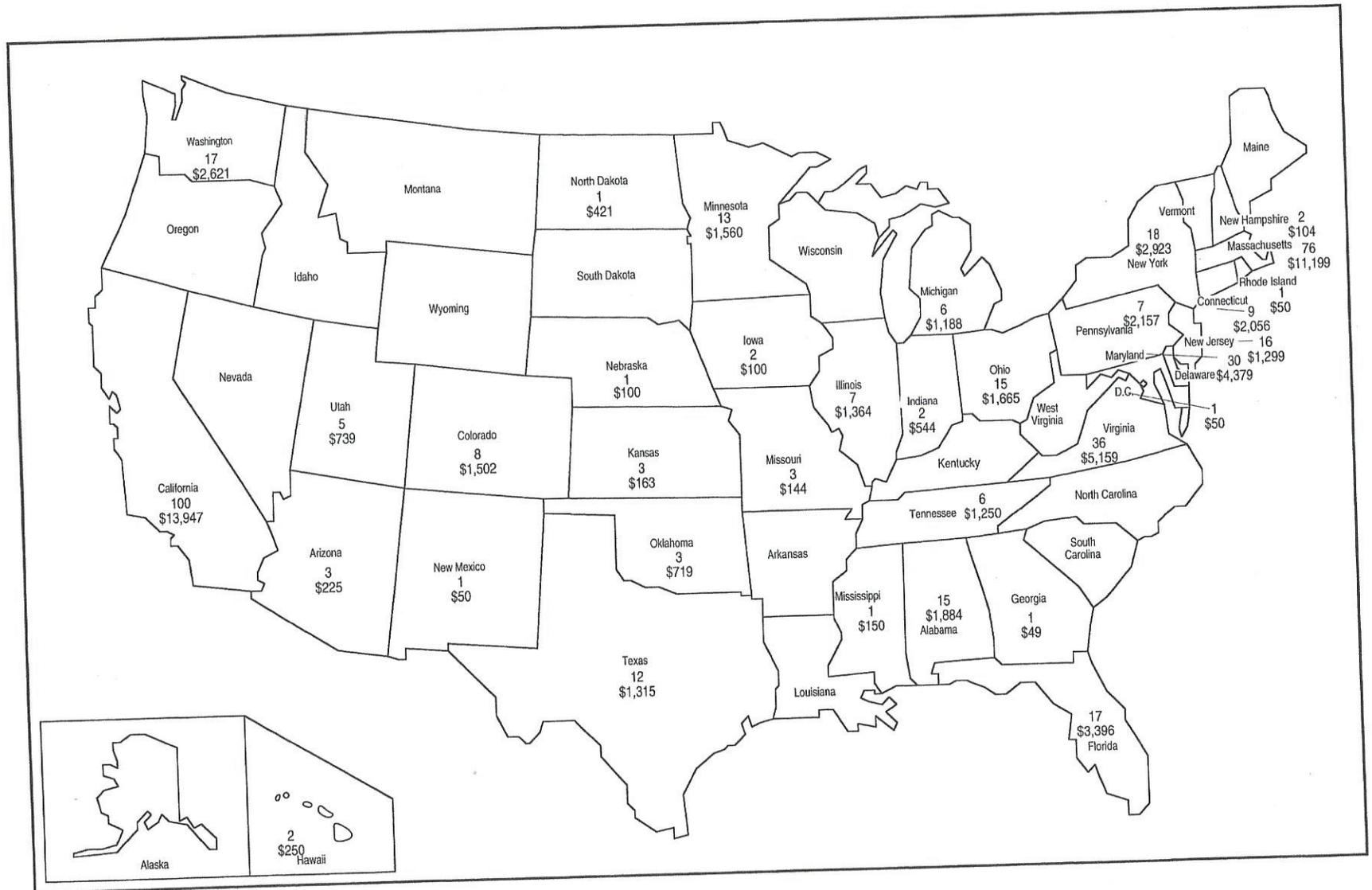


EXHIBIT ONE

DISTRIBUTION OF SBIR FUNDING BY METROPOLITAN AREAS (ordered by population)

<i>Metropolitan Area</i>	<i>Population (M)</i>	<i>FY93 (\$K)</i>	<i>FY93 No. of Awards</i>	<i>FY83-93 (\$K)</i>	<i>FY83-93 No. of Awards</i>
NEW YORK AREA	15529	26887	158	116121	739
LOS ANGELES AREA	13074	47170	309	309551	1888
CHICAGO-LAKE COUNTY	7381	7302	50	49151	298
PHILADELPHIA AREA	5697	24504	124	124410	759
BAY AREA (SF)	5534	53540	334	308948	1882
DETROIT-ANN ARBOR, MI	4600	5900	48	43204	276
BOSTON AREA	4055	107793	619	529804	3220
DALLAS-FT. WORTH AREA	3655	4387	26	26373	156
HOUSTON, GALVESTON, TX	3634	6347	47	32222	226
WASHINGTON, DC-MD-VA	3565	50065	314	285150	1831
MIAMI-FT. LAUDERDALE, FL	2912	1230	7	4001	30
CLEVELAND-AKRON AREA	2765	4017	20	15288	103
ATLANTA, GA	2560	2900	30	19750	140
ST. LOUIS, MO-IL	2438	550	11	6288	47
PITTSBURGH-BEAVAR VALLEY, PA	2316	3655	24	21103	139
MINNEAPOLIS-ST PAUL, MN-WI	2295	7085	48	43822	297
SEATTLE-TAKOMA AREA	2284	11664	73	70314	426
BALTIMORE, MD	2280	8888	67	43817	294
SAN DIEGO, CA	2201	27380	172	156056	953
TAMPA-ST PETE-CLEARWATER, FL	1914	781	7	2659	22
PHOENIX, AZ	1900	2598	22	16304	124
DENVER-BOULDER-LONGMONT, CO	1847	26249	148	98568	660
CINCINNATI-HAMILTON, OH, KY, IN	1690	1397	9	5275	35
MILWAUKEE-RACINE, WI	1552	686	5	5749	37
KANSAS CITY, MO-KS	1517	1371	8	4172	32
NEW ORLEANS, LA,	1334	471	8	5559	50

<i>Metropolitan Area</i>	<i>Population (M)</i>	<i>FY93 (\$K)</i>	<i>FY93 No. of Awards</i>	<i>FY83-93 (\$K)</i>	<i>FY83-93 No. of Awards</i>
NORFOLK-VA BEACH-NEWP. NEWS	1309	2145	15	10446	79
COLUMBUS, OH	1299	1577	8	14597	89
SACRAMENTO, CA	1291	468	8	11721	76
SAN ANTONIO, TX	1276	2222	21	11369	86
INDIANAPOLIS, IN	1212	304	6	3351	28
BUFFALO-NIAGRA AREA	1181	5656	29	31657	173
JACKSONVILLE+DAYTONA BEACH	1173	50	1	766	5
PORTLAND, OR	1152	1064	8	8357	53
PROVIDENCE-PAWTUCKET	1108	4303	15	17933	105
CHARLOTTE-GASTONIA	1065	46	1	206	4
SALT LAKE CITY-OGDEN, UT	1041	10912	50	49267	302
OKLAHOMA CITY, OK	982	750	5	2584	21
ROCHESTER, NY	980	2795	21	15084	87
HARTFORD-NEW BRITAIN-BRISTOL	967	6323	40	38963	232
LOUISVILLE, KY-IN	962	550	2	1999	14
MEMPHIS, TN-AR-MS	959	283	3	1799	16
MIDDLESEX-SOMMERSET	950	4491	28	21264	152
MONMOUTH-OCEAN, NJ	935	2348	8	6267	42
DAYTON-SPRINGFIELD, OH	933	8841	57	48109	275
NASHVILLE, TN	930	450	7	2721	27
BIRMINGHAM, AL	911	1839	12	4703	33
GREENSBORO-WINSTON SALEM-HILLTOP	899	50	1	2839	18
ORLANDO, FL	898	5207	20	23017	128
ALBANY-SCHENECTADY, NY	843	4667	24	16467	111
HONOLULU, HI	816	1301	14	11257	71
RICHMOND-PETERSBERG, VA	810	603	3	2033	14

EXHIBIT ONE

DISTRIBUTION OF SBIR FUNDING BY METROPOLITAN AREAS (ordered by population)

<i>Metropolitan Area</i>	<i>Population (M)</i>	<i>FY93 (\$K)</i>	<i>FY93 No. of Awards</i>	<i>FY83-93 (\$K)</i>	<i>FY83-93 No. of Awards</i>	<i>Metropolitan Area</i>	<i>Population (M)</i>	<i>FY93 (\$K)</i>	<i>FY93 No. of Awards</i>	<i>FY83-93 (\$K)</i>	<i>FY83-93 No. of Awards</i>
WEST PALM BEACH-BOCA RATON-	755	1113	6	6276	29	CHATTANOOGA, TN-GA	425	2398	14	6896	39
STOCKTON-MODESTO, CA	749	50	1	1185	6	LANSING-E LANSING, MI	424	424	5	4251	28
TULSA, OK	733	125	2	4542	35	WORCESTER, MA	407	1292	11	15408	89
AUSTIN, TX	726	5702	27	24236	147	SAGINAW-BAY CITY-MIDLAND, MI	403	177	2	1247	9
SCRANTON	725	50	1	660	4	CANTON, OH	400	40	1	420	5
ALLENTOWN-BETHLEHEM, PA-NJ	656	2129	13	5894	45	YORK, PA	397	50	1	250	3
RALEIGH-DURHAM, NC	650	5848	33	33058	216	LANCASTER, PA	393	2674	15	15503	73
SYRACUSE, NY	649	969	5	5244	35	JACKSON, MS	392	0	0	276	3
GRAND RAPIDS, MI	648	0	0	244	2	DES MOINES, IA	381	50	1	2326	17
OMAHA, NE-IA	614	100	1	591	8	COLORADO SPRINGS, CO	380	4389	22	17716	103
TOLEDO, OH	611	1908	16	6812	46	MELBOURNE-TITUSVILLE-PALM BEACH, FL	361	3982	24	25313	142
GREENVILLE-SPARTANBURG, SC	606	0	0	506	5	SPOKANE, WA	356	593	7	3581	23
TUCSON, AZ	602	7675	39	24932	161	FORT WAYNE, IN	356	0	0	346	3
NEW HAVEN-MERIDEN-MIDDLETON	597	7389	35	33535	199	MADISON, WI	344	2727	19	10603	68
KNOXVILLE, TN	591	2979	17	30900	168	SALINAS-SEASIDE-MONTEREY, CA	339	578	1	2688	16
HARRISBURG-LEBANON-CARLISLE	577	0	0	510	6	SANTA BARBARA-SANTA MARIA, CA	339	6643	37	32091	192
LAS VEGAS, NV	569	694	3	4544	23	PENSACOLA, FL	337	811	3	3351	19
EL PASO, TX	561	0	0	50	1	LEXINGTON, KY	332	602	4	1785	16
BATON ROUGE, LA	540	1448	4	2132	9	READING, PA	321	0	0	538	2
SPRINGFIELD, MA	517	1636	14	5980	46	UTICA-ROME, NY	315	2689	11	5197	34
YOUNGSTOWN, OH	510	50	1	100	2	APPLETON-OSHKOSH-NEENAH, WI	307	33	1	890	6
LITTLE ROCK-N LITTLE ROCK, AR	505	50	1	1390	8	ATLANTIC CITY, NJ	297	69	1	1372	7
CHARLESTON, SC	485	0	0	475	4	EUGENE-SPRINGFIELD, OR	263	1073	12	8409	51
ALBUQUERQUE, NM	474	12088	67	58871	367	SALEM, OR	262	183	4	3083	21
WICHITA, KS	470	0	0	279	3	BINGHAMTON, NY	261	0	0	3374	13
COLUMBIA, SC	444	0	0	409	3	NEW LONDON-NORWICH, CT-RI	259	826	8	3343	30
FLINT, MI	434	0	0	1114	5	POUGHKEEPSIE, NY	256	3210	18	11014	85

EXHIBIT ONE

DISTRIBUTION OF SBIR FUNDING BY METROPOLITAN AREAS (ordered by total dollars per capita)

Metropolitan Area	Population (M)	FY93 (\$K)	FY93 No. of Awards	FY83-93 (\$K)	FY83-93 No. of Awards	Metropolitan Area	Population (M)	FY93 (\$K)	FY93 No. of Awards	FY83-93 (\$K)	FY83-93 No. of Awards
DULUTH, MN-WI	243	0	0	35	1	REDDING, CA	133	0	0	49	1
SOUTH BEND-MISHAWAKA, IN	241	0	0	1416	12	PASCAGOULA, MS	128	54	1	348	4
PROVO-OREM, UT	240	350	2	2917	18	BURLINGTON, VT	124	1578	10	6460	42
ANCHORAGE, AK	235	0	0	543	2	LAFAYETTE-W LAFAYETTE, IN	124	146	3	3973	22
HUNTSVILLE, AL	233	6046	46	46094	272	LAS CRUCES, NM	123	409	8	7215	42
ROANOKE, VA	224	5969	35	23267	161	BLOOMINGTON-NORMAL, IL	122	0	0	196	2
RENO, NV	224	658	3	6345	30	CHARLOTTESVILLE, VA	121	1019	9	6003	39
TALLAHASSEE, FL	218	50	1	244	3	BRYAN-COLLEGE STATION, TX	120	3831	21	10325	71
KALAMAZOO, MI	217	493	1	1193	7	LAWTON, OK	120	619	2	3492	15
PORTSMOUTH, DOVER, ROCHESTER	215	568	7	3262	23	STATE COLLEGE, PA	114	299	3	2535	23
WATERBURY, CT	211	3340	8	19363	95	BELLINGHAM, WA	113	650	4	1788	9
PORTLAND, ME	205	2218	11	8035	52	MIDLAND, TX	111	48	1	646	4
GAINESVILLE, FL	199	1476	12	10232	73	FAYETTEVILLE-SPRINGDALE, AR	107	201	3	2195	14
WACO, TX	187	0	0	50	1	SANTA FE, NM	106	1263	8	12094	62
YAKIMA, WA	183	0	0	250	3	BLOOMINGTON, IN	101	600	3	4970	29
CHAMPAIGN-URBANA-RANTOUL, IL	171	2262	10	9344	57	KOKOMO, IN	101	50	1	50	1
ASHEVILLE, NC	170	0	0	340	4	ROCHESTER, MN	98	50	1	295	3
CEDAR RAPIDS, IA	168	200	4	2171	12	FITCHBURG-LEOMINSTER, MA	96	685	4	2678	23
NASHUA, NH	163	414	8	3714	28	ELMIRA, NY	90	2230	14	14528	85
TOPEKA, KS	160	0	0	1165	6	BISMARK, ND	86	0	0	51	1
WATERLOO-CEDAR FALLS, IA	151	0	0	555	3	BANGOR, ME	83	0	0	132	3
OLYMPIA, WA	146	642	4	2413	17	PITTSFIELD, MA	80	50	1	586	5
FARGO-MOOREHEAD, ND-MN	145	0	0	50	1	VICTORIA, TX	76	0	0	374	4
MANCHESTER, NH	145	128	2	1580	8	CASPER, WY	71	0	0	33	1
JACKSON, MI	144	0	0	250	3	GRAND FORKS, ND	69	260	2	1159	8
ATHENS, GA	141	0	0	2323	15	NOT in Metropolitan Area	0	26073	158	133501	854
MEDFORD, OR	140	50	1	50	1						

EXHIBIT TWO

SBIR AWARDS BY METROPOLITAN AREAS (ordered by total dollars, Fiscal 83-93)

<i>Metropolitan Area</i>	<i>Population (M)</i>	<i>FY93 (\$K)</i>	<i>FY93 No. of Awards</i>	<i>FY83-93 (\$K)</i>	<i>FY83-93 No. of Awards</i>
BOSTON, LAWRENCE, SALEM, LOWEL	4055	107793	619	529804	3220
LOS ANGELES AREA	13074	47170	309	309551	1888
BAY AREA (SF)	5534	53540	334	308948	1882
WASHINGTON, DC-MD-VA	3565	50065	314	285150	1831
SAN DIEGO, CA	2201	27380	172	156056	953
PHILADELPHIA AREA	5697	24504	124	124410	759
NEW YORK AREA	15529	26887	158	116121	739
DENVER-BOULDER-LONGMONT, CO	1847	26249	148	98568	660
SEATTLE-TAKOMA AREA	2284	11664	73	70314	426
ALBUQUERQUE, NM	474	12088	67	58871	367
SALT LAKE CITY-OGDEN, UT	1041	10912	50	49267	302
CHICAGO-LAKE COUNTY	7381	7302	50	49151	298
DAYTON-SPRINGFIELD, OH	933	8841	57	48109	275
HUNTSVILLE, AL	233	6046	46	46094	272
MINNEAPOLIS-ST PAUL, MN-WI	2295	7085	48	43822	297
BALTIMORE, MD	2280	8888	67	43817	294
DETROIT-ANN ARBOR, MI	4600	5900	48	43204	276
HARTFORD-NEW BRITAIN-BRISTO	967	6323	40	38963	232
NEW HAVEN-MERIDEN-MIDDLETON	596	7389	35	33535	199
RALEIGH-DURHAM, NC	650	5848	33	33058	216
HOUSTON, GALVESTON, TX	3634	6347	47	32222	226
SANTA BARBARA-SANTA MARIA, CA	339	6643	37	32091	192
BUFFALO-NIAGRA AREA	1181	5656	29	31657	173
KNOXVILLE, TN	591	2979	17	30900	168
DALLAS-FT.WORTH AREA	3655	4387	26	26373	156

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MELBOURNE-TITUSVILLE-PALM BEACH, FL	361	3982	24	25313	142
TUCSON, AZ	602	7675	39	24932	161
AUSTIN, TX	726	5702	27	24236	147
ROANOKE, VA	224	5969	35	23267	161
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MIDDLESEX-SOMMERSET, NJ	950	4491	28	21264	152
PITTSBURGH-BEAVER VALLEY, PA	2316	3655	24	21103	139
ATLANTA, GA	2560	2900	30	19750	140
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PROVIDENCE-PAWTUCKET-FALL R	1108	4303	15	17933	105
COLORADO SPRINGS, CO	380	4389	22	17716	103
ALBANY-SCHENECTADY, NY	843	4667	24	16467	111
PHOENIX, AZ	1900	2598	22	16304	124
LANCASTER, PA	393	2674	15	15503	73
WORCESTER, MA	407	1292	11	15408	89
CLEVELAND-AKRON AREA	2765	4017	20	15288	103
ROCHESTER, NY	980	2795	21	15084	87
COLUMBUS, OH	1299	1577	8	14597	89
ELMIRA, NY	90	2230	14	14528	85
SANTA FE, NM	106	1263	8	12094	62
SACRAMENTO, CA	1291	468	8	11721	76
SAN ANTONIO, TX	1276	2222	21	11369	86
HONOLULU, HI	816	1301	14	11257	71
POUGHKEEPSIE, NY	256	3210	18	11014	85
MADISON, WI	344	2727	19	10603	68

* per capital rate is obtained by dividing by the population in millions.

EXHIBIT THREE

SBIR AWARDS BY METROPOLITAN AREAS (ordered by FY 83-93 decreasing # of awards)

Metropolitan Area	Pop. (M)	FY93 (\$K)	FY93 No. of Awards	FY83-93 (\$K)	FY83-93 No. of Awards
BOSTON, LAWRENCE, SALEM, LOWEL	4,055	107793	619	529804	3220
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EXHIBIT FOUR

TECHNOLOGY AREAS

1000 COMPUTER, INFORMATION PROCESSING, ANALYSIS

1100 Computer and communication systems

- 1110 Computer systems technology
- 1120 Communication and control systems
- 1130 Networks and architectures
- 1140 Computer security

1200 Information processing and management

- 1210 Data and information processing
- 1220 Artificial intelligence
- 1230 Computer software
- 1240 Robotics and automation
- 1250 Man machine interface

1300 Signal and image processing

- 1310 Signal processing
- 1320 Image processing
- 1330 Navigation, guidance, positioning

1400 Systems studies

- 1410 General studies
- 1420 Operations and systems analysis
- 1430 Safety systems, health and risk analysis

1500 Mathematical sciences

- 1510 Math fundamentals
- 1520 Numerical modeling
- 1530 Math modeling

2000 ELECTRONICS

2100 Microelectronics

- 2110 Microelectronics:materials, concepts, processing
- 2120 Compound semiconductors
- 2130 Photovoltaics
- 2140 Optoelectronics

2200 Electronics device performance

- 2210 Electronic device performance,
packaging, reliability
- 2220 Radiation damage and hardening
- 2230 Testability

2300 Electronic equipment and instrumentation

- 2310 Electronic equipment and systems
- 2320 Data and information processing equipment
- 2330 Sensors, transducers, instrumentation

2400 Electromagnetic radiation/propagation

- 2410 RF technology
- 2420 Electronic warfare
- 2430 Target detection
- 2440 Metal and mine detection

2500 Microwave and millimeter wave electronics

- 2510 Microwave electronics
- 2520 Millimeter wave electronics

2600 Optical devices and lasers

- 2610 Optical and IR sensors, components
- 2620 Optical fiber technology
- 2630 Laser technology
- 2640 Higher frequency EM radiation

EXHIBIT FOUR

TECHNOLOGY AREAS

3000 MATERIALS

3100 Advanced materials

- 3110 Metallic, magnetic, highT, conducting & superconducting materials
- 3120 Polymers
- 3130 Ceramics
- 3140 Composites and lightweight materials
- 3150 Construction materials
- 3160 Fire, fabric, and insulation materials
- 3170 EM transparent materials
- 3180 Biomaterials

3200 Materials processing and manufacturing

- 3210 Materials processing
- 3220 Manufacturing methods
- 3230 Joining and welding technology
- 3240 Separation/characterization of multiphases

3300 Coatings, corrosion and surface phenomena

- 3310 Corrosion
- 3320 Coatings
- 3330 Thin films and surfaces

3400 Materials performance

- 3410 Failure, fracture, fatigue
- 3420 Lubrication, wear and seals
- 3430 Repair
- 3440 Non-destructive evaluation

3500 Fundamentals and instrumentation

- 3510 Materials fundamentals/general
- 3520 Instrumentation

4000 MECHANICAL PERFORMANCE OF VEHICLES, WEAPONS, FACILITIES

4100 Hydrodynamics

- 4110 Hydrodynamics
- 4120 Watercraft

4200 Aerodynamics

- 4210 Fundamental aerodynamics
- 4220 Aerodynamic performance
- 4230 Aerodynamic facilities, instrumentation

4300 Acoustics

- 4310 Underwater acoustic detection and communication
- 4320 Vibration related acoustics

4400 Mechanical performance of structures and equipment

- 4410 Shock vibration and structural performance of vehicles, facilities, equipment
- 4420 New structural concepts
- 4430 Performance of engine, equipment, mechanical components
- 4440 Weapons performance and effects

4500 Control

- 4510 Control concepts
- 4520 Vehicle/weapon motion control
- 4530 Structural controls

4600 Mechanical measurements

- 4610 Mechanical measurements (pressure, velocity, etc.)

EXHIBIT FOUR

TECHNOLOGY AREAS

5000 ENERGY CONVERSION AND USE

5100 Transport sciences

- 5110 Fluid mechanics
- 5120 Flow/fluid measurement and enhancement
- 5130 Heat transfer
- 5140 Refrigeration/cryogenics

5200 Propulsion/combustion technology

- 5210 Propulsion systems
- 5220 Propellants, fuels, explosives
- 5230 Combustion
- 5240 Fire detection
- 5250 Exhaust gases & gas analysis

5300 Large scale energy usage

- 5310 Industrial energy processes and utilization
- 5320 Physics, nuclear physics, fusion and plasma
- 5330 Energy use in buildings

5400 Energy conversion/electric power

- 5410 Batteries, fuel cells, eletrochemistry, energy storage
- 5420 Alternative energy conversion
- 5430 Electric power technology

6000 ENVIRONMENT & NATURAL RESOURCES

6100 Ocean science

- 6110 Ocean science and instrumentation

6200 Atmospheric sciences

- 6210 Atmospheric science and monitoring
- 6220 Remote sensing
- 6230 Chemical and biological measurement
- 6240 Particulates and aerosols
- 6250 Pollution abatement and environment control

6300 Water management

- 6310 Water monitoring and characterization
- 6320 Water treatment
- 6330 Water management and utlization
- 6340 Ice, snow, frost detection

6400 Earth sciences

- 6410 Earth sciences
- 6420 Soil measurement and manipulation

6500 Environment protection

- 6510 Nuclear, chemical, biological waste management
- 6520 CBR defense

EXHIBIT FOUR

TECHNOLOGY AREAS

7000 LIFE SCIENCES

7100 Medical instrumentation

- 7110 Medical measurements
- 7120 Measurements/techniques for radiation/imagery
- 7130 Medical devices
- 7140 Devices/systems for physically impaired

7200 Biotechnology and microbiology

- 7210 Biotechnology and genetic engineering
- 7220 Cellular biology
- 7230 Drugs, vaccines, toxicity, immunology, therapeutic agents
- 7240 Disease detection and screening

7300 Behavioral sciences

- 7310 Behavior, human factors, cognition
- 7320 Training, testing, simulation
- 7330 Social studies

7400 Physiology and miscellaneous

- 7410 Physiological mechanisms, injury, miscellaneous
- 7420 Dental
- 7430 Food, nutrition, agriculture
- 7440 Biotic resources
- 7450 Animal models and veterinary medicine
- 7460 Plant physiology

EXHIBIT FIVE

FISCAL 1993 PHASE I AND I I AWARDS BY TECHNOLOGY AREA AND AGENCY

(dollars in thousands)

	DOD	DOE	NASA	HHS	NSF	DOT	EPA	NRC	ED	DOA	DOC	TOTAL
1000 COMPUTER, INFORMATION PROCESSING, ANALYSIS												
1100 COMPUTER AND COMMUNICATION	39502	2220	4232	7858	3513	721	50	150	584	98	103	59032
1200 INFORMATION PROCESSING	34026	2074	12007	9482	2136	149	50	0	542	200	429	61096
1300 SIGNAL AND IMAGE PROCESSING	26144	2194	8180	4868	1340	1011	0	0	40	150	433	44359
1400 SYSTEMS STUDIES	9137	0	980	2822	366	425	50	295	199	200	0	14474
1500 MATHEMATICAL SCIENCES	4395	573	5056	1131	100	0	0	300	0	0	200	11755
2000 ELECTRONICS												
2100 MICROELECTRONICS	37975	1986	2533	1035	3825	441	0	0	0	50	35	47878
2200 DEVICE PERFORMANCE	18998	1745	10043	4241	1148	341	150	50	346	536	104	37701
2300 EQUIPMENT/INSTRUMENTATION	28124	4021	7425	3823	1639	275	200	200	216	550	409	46882
2400 EM RADIATION/PROPAGATION	31207	871	50	230	728	50	0	0	0	49	35	33221
2500 MICROWAVE/MM WAVE	8968	1499	910	500	50	0	0	0	0	0	0	11926
2600 OPTICAL DEVICES AND LASERS	43686	5126	12788	4602	3176	299	149	300	0	265	233	70625
3000 MATERIALS												
3100 ADVANCED MATERIALS	33064	6061	10282	3941	3419	575	550	49	0	785	269	58995
3200 PROCESSING/MANUFACTURING	10142	2808	3129	1436	2398	0	750	0	0	370	400	21433
3300 COATINGS/CORROSION	20535	3423	7018	2323	3107	150	800	0	0	230	35	37619
3400 MATERIALS PERFORMANCE	9322	1319	2976	547	1249	400	0	0	0	125	35	15973
3500 FUNDAMENTALS/INSTRUMENTATION	3544	2224	3064	2714	1439	273	200	177	0	0	35	1367

*multiple technology areas assigned to awards

Note: Totals have been computed using a newer more advanced and exacting computational system. This system will be used for all future generations of this report.

EXHIBIT FIVE

FISCAL 1993 PHASE I AND II AWARDS BY TECHNOLOGY AREA AND AGENCY

(dollars in thousands)

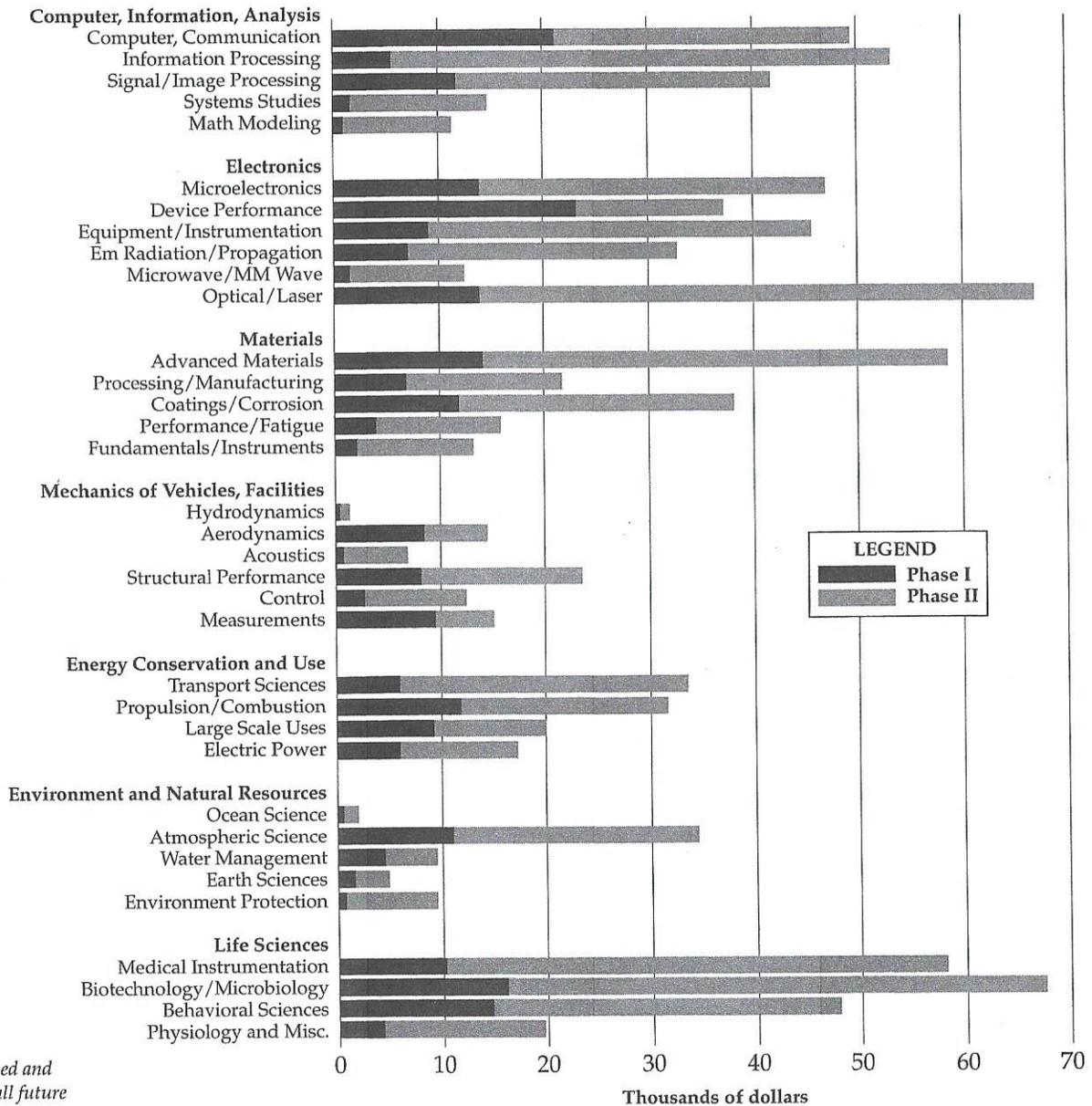
	DOD	DOE	NASA	HHS	NSF	DOT	EPA	NRC	ED	DOA	DOC	TOTAL
4000 MECHANICAL PERFORMANCE OF VEHICLES, WEAPONS, FACILITIES												
4100 HYDRODYNAMICS	64	499	0	0	0	0	0	0	0	0	0	563
4200 AERODYNAMICS	10840	0	3518	50	199	370	0	0	0	50	35	15063
4300 ACOUSTICS	5549	75	0	0	299	0	0	0	0	0	200	6123
4400 STRUCTURAL PERFORMANCE	18679	575	2370	1050	944	368	0	0	40	0	0	24026
4500 CONTROL	5364	1149	4090	500	249	73	0	145	0	0	0	11571
4600 MECHANICAL MEASUREMENTS	7224	1562	2591	1799	695	145	100	49	118	100	69	14453
5000 ENERGY AND CONVERSION USE												
5100 TRANSPORT SCIENCES	15268	4454	9817	3085	340	150	150	300	0	620	35	34220
5200 PROPULSION/COMBUSTION TECHNOLOGY	15842	5942	6366	625	946	1394	250	0	0	270	70	31706
5300 LARGE SCALE ENERGY USAGE	6706	10587	148	1392	1075	0	100	0	0	50	235	20292
5400 CONVERSION/ELECTRIC POWER	9153	4048	3604	299	650	0	150	0	0	50	0	17954
6000 ENVIRONMENT & NATURAL RESOURCES												
6100 OCEAN SCIENCE	1000	0	0	0	0	0	0	0	0	0	200	1200
6200 ATMOSPHERIC SCIENCES	14445	5679	5006	3946	2329	572	2100	0	0	510	339	34926
6300 WATER MANAGEMENT	6637	0	579	768	998	0	450	0	0	189	35	9656
6400 EARTH SCIENCES	2498	150	50	250	1404	0	100	150	0	359	0	4961
6500 ENVIRONMENTAL PROTECTION	5072	2000	944	411	250	0	600	427	0	0	0	9705
7000 LIFE SCIENCES												
7100 MEDICAL INSTRUMENTATION	5105	2035	1665	44932	1591	425	100	0	1394	530	0	57779
7200 BIOTECHNOLOGY AND MICROBIOLOGY	3026	2609	1086	57575	2139	0	50	0	0	1333	35	67852
7300 BEHAVIORIAL SCIENCES	22768	2148	636	17893	1681	224	200	100	1217	638	69	47574
7400 PHYSIOLOGY AND MISCELLANEOUS	2250	150	2511	11578	433	0	50	0	40	2857	35	19904

*multiple technology areas assigned to awards

EXHIBIT SIX

DISTRIBUTION OF FISCAL 1993 PHASE I AND II AWARDS AMONG TECHNOLOGY AREAS

(multiple technology areas assigned to awards)



Note: Totals have been computed using a newer more advanced and exacting computational system. This system will be used for all future generations of this report.

EXHIBIT SEVEN

FISCAL 1983-93 PHASE I AND II AWARDS BY TECHNOLOGY AREA AND AGENCY

(dollars in thousands)

		DOD	DOE	NASA	HHS	NSF	DOT	EPA	NRC	ED	DOA	DOC	Total
1000	COMPUTER, INFORMATION PROCESSING, ANALYSIS												
1100	COMPUTER/COMMUNICATION	147315	14194	28930	29063	9350	3728	50	710	3550	627	497	238015
1200	INFORMATION PROCESSING	214549	21284	79829	59026	15447	3269	250	842	6767	1838	1165	404268
1300	SIGNAL AND IMAGE PROCESSING	163916	10820	40556	23080	8311	5256	0	431	563	500	1994	255426
1400	SYSTEMS STUDIES	70483	5816	7450	16027	2135	1710	250	3091	837	2036	0	109833
1500	MATHEMATICAL SCIENCES	66852	3556	44871	12167	7543	346	200	2246	188	279	270	138518
2000	ELECTRONICS												
2100	MICROELECTRONICS	153107	14975	25843	1417	15671	491	0	243	0	50	70	211867
2200	ELECTRONICS DEVICE PERFORMANCE	50407	4925	14117	8950	1587	741	150	498	346	536	104	82361
2300	EQUIPMENT/ INSTRUMENTATION	139943	35913	43927	23466	9634	3465	1924	1357	1510	2791	1124	265054
2400	EM RADIATION/PROPAGATION	179049	2815	4957	2094	1793	1383	397	50	0	49	685	193272
2500	MICROWAVE /MM WAVE	52888	6113	12474	1090	374	0	0	0	0	0	227	73166
2600	OPTICAL /LASERS	230525	44406	68400	34321	16530	3189	1018	1603	30	1130	1719	402869
3000	MATERIALS												
3100	ADVANCED MATERIALS	185107	52123	52755	18298	17517	5747	1896	49	0	3852	604	337948
3200	PROCESSING/MANUFACTURING	57305	34060	26537	9809	14771	1058	4217	300	0	1724	734	150515
3300	COATINGS/ CORROSION	107506	24437	29017	13746	14961	499	2986	50	0	849	70	194122
3400	MATERIALS PERFORMANCE	68883	14631	18201	1186	10120	4861	250	965	0	1565	270	120933
3500	FUNDAMENTALS/ INSTRUMENTATION	16662	8459	11590	19313	7724	422	1048	226	0	242	735	66421

*multiple technology areas assigned to awards

Note: Totals have been computed using a newer more advanced and exacting computational system. This system will be used for all future generations of this report.

EXHIBIT SEVEN

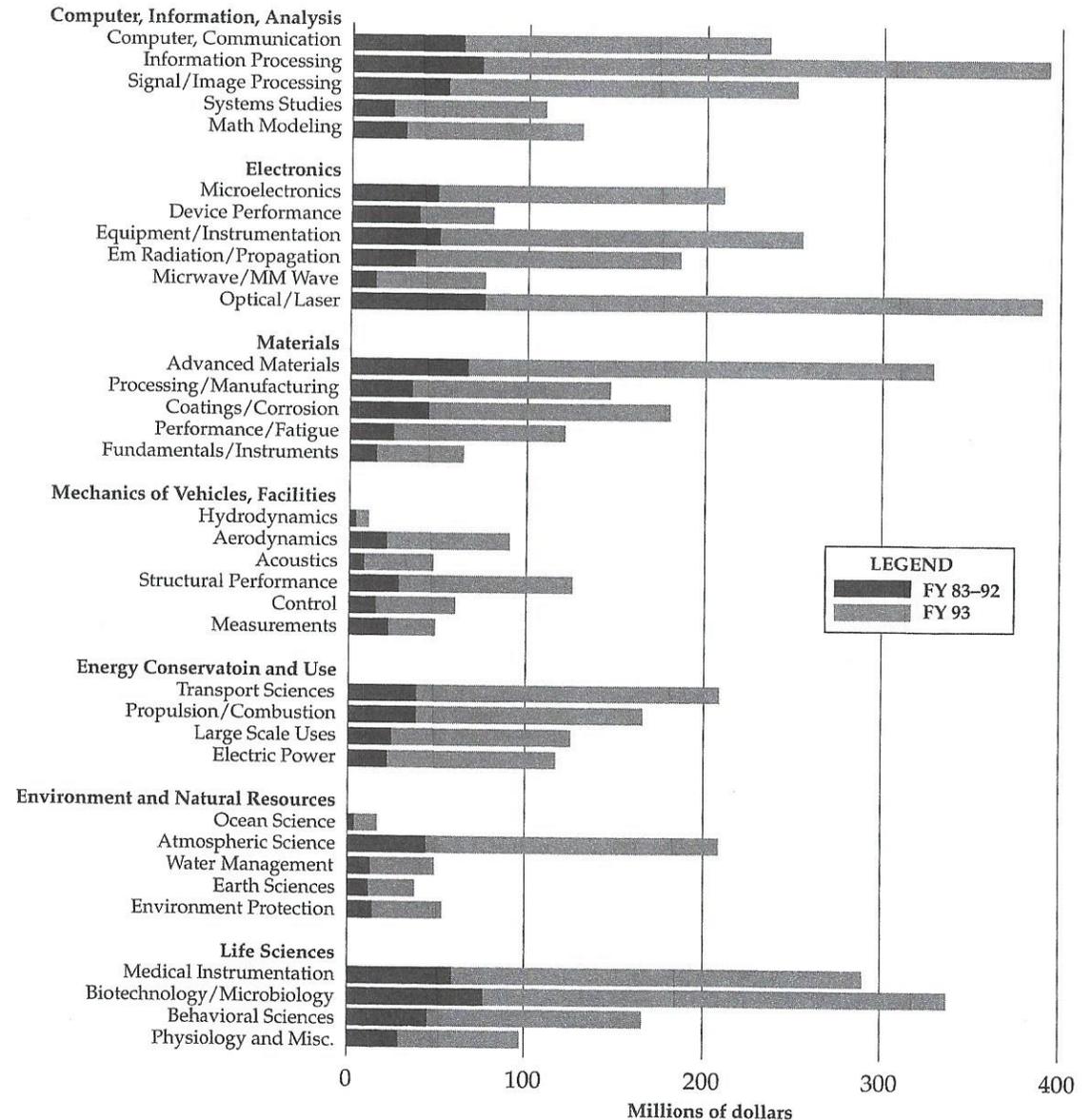
FISCAL 1983-93 PHASE I AND II AWARDS BY TECHNOLOGY AREA AND AGENCY (dollars in thousands)

	DOD	DOE	NASA	HHS	NSF	DOT	EPA	NRC	ED	DOA	DOC	Total
4000	MECHANICAL PERFORMANCE OF VEHICLES, WEAPONS, FACILITIES											
4100	5852	1099	720	0	329	97	0	0	0	0	229	8326
4200	49390	537	42930	50	1263	1515	0	0	0	50	70	95805
4300	38675	2093	4132	614	348	349	0	50	529	0	791	47581
4400	100133	2855	15410	3351	4029	2217	0	200	70	245	0	128509
4500	27750	7834	20827	1932	1983	1147	0	345	0	240	0	62056
4600	25320	4323	9426	2532	2210	1126	100	199	118	100	104	45559
5000	ENERGY AND CONSERVATION USE											
5100	83056	30429	67716	17961	5237	299	659	1309	0	2045	35	208748
5200	86045	35431	35012	2493	5370	2696	2698	0	0	726	70	170542
5300	19271	88055	4544	4350	4575	346	425	475	0	610	505	123156
5400	56077	27114	20020	5610	6930	0	746	0	0	839	0	117336
6000	ENVIRONMENT & NATURAL RESOURCES											
6100	8775	2345	2205	0	1453	0	0	0	0	0	2307	17084
6200	73079	35764	39576	27200	12798	3416	12124	50	0	2757	3113	209876
6300	18424	2341	11000	2434	5420	701	4205	288	0	2540	242	47594
6400	12663	14201	1790	300	7461	396	400	541	0	1920	197	39869
6500	21943	10992	2608	511	3414	839	10767	903	0	471	0	52450
7000	LIFE SCIENCES											
7100	19248	7437	10298	243788	5164	1485	100	0	9508	1360	0	298387
7200	22234	14960	4226	282601	14785	350	976	50	224	7860	70	348336
7300	61603	2148	7814	75220	5396	3402	200	300	8252	3018	69	167423
7400	6869	3203	11169	42969	8667	692	224	0	70	24456	1302	99621

*multiple technology areas assigned to awards

EXHIBIT EIGHT

DISTRIBUTION OF FISCAL 1983-93 PHASE I AND II AWARDS AMONG TECHNOLOGY AREAS (multiple technology areas assigned to awards)



Note: Totals have been computed using a newer more advanced and exacting computational system. This system will be used for all future generations of this report.

SBIR ADMINISTRATIVE ISSUES

During fiscal year 1993 the Office of Innovation, Research and Technology implemented every mandated element of P.L. 102-564. The Small Business Research and Development Act of 1992.

Policy Directives

The Small Business Innovation Research (SBIR) Program Policy Directive was completely updated to reflect all changes established by P.L. 102-562. The Policy Directive was published in the Federal Register, with a public comment period, as well as in final for the governing of the SBIR Program throughout the federal government.

The newly created Small Business Technology Transfer (STTR) Program was established in the five agencies with a billion dollars or more of research and research and development budget funding. A new Policy Directive was developed and published in the Federal Register with a comment period and in final to establish the STTR Program.

Expanded Electronic Public Access

Continuing our automation efforts internally as well as externally, the Office of Innovation, Research and Technology established the accessibility of the Pre-Solicitation Announcements on the SBA bulletin board in August of 1993. Additional awardee data was made available through the National Technical Information Service (NTIS) and the ground work laid to also make it available in early FY 94 on the SBA bulletin board system.

National Conferences – Fiscal Year 1993

The Department of Defense and the National Science Foundation held three extremely successful conferences for SBIR interested firms in Washington, DC, Phoenix and Minneapolis. Plans call for three conferences during FY 94 in Washington, DC, Seattle and Houston.

Program Awareness and Training

An 8a contract was let to create several documents and packages for the extension of programmatic information on both the SBIR and STTR programs. These will be dual use pieces to be used for training agency personnel as well as informing the public of the latest developments caused by P.L. 102-564.

In addition to the aforementioned visual graphic aids, the STTR Program hotline was created to handle incoming requests.

SBIR Program Expansion

The percentage of R&R&D expenditures by each of the participating agencies increased to 1.5 percent for both fiscal years 1993 and 1994.

Goaling Program

Repeated attempts to acquire legislated R&D procurement data for the goaling program was unsuccessful at the Department of Treasury, Department of Veteran Affairs and the TVA.

National Technology Transfer Center (NTTC)

In cooperation with the NTTC SBIR awardees, history files have been established. Each year the file will be updated to reflect the latest awardees as well as deleting those Phase I recipients not receiving a Phase II award within two fiscal years of the original award. Each project contains standard identifying data as well as a two-hundred word technical abstract.