

**U.S. Small Business Administration**



**SMALL BUSINESS  
INNOVATION  
RESEARCH PROGRAM  
(SBIR)**

**ANNUAL REPORT - FY 1998**

**Office of Technology  
U.S. Small Business Administration**

# TABLE OF CONTENTS

<b>Overview</b>	<b>1</b>
<b>Introduction</b>	<b>3</b>
<b>Program Services</b>	<b>6</b>
<b>Program Data</b>	<b>7</b>
<b>Success Stories</b>	<b>14</b>
<b>Distribution of SBIR Awards</b>	<b>17</b>
<b>Administrative Issues</b>	<b>18</b>

# **OVERVIEW**

The Small Business Innovation Development Act of 1982, Public Law 97-219, directs the U.S. Small Business Administration (SBA) to establish policy for, monitor, evaluate and report on accomplishments of the Small Business Innovation Research (SBIR) program. This, the 16<sup>th</sup> annual report on the SBIR program, summarizes program activities and results for FY 1998.

Public Law 97-21 was signed on July 22, 1982. Congress reauthorized the SBIR program in 1986, and again in 1993, extending it to October 1, 2000. It also mandated an increase in the percentage of research and development (R&D) funds that participating Federal agencies must direct to small business under the program from 2 percent to 2.5 percent.

In contemplating program reauthorization in 1992, Congress concluded that technological innovation creates jobs, increases productivity and economic growth, and serves as a counter force to inflation and the Nation's balance-of-payments deficit. Congress also found that while the small business sector is the Nation's principal source of significant innovation, large businesses, universities and Government laboratories historically have conducted the vast majority of Federally funded R&D.

In FY 1998, the SBIR program continued to demonstrate that with focused program support from the Federal Government, small high-tech firms could convert basic ideas and research into commercial products. In so doing, these firms increase national productivity, and contribute to American leadership in the competitive international marketplace. This partnership between the Government and private sector has proved to be remarkably effective.

Over a 16-year period, Federal agencies participating in the SBIR program have awarded more than 50,000 awards worth over \$8.6 billion to thousands of small high-tech companies. The innovative concerns that have received awards have applied their ingenuity and inventiveness to fulfilling Federal R&D requirements and to creating profitable commercial products. These products encompass a wide range of industries and technologies, from the familiar to the exotic.

SBIR program highlights since FY 1983 include the following:

- In response to 213 solicitations issued by participating Federal agencies, small high tech businesses have submitted 304,681 proposals. These proposals have resulted in 50,468 awards worth over \$8.6 billion.
- Successful commercial sales arising from SBIR awards come from an ever-broadening range of technologies and industries such as laser manufacture, medical research, robotics and military decision-making.
- New products and techniques emerging from SBIR awards support America's competitiveness worldwide, and improve the lives of people here and abroad.
- Surveys by SBA and the General Accounting Office indicate that at least 25 percent of SBIR award recipients have reported commercial success of SBIR-supported product(s) within 4 years of receiving a Phase II award.
- Small disadvantaged and women-owned businesses have received a significant portion of SBIR awards.

Despite their talent, determination and entrepreneurial spirit, many small high-tech businesses could not have commercialized innovation without the unique support of this program. As the company profiles and statistics in this report suggest, an increasing number of firms are succeeding in commercializing new products, processes and services derived from SBIR awards.

In administering and managing the SBIR program, SBA and its Office of Technology encourage small high-tech enterprises to respond to solicitations from agencies participating in the program. A number of participating small businesses are winning multiple awards. This is an understandable development that reflects their continuing spirit of innovation.

# INTRODUCTION

## The Rationale

The rationale for enactment of Public Law 97-219, was to give small, innovative enterprises a greater role in Federally-funded R&D. The law's goals were to develop the Nation's base for creative technical achievement, and to increase markets for ideas developed by America's small high-tech businesses.

Public Law 97-219 recognized that small businesses -- especially technically oriented firms -- were responsible for most new products, processes and technologies. It also recognized that these firms were particularly adept at turning R&D activities into viable commercial products. In many cases, the only thing such small firms needed to succeed was financial assistance.

The SBIR program has yielded many small business successes. These successful businesses have created many new jobs, expanded the Nation's tax base, and bolstered America's economic viability and productivity.

## Legislative Background

Public Law 97-219 requires that, beginning in FY 1983, each Federal agency having an extramural research and research and development (R&R&D) budget in excess of \$100 million in FY 1982, or any year thereafter, set aside a portion of such requirements for competitive award under the SBIR program. Through a 4-year phase-in period, civilian agencies were required to increase the percentage of their R&R&D set-asides from 0.2 percent in FY 1983 to 1.25 percent in FY 1986. The Department of Defense was allowed 5 years to phase in its increase from 0.01 percent in FY 1983, to 1.25 percent in FY 1987.

The Small Business Research and Development Enhancement Act of 1982 (Public Law 102-564) extended the SBIR program to October 1, 2000. It also incrementally increased the percentage of annual extramural R&R&D funds that participating Federal agencies must direct to small high-tech firms from 1.25 percent to 2.5 percent.

Public Law 102-564 sought to:

- Expand and improve the SBIR program.
- Emphasize increased private-sector commercialization of technology developed under the program.
- Increase small business participation in Federal research and development.
- Improve dissemination of SBIR program information to encourage participation of women-owned and socially and economically disadvantaged small businesses.

## Participating Federal Agencies

Pursuant to Public Law 97-219, the following Federal agencies are required to participate in the SBIR program:

- Department of Agriculture (DOA)
- Department of Commerce (DOC)
- Department of Defense (DOD)
- Department of Education (ED)
- Department of Health and Human Service (HHS)
- Department of Transportation (DOT)
- Environmental Protection Agency (EPA)
- National Aeronautics and Space Administration (NASA)
- Department of Energy (DOE)
- National Science Foundation (NSF)

## **SBIR Program Structure**

The SBIR program is structured in three phases:

- Phase I: Awards for up to \$100,000 are made for research projects designed to evaluate the feasibility, and the scientific and technical merit of an idea. Phase I awards are made for a period of up to 6 months.
- Phase II: Phase I projects with the most potential are funded for further development of the proposed idea. Phase II funding of up to \$750,000 may be awarded over a period of up to 2 years.
- Phase III: No SBIR funds may be used in this phase. Private-sector investment and support must be used to bring an innovation to market. However, as appropriate, Phase III funds may include follow-up contracts with Federal agencies for production of Phase II innovations.

## **The R&R&D Goaling Program**

In addition to establishing the SBIR program, Public Law 97-219 requires certain Federal agencies to participate in the Research and Research and Development (R&R&D) Goaling Program.

The law stipulates that any agency having a fiscal year budget for R&R&D in excess of \$20 million must establish goals for awarding funding agreements to small business. An agency's annual goal cannot be lower than that achieved during the previous fiscal year. In addition to the 10 agencies participating in the SBIR program, the following agencies participate in the R&R&D Goaling Program:

- Department of the Interior (DOI)
- Department of Justice (DOJ)
- Department of the Treasury (TR)
- Department of Veteran Affairs (DVA)
- Agency for International Development (AID)
- Smithsonian Institution (SI)
- Tennessee Valley Authority (TVA)

- Nuclear Regulatory Commission (NRC)

## **SBA Authorities and Responsibilities**

Under statute, SBA has authority and responsibility to:

- Develop, coordinate, issue and update a policy directive for the Federal Government-wide conduct of the SBIR and R&R&D Goaling Programs.
- Develop and administer an information and outreach program for the SBIR program.
- Develop and maintain a source and information file of interested small businesses.
- Develop, coordinate, publish and disseminate SBIR Pre-Solicitation Announcements.
- Survey, monitor and report on all SBIR programs.
- Report at least annually to Congress on all SBIR and R&R&D Goaling Programs and on SBA's monitoring activities.
- Coordinate private-sector commercialization of SBIR innovations.
- Obtain information on the current National Critical Technologies.

## **Authorities and Responsibilities for Participating Agencies**

Each participating agency has the authority and responsibility to:

- Determine the categories of projects to include in its SBIR program.
- Issue SBIR solicitations in accordance with a schedule determined cooperatively with the SBA.

- **Unilaterally determine research topics within each SBIR solicitation, giving special consideration to broad research topics and to topics that further one or more National Critical Technologies.**
- **Receive and evaluate proposals resulting from SBIR solicitations.**
- **Select awardees for SBIR funding agreements.**
- **Ensure that funding agreements under the SBIR program include provisions setting forth the respective rights of the United States and small businesses with regard to intellectual property rights and follow-on research.**
- **Administer SBIR funding agreements (or delegate such administration to another agency).**
- **Make payments to SBIR award recipients based on progress toward or completion of the funding agreement requirements.**
- **Submit annual reports on the SBIR and R&R&D Goaling Programs to the SBA.**

# **P**ROGRAM **SERVICES**

In setting SBIR program policy and in monitoring and evaluating the program, the SBA seeks to simplify and standardized grant and contract award procedures, minimize paperwork, and encourage small companies owned by women, minorities and disadvantaged individuals to participate in the program. The SBA also conducts an ongoing national information-and-outreach campaign, and ensures that participating agencies conform to SBIR policy directives.

The SBIR solicitation process minimizes administrative burden. It mandates timely receipt and review of proposals, peer review, and adherence to cost principles. Also, it establishes guidelines for proprietary-information, selection of awardees, data-rights retention, title to Government property, and cost sharing.

## **Pre-Solicitation Announcements**

The SBA's SBIR Pre-Solicitation Announcement to small businesses presents basic program solicitation information in a succinct and understandable manner. Each quarterly announcement provides complete information on all SBIR activity for that quarter, eliminating the need for small businesses to track the activities of each participating agency individually. The announcements are available from the SBA's electronic bulletin board, SBA OnLine, and on the Internet. The announcements provide small businesses with--

- A brief statement of each research topic, listed by participating agency;
- The opening and closing dates of each solicitation;

- An estimate of the number of awards to be made under each solicitation;
- The party to contact for a copy of the agency's solicitation; and,
- A master schedule of solicitation opening and closing dates for all participating agencies.

Other SBIR information available from SBA includes award winners from the latest available fiscal year and the SBIR Proposal Preparation Handbook.

## **Outreach**

SBA field representatives and public and private organizations play significant roles in dissemination of SBIR program information. During FY 1998, SBA worked with many organizations in conducting SBIR seminars and conferences, providing information, materials and speakers.

SBA has published an SBIR Program Book that provides information for use in training activities. This book is available to speakers throughout the country through SBA field offices.

Another form of outreach involves briefing officials of foreign governments. During FY 1998, foreign interest in the SBIR program continued to grow. SBIR-type programs are in place in the United Kingdom and other European countries.



# SBIR Program Data

*Fiscal Year 1998 SBIR Agency Obligations Summary (dollars in thousands)*

	DOA	DOC	DOD	DOE	DOT	ED	EPA	HHS	NASA	NSF	TOTAL
Agency Extramural Budget	466,910	265,440	22,319,892	3,048,666	138,169	202,570	313,700	10,819,519	3,832,000	2,170,000	43,576,866
Agency SBIR Budget	11,673	6,636	553,438	76,159	3,434	5,102	7,800	270,487	95,800	54,420	1,084,969
Dollars Obligated	12,648	6,821	597,288	76,185	6,173	5,102	4,920	271,643	95,922	52,774	1,129,476
Percent of SBIR to Extramural Budget	2.20%	2.57%	2.68%	2.50%	4.47%	2.52%	1.57%	2.51%	2.50%	2.43%	2.59%
Deficit/Surplus	975	185	43,850	26	2,719	0	-2,880	1,156	122	-1,646	44,507

*Fiscal Year 1998 Award Profile (dollars in thousands)*

	DOA	DOC	DOD	DOE	DOT	ED	EPA	HHS	NASA	NSF	TOTAL
Total Phase I Awards	77	45	1,286	204	21	41	37	761	339	211	3,022
Minority/Disadvantaged Phase I Awards	4	7	218	32	1	6	4	27	68	59	426
Total Phase II Awards	37	19	674	84	8	18	10	261	101	108	1,320
Minority/Disadvantaged Phase II Awards	2	3	155	11	1	2	3	11	22	20	230
Total Phase I Dollars Awarded (\$)	4,778	3,131	113,168	15,223	1,954	2,031	2,674	75,181	23,368	20,776	262,284
Minority/Disadvantaged Phase I Dollars (\$)	260	487	19,674	2,544	100	299	278	2,661	4,481	5,875	36,659
Total Phase II Dollars Awarded (Obligations)	7,870	3,690	426,384	60,962	4,219	3,070	2,246	191,578	72,432	31,998	804,449
Minority/Disadvantaged Phase II Dollars (\$)	225	500	102,064	8,246	249	500	671	1,487	8,105	5,955	128,002
Average Amount for Phase I Awards (\$)	62	70	88	75	93	50	72	99	69	98	87

*Fiscal Year 1998 Agency Solicitation Profile*

	DOA	DOC	DOD	DOE	DOT	ED	EPA	HHS	NASA	NSF	TOTAL
Number of Solicitations Released	1	1	2	1	1	1	1	2	1	1	12
Number of Research Topics in Solicitations	9	14	780	39	19	17	11	205	28	27	1,149
Number of Copies Distributed	12,000	4,000	42,000	3,000	6,000	2,500	500	9,000	25,000	20,000	124,000
Number of Phase I Proposals Received	420	374	9,157	1,191	246	231	326	2,828	2,367	1,635	18,775
Number of Phase II Proposals Received	57	53	1,086	191	26	49	30	548	277	163	2,480
Number of Phase I Awards	77	45	1,286	204	21	41	37	761	339	211	3,022
Number of Phase II Awards	37	19	674	84	8	18	10	261	101	108	1,320

*Dollars obligated can include modifications to previous year's awards: DOD \$57,733K HHS \$4,883K and NASA \$121K in non-SBIR funds.*

# **P**ROGRAM DATA

## **Reporting Requirements for SBIR and R&R&D Goaling**

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 is also required to report annually to the SBA on the number of grants, contracts, and cooperative agreements awarded that exceed \$10,000, and on the dollar value of all such awards. The agencies are also required to compare the number and amount of SBIR awards with awards to other than small business.

To monitor and report on the participating agencies' SBIR programs, SBA has established a reporting base to compare against each agency's budget data. To determine extramural obligations as a base for the size of each agency's SBIR program, Public Law 97-219 provides a definition of research and development that is identical to that contained in the Office of Management and Budget Circular A-11, "Preparation and Submission of Budget Estimates".

It should be noted that a 3-year budget cycle is used for establishing extramural R&R&D obligations. Within any given year, a participating agency's initial estimate can change due to congressional action on that agency's R&R&D budget. To ensure proper implementation of the program, each agency establishes an estimated budget as a basis for operations during the year. The SBA uses a system of deficits and credits to make the necessary adjustments during the course of the budget cycle. In this way, SBA determines whether agencies comply with SBIR set-aside requirements.

## **FY 1998 Summary**

There have been long-term upward trends in the number of Phase I, Phase II and total SBIR awards.

- In FY 1998, the 10 agencies participating in the SBIR program released a total of 12 Phase I solicitations. The Department of Health and Human Services and the Department of Defense each released two solicitations; the other eight agencies released one each.
- Participating agencies received 18,775 Phase I proposals from small high-tech enterprises. Agencies subsequently made 3,022 Phase I awards, representing 16.1 percent of proposals received.
- Some 2,480 Phase II proposals were received by participating agencies, resulting in 1,320 awards. These awards represented 53 percent of Phase II proposals received.
- In total, 21,255 Phase I and Phase II proposals were received in FY 1998. Some 4,342 Phase I and Phase II awards were made, representing 20 percent of the total number of proposals received.
- The number of SBIR proposals received has increased steadily over the years -- a trend that reflects past award successes and the ever-growing awareness and acceptance of the SBIR program within the small business community.

See Table 2 immediately following.

**Table 2: Number of SBIR Awards –  
FY 1983 through FY 1998**

Fiscal Year	Phase I	Phase II	Totals
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
94	3,102	928	4,030
95	3,085	1,263	4,348
96	2,841	1,191	4,032
97	3,371	1,404	4,775
98	<u>3,022</u>	<u>1,320</u>	<u>4,342</u>
Total	37,143	13,325	50,468

There have been parallel long-term upward trends in dollar value of Phase I, Phase II and total SBIR awards.

- During FY 1998, participating agencies awarded \$1.1 billion through the SBIR program.
- FY 1998 Phase I awards totaled \$262 million.
- Phase II awards aggregating \$804 million were made in FY 1998.
- In FY 1998, minority/disadvantaged-owned firms received 656 awards totaling \$164.6 million.

Please see Table 3, immediately following. (Note: The overall total includes \$62.7 million in modifications to non-FY 1998 awards and \$121 million in non-SBIR funds. In awarding funding agreements under Phase II, agencies utilize various acquisition methods of obligation and funding. (For purposes of consistency, the acquisition data in this report reflect only actual obligations during FY 1998.)

**Table 3: Value of SBIR Awards—  
FY 1983 through FY 1998  
(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	248.9	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
94	220.4	473.6	717.6
95	232.2	601.9	834.5
96	228.9	645.8	916.3
97	277.6	789.1	1,106.9
98	<u>262.3</u>	<u>804.4</u>	<u>1,066.7*</u>
Total	2,328.6	6,055.7	8,384.3*

FY 1999 EST: - \$1.5 billion

\*does not include award modifications

As in prior years, in FY 1998 SBA continued to use a system of deficits and credits to evaluate agency SBIR budgets against actual amounts obligated.

Through its SBIR Policy Directive, SBA requires each participating agency to list the number of Phase I awards made both within 6 months and after 6 months of the closing date of its solicitation announcement. Table 4 (immediately following) provides this information for FY 1998.

**Table 4: FY 1998– Phase I Time Frame**

Agency	Total FY98 Phase I Awards	No. within 6 Months of Solicitation Close	No. More Than 6 Months After Solicitation Close
DOA	72	0	72
DOC	45	45	0
DOD	1,286	1,226	60
DOE	204	0	204
DOT	21	20	1
ED	41	41	0
EPA	37	37	0
HHS	761	511	250
NASA	339	339	0
NSF	211	211	0
<b>TOTAL</b>	<b>3,368</b>	<b>2,947</b>	<b>421</b>

**Highlights of Cumulative Data**

The SBIR program continues to receive national acceptance and international recognition for quality performance. The following highlights accomplishments of the SBIR program since it began:

- Over \$8.6 billion has been awarded.
- Minority/disadvantaged-owned firms have received 6,176 awards, representing 12 percent of all SBIR awards. The value of these awards is \$1.6 billion, representing 19 percent of all dollars awarded under the program.
- Participating agencies received a total of 304,681 Phase I and Phase II proposals in response to 213 SBIR solicitations. A total of 37,143 Phase I and 13,325 Phase II awards have been made.
- Awards have been made to firms in all 50 states, Puerto Rico and the District of Columbia.
- Several participating agencies have allocated more for this program than required by law. In accordance with the law, each participating agency will continue to award at least 2.5 percent of its R&R&D extramural budget each fiscal year.

**R&R&D Goaling Agencies**

The SBA requires all annual reports for the R&R&D Goaling Program to include the following information:

- Total R&R&D obligations for the previous fiscal year.
- Total of the previous fiscal year's R&R&D dollars obligated to small businesses, minority and disadvantaged small businesses, and women-owned small businesses under funding agreements; and the percentage of each to the agency's total R&R&D obligations (data for women-owned small businesses are not required by law to be collected by the agencies, making the data incomplete).
- Total R&R&D budget for the current fiscal year.
- Total R&R&D small business goal for the current fiscal year based on the percentage of obligations made to small businesses the previous fiscal year.
- Current-fiscal-year achievement of the singular small business R&R&D goal and the dollars obligated through prime funding agreements in the following categories: small business, minority and disadvantaged small business, and women-owned small business.
- 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.

Please see Table 14 and Table 15.

To evaluate each agency's R&R&D Goaling Program, the SBA uses a final budget report from OMB entitled *Conduct of R&D by Agency*. This report details each agency's total R&R&D obligations for the reported fiscal year and provides R&D budget estimates for future years. The SBA then computes each agency's total R&R&D obligations to small

businesses, as reported to SBA, to determine the actual percentage of the R&R&D obligations awarded to small businesses.

In FY 1998, as in prior years, there was some difference between each agency's total R&R&D obligations as reported to the SBA and to OMB. Since the SBA uses the OMB data as the base, the percentage of an agency's awards that was given to small business may be higher or lower in this report than the percentage reported by the agency to the SBA.

Table 5: R&R&D Goaling Data - FY 1998

(dollars in thousands)

Agency	Agency %		Total R & D Budget	\$ Goal	Agency Reported \$ To Small Business		% Awarded		% Awarded To Minority/ Disadvantaged
	Goal FY98				\$	Disadvantaged	To Small Business	Minority/ Disadvantaged	
DOA	NR		1,394,577	NR	NR	NR	NR	NR	NR
DOC	NR		NR	NR	NR	NR	NR	NR	NR
DOD	NR		NR	NR	NR	NR	NR	NR	NR
DOE	1.1		5,855,282	66,750	57,958	1	2,618	0.4	0
DOI	0.1		679,239	240	390	0.4	0	0	0
DOT	24		567,000	136,080	100,040	17	67,594	12	12
ED	0.5		204,455	1,124	845	0.41	246	0.1	0.1
EPA	3.9		127,427	25,480	35,400	27.7	18,800	14.75	14.75
HHS	4.7		11,163,433	524,681	1,204,119	10.79	436,548	3.9	3.9
NASA	NR		NR	NR	NR	NR	NR	NR	NR
NSF	12		2,289,560	27,470	27,130	1.8	6,320	0.3	0.3
NRC	3.7		39,390	1,457	768	1.9	49	0.1	0.1
AID	0.8		79,500	636	8,600	1.1	301	0.3	0.3
DOJ	11		41,866	4,900	1,896	4.5	0	0	0
DVA	0.4		303,324	1,335	1,744	0.6	1,713	0.6	0.6
SI	NR		NR	NR	NR	NR	NR	NR	NR
TR	NR		NR	NR	NR	NR	NR	NR	NR
TVA	NR		NR	NR	NR	NR	NR	NR	NR

Table 6: R&R&D Goaling Data - FY 1998 (Continued)

Non-Small Business

Small Business

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	115	11,672	NR	NR	16	13,515	1,099	352,691	1,213	66,626
DOC	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
DOD	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
DOE	115	57,957	561	80,760	73	35,116	267	5,797	2,261	474,058	379	383,618
DOI	14	390	NR	NR	NR	NR	13	289	NR	NR	NR	NR
DOT	1,072	103,509	NR	NR	NR	NR	1,746	353,110	124	17,600	53	5,782
ED	65	5,103	4	846	NR	NR	20	37,794	410	111,064	17	40,097
EPA	70	7,900	NR	NR	NR	NR	26	13,300	NR	NR	NR	NR
HHS	1,228	523,243	1,276	255,425	16	7,752	3,126	681,639	30,166	4,107,609	3,070	885,996
NASA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
NSF	77	12,840	83	56,480	NR	NR	137	158,710	18,818	3,425,730	NR	NR
NRC	5	768	0	0	0	0	27	8,013	4	85	4	670
AID	23	79	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
DOJ	2	921	4	559	4	298	7	6,031	0	0	1	50
DVA	1	1,713	NR	NR	NR	NR	2	467	NR	NR	NR	NR
SI	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
TR	NR	NR	0	0	0	0	NR	NR	NR	NR	NR	NR
TVA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

NR = Not Reported

# **SUCCESS**

## **STORIES**

### **GENEX TECHNOLOGIES, INC.**

**Kensington, MD**

The world surrounding us is three-dimensional (3D), yet most existing cameras and display systems can only handle two-dimensional (2D) flat images that lack the depth cues. This fundamental restriction greatly limits the capability of human beings in perceiving and understanding the complexity of a 3D world.

Under the support of the SBIR program, Genex Technologies, Inc. (GTI) is determined to develop state-of-the-art 3D imaging and display technologies that can eliminate such fundamental limitations and to bring into market commercially viable products of 3D imaging and display systems.

Found in 1995 with several innovative ideas, GTI has been a leader in 3D imaging and display technologies with the help of the SBIR program. GTI's initial SBIR award was received from the Ballistic Missile Defense Organization (BMDO), Department of Defense, in 1996. GTI developed a unique real-time 3D imaging technique called the Rainbow 3D Camera that is able to acquire 3D image and surface measurement data at a video rate (30 frames per second).

Using this technique, GTI has further developed dental 3D imaging systems under a National Science Foundation sponsored SBIR award. The 3D dental imaging technique promises to eliminate traditional dental impressions, thus

revolutionizes current dental restoration practices and brings dentistry into a new era of digital dentistry. A commercialization arrangement has been made recently with a Dow Jones 30 company to further develop this technology into mass healthcare products.

GTI's Rainbow 3D camera is also used by reconstructive surgeons at Johns Hopkins University Hospital to provide quantitative measurement of the 3D shape of the breast during the consultation, planning, reconstructive surgery, and training for breast cancer treatment.

Supported by another SBIR award from BMDO in 1997, GTI has developed a video imaging technique called the omnidirectional camera that is able to acquire panoramic images without using any moving part. Dubbed as the OmniEye Camera, this technique can be used in the security and area surveillance as well as teleconferencing applications. GTI has now launched the OmniEye product line for security monitoring market.

GTI initiated the effort of developing a revolutionary volumetric 3D-display product in 1997 under the support from an Air Force SBIR award. The volumetric 3D-display technique is able to create 3D images floating in space. Viewers can see the 3D image as if a true object is set there, without using any special viewing aid. To date, four generations of prototypes have been developed, and case studies have been performed with Georgetown University Medical Center to use this technique in radiation therapy planning for increasing the effectiveness of cancer treatment.



The 3D imaging and display technologies and products have been featured on BBC TV "Tomorrows World" program, and Photonics and BioPhotonics Spectrum magazines. GTI has grown from a single person working at the basement of the founder's house into a company with three core product/technologies, and 14 highly talented people. The SBIR program has made a significant contribution to the success of GTI.

## **REI SYSTEMS, INC .** **Vienna, VA**

REI Systems was founded in 1989 by three engineers to address the management issues in distributed information systems. For its first successful business bid, the company responded to the 89-1 National Aeronautics and Space Administration (NASA) SBIR solicitation and also received a follow-on Phase II award in 1991. A web-based innovative paradigm, Electronic Handbooks (EHBs) and a set of software tools were developed under Phase II for managing complex distributed information processes in an integrated and intuitive environment. The successful implementation and deployment of EHBs for different NASA programs led to a Phase III award in August 1998. The prime objective of this on-going effort is to deploy an end-to-end Internet-based, paperless system supporting all SBIR/STTR management processes.

EHBs have proven themselves to be a cost-effective and efficient means of reengineering and modeling business processes. This unique methodology establishes a new approach to providing business solutions in a "faster, better, cheaper" way. The elegance of EHBs is that they not only guide the users through their roles, the EHBs are the system, and contains the necessary forms and menus that actually execute the defined processes. The Phase III funding will enhance the commercial potential of this technology and its applicability to any business process. The EHBs model has the potential to reduce the possibility of Government-wide, duplicate

funding among the Federal agencies' SBIR/STTR programs.

Major benefits of EHBs experienced by users include greater data accuracy and quality, faster turnaround time, synergy (common view) among all participants, imbedded e-mail features for effective communication, and rapid acceptance by a diverse distributed user community. The real time on-line information facilitates comprehensive reporting, analysis, and decision making.

EHBs have been implemented in diverse Federal programs. For example, the NASA Education Evaluation System was developed to facilitate the agency's program evaluation requirements with a cost effective, reliable, and secure approach. The Department of the Interior Property Disposal Management System allows DOI bureaus and offices to report available and exchange sale personal property for intra-agency screening. The Department of Justice's Bulletproof Vest Partnership Program will help states, local jurisdictions and Indian tribes obtain bullet-resistant vests for their public safety officers.

The DOJ's implementation of Internet-based EHBs system was announced recently by Vice President Gore for distribution of \$25M to jurisdictions nationwide. This system was recently selected as the Intergovernmental Open Systems Solution Gold Award Winner by the Federation of Government Information Processing Councils.

The SBIR sponsorship has enabled the company to grow to the current staff of 36. Annual revenues have increased from \$50,000 in 1990 to \$3 million projected for FY 1999. The company has grown from a basement operation to two corporate facilities occupying more than 7,000 sq. ft. in Vienna, Virginia and Calverton, Maryland.

The impact of the EHBs approach has been reviewed in several publications, including The Washington Post, Government Executive Magazine, Federal Computer Week, and Washington Technology. The company was nominated for the Regional Small Business Prime Contractor of the Year and received the

SBA "Administrator's Award for Excellence."  
REI was recently nominated for a NASA  
Space Act Award.

"The NASA SBIR program gave our  
corporation its foundation in the current  
explosive Internet technology marketplace.  
The web-based EHBs and role-based security  
provide us, today, the basis for deploying  
reliable and cost-effective information  
systems. This technology also gives us a  
competitive edge for developing faster and  
better paperless business solutions." - Veer  
Bhartiya, President

## **RADIOMETRICS CORP.**

### **Boulder, CO**

A scientist from the University of Colorado  
working with scientists and engineers from  
two small businesses founded Radiometrics  
Corporation (RC) in 1986. An SBIR award  
from the Department of Commerce funded  
the radiometer design, which included a  
number of innovations that were awarded  
United States and international patents. A  
follow-on SBIR award funded the  
development of a commercial prototype. Soon  
after the prototype was completed, the  
Japanese and Italians purchased RC  
radiometers. The success of RC's technology  
development and international marketing  
was acknowledged by the DOC through the  
award of a Silver Medal to the contract  
technical monitor.

Subsequently, the Department of Energy was  
looking for instruments that would measure  
water vapor for its global climate change  
research program. After careful evaluation,  
DOE bought its first RC radiometer and  
began extensive testing and comparison of a  
variety of water vapor sensing instruments.  
After the tests were completed, DOE  
established the RC radiometer as a primary  
instrument in its global change research  
program and became the second largest  
customer for RC radiometers.

The Department of the Army provided SBIR  
funds to RC for the development of a  
radiometer that would provide atmospheric  
temperature profiles for use in improving  
artillery accuracy. Once again, RC developed  
an innovative design that was awarded  
United States and international patents. The  
Army reported that use of the RC  
temperature profiler could improve artillery  
accuracy by 50 percent or more. The word on  
the new instrument began to spread, and  
NASA's Jet Propulsion Laboratory (JPL)  
bought two units for use in correcting the  
effects of earth's atmosphere for high  
accuracy measurements during its Cassini  
mission to Saturn. Since JPL has its own  
internal expert group in radiometer  
development, this sale demonstrated the high  
quality and competitive pricing of the RC  
instrument.

Additional SBIR support from the DOE  
supported RC's development of a  
temperature, water vapor and liquid water  
profiling radiometer. The profiling  
radiometer provides data that are key to  
weather forecasting. The German Weather  
Service purchased the first commercial unit to  
gather data for this purpose. Other weather  
services, the DOE, and the Department of the  
Army are planning to use RC's profiler for a  
variety of atmospheric modeling and  
prediction applications. RC has also  
developed procedures using radiometers and  
other sensors to predict weather-related  
satellite communications outages, under an  
SBIR award from the Air Force.

With crucial assistance from the SBIR  
program, Radiometrics is now well  
established as a primary player in the  
international radiometer market. United  
States agencies in need of this technology  
have been able to purchase high quality  
radiometers at competitive prices, with full  
commercial support of the product. In  
addition, strong international sales by RC are  
contributing to United States international  
trade.

# **DISTRIBUTION**

## **OF SBIR AWARDS**

The tables on the following pages show the distribution of FY 1998 SBIR awards (Phase I and Phase II) by state. A more detailed view of the geographical distribution of SBIR awards is presented in Exhibit One. 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 FY 1998 and the number of awards made to that metropolitan area. The last two columns show the cumulative funding and SBIR awards per metropolitan area.

Most SBIR awards are made to small businesses located in large metropolitan areas. However, companies located in small towns and rural settings are major participants in the SBIR program. Over \$212 million was awarded to firms in communities with populations under 125,000 through FY 1998. These communities also received 109 awards in FY 1998 with an average of \$260 thousand per award. As a group, these communities would rank first in the top five of all metropolitan areas in terms of total dollars awarded in FY 1998.

Metropolitan areas are ranked by total SBIR funding, FY 1983-98 in Exhibit Two. Large metropolitan areas dominate the ranking: 16 of the first 25 have more than one million in population. The ranking is largely unchanged from last year. The biggest gains were in York, PA (from 141<sup>st</sup> place to 110<sup>th</sup> place); State College, PA (from 95<sup>th</sup> place to 76<sup>th</sup> place); Allentown – Bethlehem, PA (from 78<sup>th</sup> place to 64<sup>th</sup> place); Kansas City, MO (from 76<sup>th</sup> place to 69<sup>th</sup> place).

Metropolitan areas are ranked by total number of cumulative awards in Exhibit Three. Localities that are not part of Metropolitan Statistical Area (generally with populations less than 500,000) rank 6th in total SBIR awards received. It should be noted that many of the communities with a large number of SBIR awards are located near major universities or Government laboratories.

Technology investment policies of agencies participating in the SBIR program are reflected in the amount of funding for awards in various technology areas. Those areas are listed in Exhibit Four.

Exhibit Five summarizes, by participating agency, the dollar amount of FY 1998 funding made in each technology area. Exhibit Six illustrates the FY 1998 technology distribution for all agencies combined. Exhibits Seven and Eight show corresponding distributions for the entire program to date, that is, FY 1983-98.

Electronic Device Performance, Advanced Materials, and Electromagnetic Radiation/Propagation were the leading technology areas funded in FY 1998. Advanced Materials has now surpassed \$3 billion in funding, to lead all other technology areas in funding in the SBIR program.

# **A**DMINISTRATIVE ISSUES

## **Publications Update**

All publicly distributed SBIR documents have been updated and are available on the SBA's electronic bulletin board, SBA OnLine. The bulletin board can be accessed 24 hours a day via modem or the Internet, eliminating the printing, mailing and storage costs previously incurred for SBIR publications. Information is published on the bulletin board at the same time it is available in hard copy.

## **National Conferences**

The Department of Defense and the National Science Foundation sponsored SBIR conferences in FY 1998 in Washington, DC; Phoenix, Arizona and in San Jose, California.

## **General Information**

The SBA has offices located throughout the United States. For the one nearest you, look under "U.S. Government" in your telephone directory, or call the SBA Answer Desk at (800) 8-ASK-SBA. To send a fax to the SBA, dial (202) 205-7064. For the hearing impaired, the TTD number is (704) 344-6640.

To access the Agency's electronic public information services, you may call the following:

- SBA Online: electronic bulletin board-modem and computer required:
  - (800) 697-4636 (limited access)
  - (900) 463-4636 (full access)
  - (202) 401-9600 (DC metro area)
- Internet: using uniform resource locators URLs
- SBA Home Page:  
<http://www.sba.gov/sbir>
- SBA gopher: <gopher://gopher.sba.gov>
- File transfer protocol: <ftp://ftp.sba.gov>
- Telnet: <telnet://sbaonline.sba.gov>
- U.S. Business Advisor:  
<http://www.business.gov>

You also may request a free copy of The Resource Directory for Small Business Management, a listing of for-sale publications and videotapes, from your local SBA office or the SBA Answer Desk.

U.S. Small Business Administration  
Office of Technology

Total SBIR Awards for Fiscal Year 1998

State	Phase 1 Awards	Phase 1 Dollars	Phase 2 Awards	Phase 2 Dollars	Total Awards	Total Dollars
Alabama	46	3,908	24	14,756	70	18,664
Alaska	3	263	0	0	3	263
Arizona	60	4,975	24	14,130	84	19,105
Arkansas	2	152	1	750	3	902
California	577	50,271	275	179,441	852	229,712
Colorado	141	11,938	58	36,422	199	48,360
Connecticut	67	5,821	29	19,326	96	25,147
Delaware	8	648	1	225	9	873
District of Columbia	8	760	1	250	9	1,010
Florida	60	4,993	23	13,076	83	18,069
Georgia	27	2,279	15	9,583	42	11,862
Hawaii	15	1,139	4	1,320	19	2,459
Idaho	5	354	1	225	6	579
Illinois	50	4,549	18	10,593	68	15,142
Indiana	22	1,769	2	1,350	24	3,119
Iowa	5	438	1	225	6	663
Kansas	8	578	6	3,948	14	4,526
Kentucky	4	357	3	1,375	7	1,732
Louisiana	6	445	3	1,294	9	1,739
Maine	6	469	1	750	7	1,219
Maryland	134	11,491	68	41,909	202	53,400
Massachusetts	434	38,156	193	122,011	627	160,167
Michigan	69	6,277	45	25,891	114	32,168
Minnesota	52	4,471	12	7,003	64	11,474
Mississippi	2	125	0	0	2	125
Missouri	14	1,076	9	5,416	23	6,492
Montana	8	703	4	2,154	12	2,857
Nebraska	6	555	2	615	8	1,170
Nevada	4	343	3	2,110	7	2,453
New Hampshire	26	2,293	12	7,774	38	10,067
New Jersey	84	7,447	35	21,301	119	28,748
New Mexico	55	4,643	22	12,313	77	16,956
New York	122	10,941	45	27,156	167	38,097
North Carolina	43	3,998	14	9,656	57	13,654
North Dakota	4	301	0	0	4	301
Ohio	140	12,345	52	34,583	192	46,928

ordered by: State

U.S. Small Business Administration  
Office of Technology

Total SBIR Awards for Fiscal Year 1998

State	Phase 1		Phase 2		Total Awards	Total Dollars
	Awards	Dollars	Awards	Dollars		
Oklahoma	14	1,189	3	1,952	17	3,141
Oregon	37	3,105	18	12,151	55	15,256
Pennsylvania	101	8,926	53	32,311	154	41,237
Puerto Rico	1	86	0	0	1	86
Rhode Island	8	650	0	0	8	650
South Carolina	8	631	2	620	10	1,251
South Dakota	4	398	4	471	8	869
Tennessee	26	2,078	13	6,790	39	8,868
Texas	118	10,238	45	29,619	163	39,857
Utah	34	3,084	9	5,616	43	8,700
Vermont	12	972	4	2,155	16	3,127
Virginia	185	15,480	75	45,792	260	61,272
Washington	68	5,972	42	23,478	110	29,450
West Virginia	5	474	0	0	5	474
Wisconsin	31	2,700	8	3,591	39	6,291
Wyoming	6	509	1	225	7	734

ordered by: State

U.S. Small Business Administration  
Office of Technology

Total SBIR Awards for Fiscal Year 1998

State	Phase 1		Phase 2		Total
	Awards	Dollars	Awards	Dollars	
California	577	50,271	275	179,441	852
Massachusetts	434	38,156	193	122,011	627
Virginia	185	15,480	75	45,792	260
Maryland	134	11,491	68	41,909	202
Colorado	141	11,938	58	36,422	199
Ohio	140	12,345	52	34,583	192
Pennsylvania	101	8,926	53	32,311	154
Texas	118	10,238	45	29,619	163
New York	122	10,941	45	27,156	167
Michigan	69	6,277	45	25,891	114
Washington	68	5,972	42	23,478	110
New Jersey	84	7,447	35	21,301	119
Connecticut	67	5,821	29	19,326	96
Arizona	60	4,975	24	14,130	84
Alabama	46	3,908	24	14,756	70
Florida	60	4,993	23	13,076	83
New Mexico	55	4,643	22	12,313	77
Oregon	37	3,105	18	12,151	55
Illinois	50	4,549	18	10,593	68
North Carolina	43	3,998	14	9,656	57
Georgia	27	2,279	15	9,583	42
Minnesota	52	4,471	12	7,003	64
New Hampshire	26	2,293	12	7,774	38
Tennessee	26	2,078	13	6,790	39
Utah	34	3,084	9	5,616	43
Missouri	14	1,076	9	5,416	23
Wisconsin	31	2,700	8	3,591	39
Kansas	8	578	6	3,948	14
Oklahoma	14	1,189	3	1,952	17
Vermont	12	972	4	2,155	16
Indiana	22	1,769	2	1,350	24
Montana	8	703	4	2,154	12
Hawaii	15	1,139	4	1,320	19
Nevada	4	343	3	2,110	7
Louisiana	6	445	3	1,294	9
Kentucky	4	357	3	1,375	7

ordered by: Total Dollars

U.S. Small Business Administration  
Office of Technology

Total SBIR Awards for Fiscal Year 1998

State	Phase 1 Awards	Phase 1 Dollars	Phase 2 Awards	Phase 2 Dollars	Total Awards	Total Dollars
South Carolina	8	631	2	620	10	1,251
Maine	6	469	1	750	7	1,219
Nebraska	6	555	2	615	8	1,170
District of Columbia	8	760	1	250	9	1,010
Arkansas	2	152	1	750	3	902
Delaware	8	648	1	225	9	873
South Dakota	4	398	4	471	8	869
Wyoming	6	509	1	225	7	734
Iowa	5	438	1	225	6	663
Rhode Island	8	650	0	0	8	650
Idaho	5	354	1	225	6	579
West Virginia	5	474	0	0	5	474
North Dakota	4	301	0	0	4	301
Alaska	3	263	0	0	3	263
Mississippi	2	125	0	0	2	125
Puerto Rico	1	86	0	0	1	86

ordered by: Total Dollars



DISTRIBUTION of SBIR FUNDING by METROPOLITAN AREAS (ordered by population)

Metropolitan Area	<u>Population</u>	<u>FY98 (\$k)</u>	<u>FY98</u> <u>No. of</u> <u>Awards</u>	<u>FY83-98</u> <u>(\$k)</u>	<u>FY83-98</u> <u>No. of</u> <u>Awards</u>
NEW YORK AREA	15,529,300	63,016	429	332,897	2,166
LOS ANGELES AREA	13,074,800	72,935	273	696,406	4,040
CHICAGO-LAKE COUNTY	7,381,400	11,893	53	99,727	631
PHILADELPHIA AREA	5,697,200	30,578	129	293,561	1,709
BAY AREA (SF)	5,534,200	83,287	293	712,040	4,159
DETROIT-ANN ARBOR, MI	4,600,700	22,464	74	131,277	715
BOSTON, LAWRENCE, SALEM, LOWEL, MA	4,055,700	130,649	498	1,183,240	6,806
DALLAS-FT.WORTH AREA	3,655,300	6,655	20	56,945	321
HOUSTON, GALVESTON, TX	3,634,300	7,272	27	79,268	508
WASHINGTON, DC-MD-VA	3,565,000	81,974	310	663,844	4,011
MIAMI-FT.LAUDERDALE, FL	2,912,000	752	5	11,366	79
CLEVELAND-AKRON AREA	2,765,600	11,618	57	64,256	357
ATLANTA, GA	2,560,500	10,541	36	56,504	336
ST LOUIS, MO-IL	2,438,000	5,235	19	17,716	115
PITTSBURGH-BEAVER VALLEY, PA	2,316,100	10,974	30	55,707	344
MINNEAPOLIS-ST PAUL, MN-WI	2,295,200	8,449	52	113,069	702
SEATTLE-TAKOMA AREA	2,284,400	25,976	87	170,405	1,011
BALTIMORE, MD	2,280,000	15,621	61	109,632	698
SAN DIEGO, CA	2,201,300	47,208	161	363,875	2,118
TAMPA-ST PETE-CLEARWATER, FL	1,914,300	514	6	6,637	55
PHOENIX, AZ	1,900,200	6,190	23	36,079	252
DENVER-Boulder-LONGMONT, CO	1,847,400	41,592	168	262,486	1,562
CINCINNATI-HAMILTON, OH, KY, IN	1,690,100	6,564	33	21,857	145
MILWAUKEE-RACINE, WI	1,552,000	663	4	11,777	85
KANSAS CITY, MO-KS	1,517,800	3,135	6	14,502	76
NEW ORLEANS, LA	1,334,400	161	2	8,366	96
NORFOLK-VA BEACH-NEWPORT NEWS, VA	1,309,500	2,928	17	31,724	184
COLUMBUS, OH	1,299,400	4,333	18	33,070	207
SACRAMENTO, CA	1,291,400	2,153	8	28,563	183
SAN ANTONIO, TX	1,276,400	2,581	14	31,315	191
INDIANAPOLIS, IN	1,212,600	370	4	7,853	54
BUFFALO-NIAGRA AREA	1,181,600	5,551	14	63,490	350
JACKSONVILLE-DAYTONA BEACH, FL	1,173,600	0	0	991	10

All \$ amounts in thousands

DISTRIBUTION of SBIR FUNDING by METROPOLITAN AREAS (ordered by population)

<u>Metropolitan Area</u>	<u>Population</u>	<u>FY98 (\$k)</u>	<u>FY98</u> <u>No. of</u> <u>Awards</u>	<u>FY83-98</u> <u>(\$k)</u>	<u>FY83-98</u> <u>No. of</u> <u>Awards</u>
PORTLAND, OR	1,152,800	5,473	14	34,559	185
PROVIDENCE-PAWTUCKET-FALL RIVERS, RI	1,108,500	1,821	14	31,537	191
CHARLOTTE-GASTONIA-ROCK HILL, NC	1,065,400	907	5	4,541	23
SALT LAKE CITY-OGDEN, UT	1,041,400	8,535	41	93,975	643
OKLAHOMA CITY, OK	982,900	1,287	7	6,968	47
ROCHESTER, NY	980,300	3,659	15	29,972	171
HARTFORD-NEW BRITAIN-BRISTOL, CT	967,100	2,898	14	74,024	450
LOUISVILLE, KY-IN	962,800	1,625	6	6,598	39
MEMPHIS, TN-AR-MS	959,500	1,585	3	4,590	31
MIDDLESEX-SOMMERSET, NJ	950,100	4,229	15	48,139	317
MONMOUTH-OCEAN, NJ	935,200	2,259	12	17,049	94
DAYTON-SPRINGFIELD, OH	933,500	21,208	69	126,089	684
NASHVILLE, TN	930,700	589	5	7,969	63
BIRMINGHAM, AL	911,000	1,836	7	10,820	65
GREENSBORO-WINSTON SALEM, NC	899,500	2,263	10	10,581	59
ORLANDO, FL	898,400	7,205	25	45,224	269
ALBANY-SCHENECTADY, NY	843,600	9,954	33	57,836	316
HONOLULU, HI	816,700	1,959	11	24,803	148
RICHMOND-PETERSBERG, VA	810,200	1,119	4	4,753	34
WEST PALM BEACH-BOCA RATON, FL	755,600	600	1	13,217	68
STOCKTON-MODESTO, CA	749,300	0	0	1,505	11
TULSA, OK	733,500	1,675	7	8,438	68
AUSTIN, TX	726,400	13,876	55	67,380	403
SCRANTON, PA	725,900	0	0	660	4
ALLEN-TOWN-BETHLEHEM, PA-NJ	656,800	4,873	14	16,033	98
RALEIGH-DURHAM, NC	650,600	9,793	34	77,752	465
SYRACUSE, NY	649,300	1,492	6	14,238	99
GRAND RAPIDS, MI	648,800	700	2	1,721	11
OMAHA, NE-IA	614,300	600	1	1,453	14
TOLEDO, OH	611,200	1,897	5	14,516	79
GREENVILLE-SPARTANBURG, SC	606,400	765	5	3,301	29
TUCSON, AZ	602,400	11,117	51	76,186	494
NEW HAVEN-MERIDEN-MIDDLETON, CT	596,700	8,946	42	83,301	471

All \$ amounts in thousands

DISTRIBUTION of SBIR FUNDING by METROPOLITAN AREAS (ordered by population)

Metropolitan Area	Population	FY98 (\$k)	FY98 No. of Awards	FY83-98 (\$k)	FY83-98 No. of Awards
KNOXVILLE, TN	591,100	4,268	15	53,876	328
HARRISBURG-LEBANON-CARLISLE, PA	577,300	39	1	2,608	16
LAS VEGAS, NV	569,500	145	2	6,721	44
EL PASO, TX	561,500	0	0	100	2
BATON ROUGE, LA	545,700	0	0	1,968	12
SPRINGFIELD, MA	517,800	797	4	13,414	99
YOUNGSTOWN, OH	510,000	70	1	170	3
LITTLE ROCK-N LITTLE ROCK, AR	505,600	0	0	2,038	14
CHARLESTON, SC	485,700	78	1	1,013	10
ALBUQUERQUE, NM	474,400	11,320	56	122,446	745
WICHITA, KS	470,000	64	1	1,091	8
COLUMBIA, SC	444,700	295	2	1,111	12
FLINT, MI	434,900	397	1	1,634	9
CHATTANOOGA, TN-GA	425,500	2,169	14	23,838	116
LANSING-E LANSING, MI	424,800	3,109	9	13,126	85
WORCESTER, MA	407,800	7,803	26	38,306	226
SAGINAW-BAY CITY-MIDLAND, MI	403,600	750	1	2,552	18
CANTON, OH	400,400	0	0	1,705	15
YORK, PA	397,700	1,420	3	2,657	11
LANCASTER, PA	393,500	1,175	6	25,000	121
JACKSON, MS	392,000	0	0	396	5
AUGUSTA, GA-SC	390,000	70	1	388	5
DES MOINES, IA	381,300	1,868	7	6,527	45
COLORADO SPRINGS, CO	380,400	5,428	19	44,322	235
SHREVEPORT, LA	364,600	0	0	37	1
CORPUS CHRISTI, TX	363,300	0	0	49	1
MELBOURNE-TITUSVILLE-PALM BEACH, FL	361,200	4,894	21	51,439	293
SPOKANE, WA	356,900	264	3	8,339	54
FORT WAYNE, IN	356,100	0	0	586	6
MADISON, WI	344,900	4,087	24	39,705	217
SALINAS-SEASIDE-MONTEREY, CA	339,700	375	3	6,052	42
SANTA BARBARA-SANTA MARIA, CA	339,400	13,140	41	92,534	468
PENSACOLA, FL	337,100	1,347	6	9,842	51

All \$ amounts in thousands

DISTRIBUTION of SBIR FUNDING by METROPOLITAN AREAS (ordered by population)

Metropolitan Area	<u>Population</u>	<u>FY98 (\$k)</u>	<u>FY98</u> <u>No. of</u> <u>Awards</u>	<u>FY83-98</u> <u>(\$k)</u>	<u>FY83-98</u> <u>No. of</u> <u>Awards</u>
LEXINGTON, KY	332,000	448	3	8,363	40
READING, PA	321,000	500	1	1,943	6
UTICA-ROME, NY	315,400	1,670	8	13,341	73
APPLETON-OSHKOSH-NEENAH, WI	307,500	70	1	1,890	11
MONTGOMERY, AL	299,000	0	0	141	3
ATLANTIC CITY, NJ	297,400	0	0	2,654	12
ROCKFORD, IL	280,300	100	1	932	4
EUGENE-SPRINGFIELD, OR	263,200	7,771	20	36,077	160
SALEM, OR	262,100	149	2	8,030	57
BINGHAMTON, NY	261,800	499	2	6,245	31
NEW LONDON-NORWICH, CT-RI	259,500	1,632	8	13,651	76
POUGHKEEPSIE, NY	256,800	1,781	11	24,330	179
JOHNSTOWN, PA	254,100	0	0	100	2
DULUTH, MN-WI	243,500	280	2	519	7
SOUTH BEND-MISHAWAKA, IN	241,400	137	2	2,194	24
PROVO-OREM, UT	240,500	0	0	7,757	39
SAVANNAH, GA	239,700	65	1	140	2
ANCHORAGE, AK	235,000	193	2	2,071	17
HUNTSVILLE, AL	233,700	16,368	57	134,591	718
ROANOKE, VA	224,900	6,809	34	66,663	383
LUBBOCK, TX	224,800	0	0	250	3
RENO, NV	224,600	1,362	2	10,923	54
TALLAHASSEE, FL	218,000	130	2	1,913	14
KALAMAZOO, MI	217,700	225	1	1,734	14
PORTSMOUTH, DOVER, ROCHESTER, DE	215,000	1,200	4	8,684	54
WATERBURY, CT	211,900	0	0	24,294	123
LINCOLN, NE	206,100	0	0	50	1
PORTLAND, ME	205,700	850	2	15,934	105
GAINESVILLE, FL	199,800	1,345	6	23,536	161
WACO, TX	187,600	0	0	148	3
YAKIMA, WA	183,200	0	0	380	5
CHAMPAIGN-URBANA-RANTOUL, IL	171,100	1,999	7	18,962	117
ASHEVILLE, NC	170,000	99	1	1,715	15

All \$ amounts in thousands

**DISTRIBUTION of SBIR FUNDING by METROPOLITAN AREAS (ordered by population)**

<u>Metropolitan Area</u>	<u>Population</u>	<u>FY98 (\$k)</u>	<u>FY98</u> <u>No. of</u> <u>Awards</u>	<u>FY83-98</u> <u>(\$k)</u>	<u>FY83-98</u> <u>No. of</u> <u>Awards</u>
CEDAR RAPIDS, IA	168,800	199	2	3,087	26
NASHUA, NH	163,300	2,329	8	25,272	123
TOPEKA, KS	160,800	850	2	4,377	16
WATERLOO-CEDAR FALLS, IA	151,500	0	0	605	4
OLYMPIA, WA	146,600	0	0	5,928	29
FARGO-MOOREHEAD, ND-MN	145,300	175	2	1,548	9
MANCHESTER, NH	145,100	170	2	4,146	18
JACKSON, MI	144,400	1,133	4	2,649	12
ATHENS, GA	141,500	100	1	3,006	25
MEDFORD, OR	140,000	391	2	1,466	8
REDDING, CA	133,100	0	0	49	1
PASCAGOULA, MS	128,200	0	0	1,759	10
WICHITA FALLS, TX	127,100	0	0	719	3
ABILENE, TX	125,900	750	1	925	4
BURLINGTON, VT	124,600	1,630	4	14,895	79
LAFAYETTE-W LAFAYETTE, IN	124,400	549	6	11,714	77
LAS CRUCES, NM	123,000	1,493	2	14,891	79
BLOOMINGTON-NORMAL, IL	122,700	180	1	1,300	7
CHARLOTTESVILLE, VA	121,400	2,979	9	22,049	118
MUNCIE, IN	120,900	0	0	95	2
BRYAN-COLLEGE STATION, TX	120,800	7,110	31	36,444	234
LAWTON, OK	120,700	0	0	5,546	26
STATE COLLEGE, PA	114,600	5,021	14	12,251	72
BELLINGHAM, WA	113,700	240	3	4,613	27
GLENS FALLS, NY	112,400	180	1	287	3
MIDLAND, TX	111,300	0	0	883	5
FAYETTEVILLE-SPRINGDALE, AR	107,400	152	2	3,148	21
SANTA FE, NM	106,200	2,758	14	25,651	144
BLOOMINGTON, IN	101,700	90	1	7,285	40
KOKOMO, IN	101,400	0	0	179	3
ROCHESTER, MN	98,000	1,496	2	2,249	10
FITCHBURG-LEOMINSTER, MA	96,300	308	4	8,512	56
LA CROSSE, WI	94,100	0	0	39	1

All \$ amounts in thousands

DISTRIBUTION of SBIR FUNDING by METROPOLITAN AREAS (ordered by population)

Metropolitan Area	<u>Population</u>	<u>FY98 (\$k)</u>	<u>FY98</u> <u>No. of</u> <u>Awards</u>	<u>FY83-98</u> <u>(\$k)</u>	<u>FY83-98</u> <u>No. of</u> <u>Awards</u>
ELMIRA, NY	90,500	2,279	8	31,688	175
BISMARCK, ND	86,000	0	0	151	3
BANGOR, ME	83,400	983	4	2,379	16
PITTSFIELD, MA	80,900	731	1	2,180	11
RAPID CITY, SD	76,900	198	2	1,139	13
VICTORIA, TX	76,000	0	0	407	5
CASPER, WY	71,000	0	0	601	5
GRAND FORKS, ND	69,400	0	0	2,031	17
NOT in Metropolitan Area	0	67,681	427	358,710	2,268

SBIR AWARDS by METROPOLITAN AREAS (ordered by total dollars)

<u>Metropolitan Area</u>	<u>Population</u>	<u>FY98</u> <u>(\$k)</u>	<u>FY98</u> <u>No. of</u> <u>Awards</u>	<u>FY83-98</u> <u>(\$k)</u>	<u>FY83-98</u> <u>No. of</u> <u>Awards</u>
BOSTON, LAWRENCE, SALEM, LOWEL, MA	4,055,700	130,649	498	1,183,240	6,806
BAY AREA (SF)	5,534,200	83,287	293	712,040	4,159
LOS ANGELES AREA	13,074,800	72,935	273	696,406	4,040
WASHINGTON, DC-MD-VA	3,565,000	81,974	310	663,844	4,011
SAN DIEGO, CA	2,201,300	47,208	161	363,875	2,118
NOT in Metropolitan Area	0	67,681	427	358,710	2,268
NEW YORK AREA	15,529,300	63,016	429	332,897	2,166
PHILADELPHIA AREA	5,697,200	30,578	129	293,561	1,709
DENVER-Boulder-Longmont, CO	1,847,400	41,592	168	262,486	1,562
SEATTLE-Takoma Area	2,284,400	25,976	87	170,405	1,011
HUNTSVILLE, AL	233,700	16,368	57	134,591	718
DETROIT-ANN ARBOR, MI	4,600,700	22,464	74	131,277	715
DAYTON-SPRINGFIELD, OH	933,500	21,208	69	126,089	684
ALBUQUERQUE, NM	474,400	11,320	56	122,446	745
MINNEAPOLIS-ST PAUL, MN-WI	2,295,200	8,449	52	113,069	702
BALTIMORE, MD	2,280,000	15,621	61	109,632	698
CHICAGO-LAKE COUNTY	7,381,400	11,893	53	99,727	631
SALT LAKE CITY-OGDEN, UT	1,041,400	8,535	41	93,975	643
SANTA BARBARA-SANTA MARIA, CA	339,400	13,140	41	92,534	468
NEW HAVEN-MERIDEN-MIDDLETON, CT	596,700	8,946	42	83,301	471
HOUSTON, GALVESTON, TX	3,634,300	7,272	27	79,268	508
RALEIGH-DURHAM, NC	650,600	9,793	34	77,752	465
TUCSON, AZ	602,400	11,117	51	76,186	494
HARTFORD-NEW BRITAIN-BRISTOL, CT	967,100	2,898	14	74,024	450
AUSTIN, TX	726,400	13,876	55	67,380	403
ROANOKE, VA	224,900	6,809	34	66,663	383
CLEVELAND-AKRON AREA	2,765,600	11,618	57	64,256	357
BUFFALO-NIAGRA AREA	1,181,600	5,551	14	63,490	350
ALBANY-SCHENECTADY, NY	843,600	9,954	33	57,836	316
DALLAS-FT.WORTH AREA	3,655,300	6,655	20	56,945	321
ATLANTA, GA	2,560,500	10,541	36	56,504	336
PITTSBURGH-BEAVIER VALLEY, PA	2,316,100	10,974	30	55,707	344
KNOXVILLE, TN	591,100	4,268	15	53,876	328

All \$ amounts in thousands

SBIR AWARDS by METROPOLITAN AREAS (ordered by total dollars)

<u>Metropolitan Area</u>	<u>Population</u>	<u>FY98</u> <u>(\$k)</u>	<u>FY98</u> <u>No. of</u> <u>Awards</u>	<u>FY83-98</u> <u>(\$k)</u>	<u>FY83-98</u> <u>No. of</u> <u>Awards</u>
MELBOURNE-TITUSVILLE-PALM BEACH, FL	361,200	4,894	21	51,439	293
MIDDLESEX-SOMMERSET, NJ	950,100	4,229	15	48,139	317
ORLANDO, FL	898,400	7,205	25	45,224	269
COLORADO SPRINGS, CO	380,400	5,428	19	44,322	235
MADISON, WI	344,900	4,087	24	39,705	217
WORCESTER, MA	407,800	7,803	26	38,306	226
BRYAN-COLLEGE STATION, TX	120,800	7,110	31	36,444	234
PHOENIX, AZ	1,900,200	6,190	23	36,079	252
EUGENE-SPRINGFIELD, OR	263,200	7,771	20	36,077	160
PORTLAND, OR	1,152,800	5,473	14	34,559	185
COLUMBUS, OH	1,299,400	4,333	18	33,070	207
NORFOLK-VA BEACH-NEWPORT NEWS, VA	1,309,500	2,928	17	31,724	184
ELMIRA, NY	90,500	2,279	8	31,688	175
PROVIDENCE-PAWTUCKET-FALL RIVERS, RI	1,108,500	1,821	14	31,537	191
SAN ANTONIO, TX	1,276,400	2,581	14	31,315	191
ROCHESTER, NY	980,300	3,659	15	29,972	171
SACRAMENTO, CA	1,291,400	2,153	8	28,563	183
SANTA FE, NM	106,200	2,758	14	25,651	144
NASHUA, NH	163,300	2,329	8	25,272	123
LANCASTER, PA	393,500	1,175	6	25,000	121
HONOLULU, HI	816,700	1,959	11	24,803	148
POUGHKEEPSIE, NY	256,800	1,781	11	24,330	179
WATERBURY, CT	211,900	0	0	24,294	123
CHATTANOOGA, TN-GA	425,500	2,169	14	23,838	116
GAINESVILLE, FL	199,800	1,345	6	23,536	161
CHARLOTTESVILLE, VA	121,400	2,979	9	22,049	118
CINCINNATI-HAMILTON, OH, KY, IN	1,690,100	6,564	33	21,857	145
CHAMPAIGN-URBANA-RANTOUL, IL	171,100	1,999	7	18,962	117
ST LOUIS, MO-IL	2,438,000	5,235	19	17,716	115
MONMOUTH-OCEAN, NJ	935,200	2,259	12	17,049	94
ALLEN-TOWN-BETHLEHEM, PA-NJ	656,800	4,873	14	16,033	98
PORTLAND, ME	205,700	850	2	15,934	105
BURLINGTON, VT	124,600	1,630	4	14,895	79

All \$ amounts in thousands



SBIR AWARDS by METROPOLITAN AREAS (ordered by total dollars)

<u>Metropolitan Area</u>	<u>Population</u>	<u>FY98</u> <u>(\$k)</u>	<u>FY98</u> <u>No. of</u> <u>Awards</u>	<u>FY83-98</u> <u>(\$k)</u>	<u>FY83-98</u> <u>No. of</u> <u>Awards</u>
LAS CRUCES, NM	123,000	1,493	2	14,891	79
TOLEDO, OH	611,200	1,897	5	14,516	79
KANSAS CITY, MO-KS	1,517,800	3,135	6	14,502	76
SYRACUSE, NY	649,300	1,492	6	14,238	99
NEW LONDON-NORWICH, CT-RI	259,500	1,632	8	13,651	76
SPRINGFIELD, MA	517,800	797	4	13,414	99
UTICA-ROME, NY	315,400	1,670	8	13,341	73
WEST PALM BEACH-BOCA RATON, FL	755,600	600	1	13,217	68
LANSING-E LANSING, MI	424,800	3,109	9	13,126	85
STATE COLLEGE, PA	114,600	5,021	14	12,251	72
MILWAUKEE-RACINE, WI	1,552,000	663	4	11,777	85
LAFAYETTE-W LAFAYETTE, IN	124,400	549	6	11,714	77
MIAMI-FT.LAUDERDALE, FL	2,912,000	752	5	11,366	79
RENO, NV	224,600	1,362	2	10,923	54
BIRMINGHAM, AL	911,000	1,836	7	10,820	65
GREENSBORO-WINSTON SALEM, NC	899,500	2,263	10	10,581	59
PENSACOLA, FL	337,100	1,347	6	9,842	51
PORTSMOUTH, DOVER, ROCHESTER, DE	215,000	1,200	4	8,684	54
FITCHBURG-LEOMINSTER, MA	96,300	308	4	8,512	56
TULSA, OK	733,500	1,675	7	8,438	68
NEW ORLEANS, LA	1,334,400	161	2	8,366	96
LEXINGTON, KY	332,000	448	3	8,363	40
SPOKANE, WA	356,900	264	3	8,339	54
SALEM, OR	262,100	149	2	8,030	57
NASHVILLE, TN	930,700	589	5	7,969	63
INDIANAPOLIS, IN	1,212,600	370	4	7,853	54
PROVO-OREM, UT	240,500	0	0	7,757	39
BLOOMINGTON, IN	101,700	90	1	7,285	40
OKLAHOMA CITY, OK	982,900	1,287	7	6,968	47
LAS VEGAS, NV	569,500	145	2	6,721	44
TAMPA-ST PETE-CLEARWATER, FL	1,914,300	514	6	6,637	55
LOUISVILLE, KY-IN	962,800	1,625	6	6,598	39
DES MOINES, IA	381,300	1,868	7	6,527	45

All \$ amounts in thousands

SBIR AWARDS by METROPOLITAN AREAS (ordered by total dollars)

<u>Metropolitan Area</u>	<u>Population</u>	<u>FY98</u> <u>(\$k)</u>	<u>FY98</u> <u>No. of</u> <u>Awards</u>	<u>FY83-98</u> <u>(\$k)</u>	<u>FY83-98</u> <u>No. of</u> <u>Awards</u>
BINGHAMTON, NY	261,800	499	2	6,245	31
SALINAS-SEASIDE-MONTEREY, CA	339,700	375	3	6,052	42
OLYMPIA, WA	146,600	0	0	5,928	29
LAWTON, OK	120,700	0	0	5,546	26
RICHMOND-PETERSBERG, VA	810,200	1,119	4	4,753	34
BELLINGHAM, WA	113,700	240	3	4,613	27
MEMPHIS, TN-AR-MS	959,500	1,585	3	4,590	31
CHARLOTTE-GASTONIA-ROCK HILL, NC	1,065,400	907	5	4,541	23
TOPEKA, KS	160,800	850	2	4,377	16
MANCHESTER, NH	145,100	170	2	4,146	18
GREENVILLE-SPARTANBURG, SC	606,400	765	5	3,301	29
FAYETTEVILLE-SPRINGDALE, AR	107,400	152	2	3,148	21
CEDAR RAPIDS, IA	168,800	199	2	3,087	26
ATHENS, GA	141,500	100	1	3,006	25
YORK, PA	397,700	1,420	3	2,657	11
ATLANTIC CITY, NJ	297,400	0	0	2,654	12
JACKSON, MI	144,400	1,133	4	2,649	12
HARRISBURG-LEBANON-CARLISLE, PA	577,300	39	1	2,608	16
SAGINAW-BAY CITY-MIDLAND, MI	403,600	750	1	2,552	18
BANGOR, ME	83,400	983	4	2,379	16
ROCHESTER, MN	98,000	1,496	2	2,249	10
SOUTH BEND-MISHAWAKA, IN	241,400	137	2	2,194	24
PITTSFIELD, MA	80,900	731	1	2,180	11
ANCHORAGE, AK	235,000	193	2	2,071	17
LITTLE ROCK-N LITTLE ROCK, AR	505,600	0	0	2,038	14
GRAND FORKS, ND	69,400	0	0	2,031	17
BATON ROUGE, LA	545,700	0	0	1,968	12
READING, PA	321,000	500	1	1,943	6
TALLAHASSEE, FL	218,000	130	2	1,913	14
APPLETON-OSHKOSH-NEENAH, WI	307,500	70	1	1,890	11
PASCAGOULA, MS	128,200	0	0	1,759	10
KALAMAZOO, MI	217,700	225	1	1,734	14
GRAND RAPIDS, MI	648,800	700	2	1,721	11

All \$ amounts in thousands

SBIR AWARDS by METROPOLITAN AREAS (ordered by total dollars)

<u>Metropolitan Area</u>	<u>Population</u>	<u>FY98</u> <u>(\$k)</u>	<u>FY98</u> <u>No. of</u> <u>Awards</u>	<u>FY83-98</u> <u>(\$k)</u>	<u>FY83-98</u> <u>No. of</u> <u>Awards</u>
ASHEVILLE, NC	170,000	99	1	1,715	15
CANTON, OH	400,400	0	0	1,705	15
FLINT, MI	434,900	397	1	1,634	9
FARGO-MOOREHEAD, ND-MN	145,300	175	2	1,548	9
STOCKTON-MODESTO, CA	749,300	0	0	1,505	11
MEDFORD, OR	140,000	391	2	1,466	8
OMAHA, NE-IA	614,300	600	1	1,453	14
BLOOMINGTON-NORMAL, IL	122,700	180	1	1,300	7
RAPID CITY, SD	76,900	198	2	1,139	13
COLUMBIA, SC	444,700	295	2	1,111	12
WICHITA, KS	470,000	64	1	1,091	8
CHARLESTON, SC	485,700	78	1	1,013	10
JACKSONVILLE-DAYTONA BEACH, FL	1,173,600	0	0	991	10
ROCKFORD, IL	280,300	100	1	932	4
ABILENE, TX	125,900	750	1	925	4
MIDLAND, TX	111,300	0	0	883	5
WICHITA FALLS, TX	127,100	0	0	719	3
SCRANTON-	725,900	0	0	660	4
WATERLOO-CEDAR FALLS, IA	151,500	0	0	605	4
CASPER, WY	71,000	0	0	601	5
FORT WAYNE, IN	356,100	0	0	586	6
DULUTH, MN-WI	243,500	280	2	519	7
VICTORIA, TX	76,000	0	0	407	5
JACKSON, MS	392,000	0	0	396	5
AUGUSTA, GA-SC	390,000	70	1	388	5
YAKIMA, WA	183,200	0	0	380	5
GLENS FALLS, NY	112,400	180	1	287	3
LUBBOCK, TX	224,800	0	0	250	3
KOKOMO, IN	101,400	0	0	179	3
YOUNGSTOWN, OH	510,000	70	1	170	3
BISMARCK, ND	86,000	0	0	151	3
WACO, TX	187,600	0	0	148	3
MONTGOMERY, AL	299,000	0	0	141	3

All \$ amounts in thousands

SBIR AWARDS by METROPOLITAN AREAS (ordered by total dollars)

<u>Metropolitan Area</u>	<u>Population</u>	FY98 (\$k)	FY98 No. of <u>Awards</u>	FY83-98 (\$k)	FY83-98 No. of <u>Awards</u>
SAVANNAH, GA	239,700	65	1	140	2
JOHNSTOWN, PA	254,100	0	0	100	2
EL PASO, TX	561,500	0	0	100	2
MUNCIE, IN	120,900	0	0	95	2
LINCOLN, NE	206,100	0	0	50	1
REDDING, CA	133,100	0	0	49	1
CORPUS CHRISTI, TX	363,300	0	0	49	1
LA CROSSE, WI	94,100	0	0	39	1
SHREVEPORT, LA	364,600	0	0	37	1

SBIR AWARDS by METROPOLITAN AREAS (ordered by decreasing FY83-98 total awards)

<u>Metropolitan Area</u>	<u>Population</u>	<u>FY98</u> <u>(\$k)</u>	<u>FY98</u> <u>No. of</u> <u>Awards</u>	<u>FY83-98</u> <u>(\$k)</u>	<u>FY83-98</u> <u>No. of</u> <u>Awards</u>
BOSTON, LAWRENCE, SALEM, LOWEL, MA	4,055,700	130,649	498	1,183,240	6,806
BAY AREA (SF)	5,534,200	83,287	293	712,040	4,159
LOS ANGELES AREA	13,074,800	72,935	273	696,406	4,040
WASHINGTON, DC-MD-VA	3,565,000	81,974	310	663,844	4,011
NOT in Metropolitan Area	0	67,681	427	358,710	2,268
NEW YORK AREA	15,529,300	63,016	429	332,897	2,166
SAN DIEGO, CA	2,201,300	47,208	161	363,875	2,118
PHILADELPHIA AREA	5,697,200	30,578	129	293,561	1,709
DENVER-Boulder-LONGMONT, CO	1,847,400	41,592	168	262,486	1,562
SEATTLE-TAKOMA AREA	2,284,400	25,976	87	170,405	1,011
ALBUQUERQUE, NM	474,400	11,320	56	122,446	745
HUNTSVILLE, AL	233,700	16,368	57	134,591	718
DETROIT-ANN ARBOR, MI	4,600,700	22,464	74	131,277	715
MINNEAPOLIS-ST PAUL, MN-WI	2,295,200	8,449	52	113,069	702
BALTIMORE, MD	2,280,000	15,621	61	109,632	698
DAYTON-SPRINGFIELD, OH	933,500	21,208	69	126,089	684
SALT LAKE CITY-OGDEN, UT	1,041,400	8,535	41	93,975	643
CHICAGO-LAKE COUNTY	7,381,400	11,893	53	99,727	631
HOUSTON, GALVESTON, TX	3,634,300	7,272	27	79,268	508
TUCSON, AZ	602,400	11,117	51	76,186	494
NEW HAVEN-MERIDEN-MIDDLETON, NJ	596,700	8,946	42	83,301	471
SANTA BARBARA-SANTA MARIA, CA	339,400	13,140	41	92,534	468
RALEIGH-DURHAM, NC	650,600	9,793	34	77,752	465
HARTFORD-NEW BRITAIN-BRISTOL, CT	967,100	2,898	14	74,024	450
AUSTIN, TX	726,400	13,876	55	67,380	403
ROANOKE, VA	224,900	6,809	34	66,663	383
CLEVELAND-AKRON AREA	2,765,600	11,618	57	64,256	357
BUFFALO-NIAGRA AREA	1,181,600	5,551	14	63,490	350
PITTSBURGH-BEAVIER VALLEY, PA	2,316,100	10,974	30	55,707	344
ATLANTA, GA	2,560,500	10,541	36	56,504	336
KNOXVILLE, TN	591,100	4,268	15	53,876	328
DALLAS-FT. WORTH AREA	3,655,300	6,655	20	56,945	321
MIDDLESEX-SOMMERSET, NJ	950,100	4,229	15	48,139	317

All \$ amounts in thousands

SBIR AWARDS by METROPOLITAN AREAS (ordered by decreasing FY83-98 total awards)

<u>Metropolitan Area</u>	<u>Population</u>	<u>FY98</u> <u>(\$k)</u>	<u>FY98</u> <u>No. of</u> <u>Awards</u>	<u>FY83-98</u> <u>(\$k)</u>	<u>FY83-98</u> <u>No. of</u> <u>Awards</u>
ALBANY-SCHENECTADY, NY	843,600	9,954	33	57,836	316
MELBOURNE-TITUSVILLE-PALM BEACH, FL	361,200	4,894	21	51,439	293
ORLANDO, FL	898,400	7,205	25	45,224	269
PHOENIX, AZ	1,900,200	6,190	23	36,079	252
COLORADO SPRINGS, CO	380,400	5,428	19	44,322	235
BRYAN-COLLEGE STATION, TX	120,800	7,110	31	36,444	234
WORCESTER, MA	407,800	7,803	26	38,306	226
MADISON, WI	344,900	4,087	24	39,705	217
COLUMBUS, OH	1,299,400	4,333	18	33,070	207
PROVIDENCE-PAWTUCKET-FALL RIVERS, RI	1,108,500	1,821	14	31,537	191
SAN ANTONIO, TX	1,276,400	2,581	14	31,315	191
PORTLAND, OR	1,152,800	5,473	14	34,559	185
NORFOLK-VA BEACH-NEWPORT NEWS, VA	1,309,500	2,928	17	31,724	184
SACRAMENTO, CA	1,291,400	2,153	8	28,563	183
POUGHKEEPSIE, NY	256,800	1,781	11	24,330	179
ELMIRA, NY	90,500	2,279	8	31,688	175
ROCHESTER, NY	980,300	3,659	15	29,972	171
GAINESVILLE, FL	199,800	1,345	6	23,536	161
EUGENE-SPRINGFIELD, OR	263,200	7,771	20	36,077	160
HONOLULU, HI	816,700	1,959	11	24,803	148
CINCINNATI-HAMILTON, OH, KY, IN	1,690,100	6,564	33	21,857	145
SANTA FE, NM	106,200	2,758	14	25,651	144
NASHUA, NH	163,300	2,329	8	25,272	123
WATERBURY, CT	211,900	0	0	24,294	123
LANCASTER, PA	393,500	1,175	6	25,000	121
CHARLOTTEVILLE, VA	121,400	2,979	9	22,049	118
CHAMPAIGN-URBANA-RANTOUL, IL	171,100	1,999	7	18,962	117
CHATTANOOGA, TN-GA	425,500	2,169	14	23,838	116
ST LOUIS, MO-IL	2,438,000	5,235	19	17,716	115
PORTLAND, ME	205,700	850	2	15,934	105
SPRINGFIELD, MA	517,800	797	4	13,414	99
SYRACUSE, NY	649,300	1,492	6	14,238	99
ALLENTOWN-BETHLEHEM, PA-NJ	656,800	4,873	14	16,033	98

All \$ amounts in thousands

SBIR AWARDS by METROPOLITAN AREAS (ordered by decreasing FY83-98 total awards)

<u>Metropolitan Area</u>	<u>Population</u>	<u>FY98</u> <u>(\$k)</u>	<u>FY98</u> <u>No. of</u> <u>Awards</u>	<u>FY83-98</u> <u>(\$k)</u>	<u>FY83-98</u> <u>No. of</u> <u>Awards</u>
NEW ORLEANS, LA	1,334,400	161	2	8,366	96
MONMOUTH-OCEAN, NJ	935,200	2,259	12	17,049	94
LANSING-E LANSING, MI	424,800	3,109	9	13,126	85
MILWAUKEE-RACINE, WI	1,552,000	663	4	11,777	85
LAS CRUCES, NM	123,000	1,493	2	14,891	79
BURLINGTON, VT	124,600	1,630	4	14,895	79
TOLEDO, OH	611,200	1,897	5	14,516	79
MIAMI-FT.LAUDERDALE, FL	2,912,000	752	5	11,366	79
LAFAYETTE-W LAFAYETTE, IN	124,400	549	6	11,714	77
NEW LONDON-NORWICH, CT-RI	259,500	1,632	8	13,651	76
KANSAS CITY, MO-KS	1,517,800	3,135	6	14,502	76
UTICA-ROME, NY	315,400	1,670	8	13,341	73
STATE COLLEGE, PA	114,600	5,021	14	12,251	72
TULSA, OK	733,500	1,675	7	8,438	68
WEST PALM BEACH-BOCA RATON, FL	755,600	600	1	13,217	68
BIRMINGHAM, AL	911,000	1,836	7	10,820	65
NASHVILLE, TN	930,700	589	5	7,969	63
GREENSBORO-WINSTON SALEM-HI	899,500	2,263	10	10,581	59
SALEM, OR	262,100	149	2	8,030	57
FITCHBURG-LEOMINSTER, MA	96,300	308	4	8,512	56
TAMPA-ST PETE-CLEARWATER, FL	1,914,300	514	6	6,637	55
PORTSMOUTH, DOVER, ROCHESTER, DE	215,000	1,200	4	8,684	54
RENO, NV	224,600	1,362	2	10,923	54
SPOKANE, WA	356,900	264	3	8,339	54
INDIANAPOLIS, IN	1,212,600	370	4	7,853	54
PENSACOLA, FL	337,100	1,347	6	9,842	51
OKLAHOMA CITY, OK	982,900	1,287	7	6,968	47
DES MOINES, IA	381,300	1,868	7	6,527	45
LAS VEGAS, NV	569,500	145	2	6,721	44
SALINAS-SEASIDE-MONTEREY, CA	339,700	375	3	6,052	42
BLOOMINGTON, IN	101,700	90	1	7,285	40
LEXINGTON, KY	332,000	448	3	8,363	40
PROVO-OREM, UT	240,500	0	0	7,757	39

All \$ amounts in thousands

SBIR AWARDS by METROPOLITAN AREAS (ordered by decreasing FY83-98 total awards)

<u>Metropolitan Area</u>	<u>Population</u>	<u>FY98</u> <u>(\$k)</u>	<u>FY98</u> <u>No. of</u> <u>Awards</u>	<u>FY83-98</u> <u>(\$k)</u>	<u>FY83-98</u> <u>No. of</u> <u>Awards</u>
LOUISVILLE, KY-IN	962,800	1,625	6	6,598	39
RICHMOND-PETERSBERG, VA	810,200	1,119	4	4,753	34
BINGHAMTON, NY	261,800	499	2	6,245	31
MEMPHIS, TN-AR-MS	959,500	1,585	3	4,590	31
OLYMPIA, WA	146,600	0	0	5,928	29
GREENVILLE-SPARTANBURG, SC	606,400	765	5	3,301	29
BELLINGHAM, WA	113,700	240	3	4,613	27
LAWTON, OK	120,700	0	0	5,546	26
CEDAR RAPIDS, IA	168,800	199	2	3,087	26
ATHENS, GA	141,500	100	1	3,006	25
SOUTH BEND-MISHAWAKA, IN	241,400	137	2	2,194	24
CHARLOTTE-GASTONIA-ROCK HILL, NC	1,065,400	907	5	4,541	23
FAYETTEVILLE-SPRINGDALE, AR	107,400	152	2	3,148	21
MANCHESTER, NH	145,100	170	2	4,146	18
SAGINAW-BAY CITY-MIDLAND, MI	403,600	750	1	2,552	18
GRAND FORKS, ND	69,400	0	0	2,031	17
ANCHORAGE, AK	235,000	193	2	2,071	17
BANGOR, ME	83,400	983	4	2,379	16
TOPEKA, KS	160,800	850	2	4,377	16
HARRISBURG-LEBANON-CARLISLE, PA	577,300	39	1	2,608	16
ASHEVILLE, NC	170,000	99	1	1,715	15
CANTON, OH	400,400	0	0	1,705	15
KALAMAZOO, MI	217,700	225	1	1,734	14
TALLAHASSEE, FL	218,000	130	2	1,913	14
LITTLE ROCK-N LITTLE ROCK, AR	505,600	0	0	2,038	14
OMAHA, NE-IA	614,300	600	1	1,453	14
RAPID CITY, SD	76,900	198	2	1,139	13
JACKSON, MI	144,400	1,133	4	2,649	12
ATLANTIC CITY, NJ	297,400	0	0	2,654	12
COLUMBIA, SC	444,700	295	2	1,111	12
BATON ROUGE, LA	545,700	0	0	1,968	12
PITTSFIELD, MA	80,900	731	1	2,180	11
APPLETON-OSHKOSH-NEENAH, WI	307,500	70	1	1,890	11

All \$ amounts in thousands



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YORK, PA	397,700	1,420	3	2,657	11
GRAND RAPIDS, MI	648,800	700	2	1,721	11
STOCKTON-MODESTO, CA	749,300	0	0	1,505	11
ROCHESTER, MN	98,000	1,496	2	2,249	10
PASCAGOULA, MS	128,200	0	0	1,759	10
CHARLESTON, SC	485,700	78	1	1,013	10
JACKSONVILLE-DAYTONA BEACH, FL	1,173,600	0	0	991	10
FARGO-MOOREHEAD, ND-MN	145,300	175	2	1,548	9
FLINT, MI	434,900	397	1	1,634	9
MEDFORD, OR	140,000	391	2	1,466	8
WICHITA, KS	470,000	64	1	1,091	8
BLOOMINGTON-NORMAL, IL	122,700	180	1	1,300	7
DULUTH, MN-WI	243,500	280	2	519	7
READING, PA	321,000	500	1	1,943	6
FORT WAYNE, IN	356,100	0	0	586	6
CASPER, WY	71,000	0	0	601	5
VICTORIA, TX	76,000	0	0	407	5
MIDLAND, TX	111,300	0	0	883	5
YAKIMA, WA	183,200	0	0	380	5
AUGUSTA, GA-SC	390,000	70	1	388	5
JACKSON, MS	392,000	0	0	396	5
ABILENE, TX	125,900	750	1	925	4
WATERLOO-CEDAR FALLS, IA	151,500	0	0	605	4
ROCKFORD, IL	280,300	100	1	932	4
SCRANTON-	725,900	0	0	660	4
BISMARCK, ND	86,000	0	0	151	3
KOKOMO, IN	101,400	0	0	179	3
GLENS FALLS, NY	112,400	180	1	287	3
WICHITA FALLS, TX	127,100	0	0	719	3
WACO, TX	187,600	0	0	148	3
LUBBOCK, TX	224,800	0	0	250	3
MONTGOMERY, AL	299,000	0	0	141	3
YOUNGSTOWN, OH	510,000	70	1	170	3

All \$ amounts in thousands

SBIR AWARDS by METROPOLITAN AREAS (ordered by decreasing FY83-98 total awards)

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MUNCIE, IN	120,900	0	0	95	2
SAVANNAH, GA	239,700	65	1	140	2
JOHNSTOWN, PA	254,100	0	0	100	2
EL PASO, TX	561,500	0	0	100	2
LA CROSSE, WI	94,100	0	0	39	1
REDDING, CA	133,100	0	0	49	1
LINCOLN, NE	206,100	0	0	50	1
CORPUS CHRISTI, TX	363,300	0	0	49	1
SHREVEPORT, LA	364,600	0	0	37	1

## Technology Areas

1000 COMPUTER, INFORMATION PROCESSING ANALYSIS

- 1100 Computer and communication systems
- 1110 Computer systems technology
- 1120 Communications 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

## Technology Areas

- 2600 Optical devices and lasers
- 2610 Optical and IR sensors, components
- 2620 Optical-fiber technology
- 2630 Laser technology
- 2640 Higher-frequency EM radiation
- 3000 MATERIALS
  - 3100 Advanced Materials
  - 3110 Metallic, magnetic, high T, 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 Nondestructive evaluation
- 3500 Fundamentals and instrumentation
- 3510 Materials fundamentals/general
- 3520 Instrumentation
- 4000 MECHANICAL PERFORMANCE OF VEHICLES, WEAPONS, FACILITIES
  - 4100 Hydrodynamics
  - 4110 Hydrodynamics
  - 4120 Watertcraft
  - 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 & 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

## Technology Areas

- 4500 Control
- 4510 Control concepts
- 4520 Vehicle/weapon motion control
- 4530 Structural controls
  
- 4600 Mechanical measurements
- 4610 Mechanical measurements (pressure, velocity, etc.)

## 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 and 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, electrochemistry, energy storage
- 5420 Alternative energy conversion
- 5430 Electric power technology

## 6000 ENVIRONMENT AND NATURAL SCIENCES

- 6100 Ocean science
- 6110 Ocean science and instrumentation
  
- 6200 Environmental Protection Technology
- 6210 Atmospheric science and monitoring
- 6220 Remote sensing
- 6230 Chemical and biological measurement
- 6240 Particulates and aerosols
  
- 6300 Water management
- 6310 Water monitoring and characterization
- 6320 Water treatment
- 6330 Water management and utilization
- 6340 Ice, snow, frost detection
  
- 6400 Earth sciences
- 6410 Earth sciences
- 6420 Soil measurement and manipulation
  
- 6500 Environmental Protection Technology
- 6510 Nuclear, chemical, biological waste management
- 6520 CBR defense
- 6521 Remediation of contaminated sites
- 6522 Hazardous and solid waste controls and abatement
- 6523 Monitoring and analytical methods for pollution abatement
- 6524 Air pollution control and abatement
- 6525 Pollution prevention

## 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
  - 7150 Assistive Technology
- 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
  - 7560 Plant physiology

FY98 PHASE I and PHASE II AWARDS by TECHNOLOGY AREA and AGENCY

Technology Area		DOD	DOE	NASA	HHS	NSF	DOT	EPA	ED	DOA	DOC	Total
1000	Computer, Information Processing, Analysis											
1100	Computer and Communication Systems	208,335	17,607	5,572	19,510	2,981	1,912	0	3,696	740	1,972	262,326
1200	Information Processing and Management	93,473	6,488	1,421	18,260	744	2,203	0	1,987	675	1,098	126,347
1300	Signal and Image Processing	86,890	7,771	3,298	12,059	1,719	0	0	1,445	235	898	114,316
1400	Systems Studies	8,692	750	0	1,423	0	0	0	0	0	200	11,065
1500	Mathematical Sciences	5,205	1,565	600	0	0	500	0	0	0	0	7,370
2000	Electronics											
2100	Microelectronics	84,771	8,973	5,928	2,517	1,080	0	138	0	0	294	103,701
2200	Electronics Device Performance	582,319	80,603	32,001	150,928	31,898	3,212	2,246	4,497	12,102	399	900,205
2300	Electronic Equipment and Instrumentation	78,242	7,545	5,739	6,204	1,050	500	70	0	434	949	100,733
2400	Electromagnetic Radiation/Propagation	279,629	22,563	9,207	69,005	31,148	2,712	1,571	3,499	5,985	200	425,520
2500	Microwave and Millimeter Wave Electronics	14,461	525	210	1,017	300	0	0	0	295	75	16,883
2600	Optical Devices and Lasers	144,897	24,877	13,929	10,173	2,395	395	225	0	722	1,349	198,962
3000	Materials											
3100	Advanced Materials	579,866	80,378	35,118	149,684	31,898	3,361	2,316	4,497	12,167	500	899,785
3200	Materials Processing and Manufacturing	43,386	13,683	2,704	738	799	500	225	0	283	600	62,917
3300	Coatings, Corrosion and Surface Phenomena	32,231	12,827	4,145	1,025	1,980	0	295	0	290	94	52,888
3400	Materials Performance	16,167	4,073	70	1,567	400	0	0	0	200	0	22,477
3500	Fundamentals and Instrumentation	5,825	1,875	639	750	0	0	0	0	0	200	9,289
4000	Mechanical Performance of Vehicles, Weapons, Facilities											
4100	Hydrodynamics	1,622	750	0	0	0	0	0	0	0	0	2,372
4200	Aerodynamics	75,821	1,326	7,873	750	288	77	225	0	275	200	86,835
4300	Acoustics	8,429	750	68	749	0	0	0	0	0	423	19,419
4400	Mechanical Performance of Structures and Equipment	97,680	11,137	6,828	2,436	1,376	99	295	300	225	474	120,850
4500	Control	26,657	6,073	1,748	5,597	786	0	225	250	665	424	42,425
4600	Mechanical Measurements	38,707	4,173	4,574	3,855	0	500	0	0	880	0	52,689
5000	Energy and Conversion Use											
5100	Transport Sciences	70,112	18,094	8,235	2,102	2,273	2,061	295	0	670	425	104,266
5200	Propulsion/Combustion Technology	74,293	20,363	13,594	2,148	2,346	0	1,335	50	1,170	494	115,793
5300	Large Scale Energy Usage	7,310	6,999	1,336	173	22,538	0	69	250	0	0	38,674
5400	Energy Conversion/Electric Power	22,402	4,349	2,124	1,588	390	0	68	0	0	0	30,920

dollars in thousands

FY98 PHASE I and PHASE II AWARDS by TECHNOLOGY AREA and AGENCY

Technology Area	DOD	DOE	NASA	HHS	NSF	DOT	EPA	ED	DOA	DOC	Total
<b>6000 Environment &amp; Natural Resources</b>											
6100 Ocean Science	0	0	600	0	0	0	1,746	0	0	0	2,346
6200 Environmental Protection Technology	59,944	6,871	5,106	850	2,260	500	70	0	700	1,025	77,326
6300 Water Management	25,313	8,291	1,681	4,700	1,500	0	724	0	1,524	941	44,674
6400 Earth Sciences	17,529	6,595	1,170	2,729	0	0	744	0	730	199	29,696
6500 Environmental Protection	4,598	1,124	1,170	1,500	0	0	70	0	54	0	8,516
<b>7000 Life Sciences</b>											
7100 Medical Instrumentation	36,862	7,192	2,900	74,490	700	0	0	2,048	230	599	125,040
7200 Biotechnology and Microbiology	25,106	6,070	2,624	68,872	2,213	0	222	0	2,424	294	107,824
7300 Behavioral Sciences	73,434	10,420	2,002	18,430	778	500	225	3,991	660	474	110,915
7400 Physiology and Miscellaneous	5,217	1,200	209	7,016	300	0	0	250	3,111	0	17,303

dollars in thousands



DISTRIBUTION of FY 1998 PHASE I and PHASE II AWARDS AMONG TECHNOLOGY AREAS

Computer, Information Processing, Analysis	Phase I	Phase II
Computer and Communication Systems	46,285	204,351
Information Processing and Management	25,347	95,785
Signal and Image Processing	18,486	90,886
Systems Studies	1,256	7,558
Mathematical Sciences	575	6,675
<b>Electronics</b>		
Microelectronics	16,469	82,082
Electronics Device Performance	225,597	622,172
Electronic Equipment and Instrumentation	17,268	75,106
Electromagnetic Radiation/Propagation	16,043	385,015
Microwave and Millimeter Wave Electronics	2,904	13,366
Optical Devices and Lasers	36,486	151,509
<b>Materials</b>		
Advanced Materials	224,472	623,448
Materials Processing and Manufacturing	11,892	45,493
Coatings, Corrosion and Surface Phenomena	11,088	36,770
Materials Performance	4,836	16,445
Fundamentals and Instrumentation	1,768	5,616
<b>Mechanical Performance of Vehicles, Weapons, Facilities</b>		
Hydrodynamics	220	2,070
Aerodynamics	15,456	68,261
Acoustics	1,808	8,215
Mechanical Performance of Structures and Equipment	23,726	88,089
Control	7,546	33,291
Mechanical Measurements	8,894	42,487

dollars in thousands

DISTRIBUTION of FY 1998 PHASE I and PHASE II AWARDS AMONG TECHNOLOGY AREAS

Energy and Conversion Use	Phase I	Phase II
Transport Sciences	20,614	80,160
Propulsion/Combustion Technology	23,820	86,491
Large Scale Energy Usage	25,496	9,383
Energy Conversion/Electric Power	8,293	21,466
<b>Environment &amp; Natural Resources</b>		
Ocean Science	1,746	600
Environmental Protection Technology	15,664	53,400
Water Management	10,818	30,893
Earth Sciences	5,564	21,226
Environmental Protection	2,239	5,678
<b>Life Sciences</b>		
Medical Instrumentation	20,969	91,955
Biotechnology and Microbiology	26,017	80,014
Behavioral Sciences	19,930	86,513
Physiology and Miscellaneous	5,607	10,722

dollars in thousands

FY 1983 - 1998 PHASE I and PHASE II AWARDS by TECHNOLOGY AREA and AGENCY

Technology Area	DOD	DOE	NASA	HHS	NSF	DOT	EPA	ED	DOA	DOC	Total
<b>1000 Computer, Information Processing, Analysis</b>											
1100 Computer and Communication Systems	873,250	65,727	81,417	174,005	37,212	13,920	456	13,787	4,056	8,652	1,273,767
1200 Information Processing and Management	565,002	42,203	98,999	170,244	285&2	11,465	780	14,869	4,361	5,721	943,684
1300 Signal and Image Processing	477,083	29,100	58,942	92,717	20,023	9,539	295	3,730	3,628	6,358	701,896
1400 System Studies	108,312	8,348	8,151	21,338	2,826	3,498	250	1,094	2,262	250	160,080
1500 Mathematical Sciences	90,180	6,567	50,310	13,557	10,236	1,241	262	188	599	630	176,265
<b>2000 Electronics</b>											
2100 Microelectronics	470,817	49,615	66,461	17,857	30,333	1,693	498	40	780	2,405	640,742
2200 Electronics Device Performance	1,585,588	303,656	333,182	333,182	165,164	17,458	11,433	12,579	34,176	13,967	2,855,157
2300 Electronic Equipment and Instrumentation	409,317	61,024	85,624	58,410	19,042	7,670	2,504	1817	7,171	4,110	658,881
2400 Electromagnetic Radiation/Propagation	1,086,248	171,374	250,346	202,604	124,150	16,362	7,263	9,087	24,195	11,846	1,903,705
2500 Microwave and Millimeter Wave Electronics	93,265	12,131	15,133	3,396	2,130	49	49	30	345	302	126,830
2600 Optical Devices and Lasers	815,952	126,200	135,425	109,145	39,022	5,440	2,260	87	3,364	8,829	1,247,623
<b>3000 Materials</b>											
3100 Advanced Materials	1,772,501	360,414	341,883	390,064	182,119	24,831	14,096	11,526	37,975	14,618	3,150,593
3200 Materials Processing and Manufacturing	236,048	72,235	36,144	22,951	26,026	2,258	5,966	119	4,550	3,149	409,797
3300 Coatings, Corrosion and Surface Phenomena	267,761	64,948	48,920	27,745	30,300	1,697	5,210	0	1,470	2,110	450,262
3400 Materials Performance	138,738	29,785	22,036	12,439	13,886	7,470	570	27	2,078	669	229,069
3500 Fundamentals and Instrumentation	43,561	12,381	16,867	32,399	9,792	422	1,289	50	508	1,365	119,485
<b>4000 Mechanical Performance of Vehicles, Weapons, Facilities</b>											
4100 Hydrodynamics	11,272	1,999	789	0	394	97	0	0	0	259	14,810
4200 Aerodynamics	349,589	8,075	86,816	3,832	3,580	2,365	585	0	945	1,817	457,604
4300 Acoustics	70,207	4,078	5,446	3,864	1,170	497	0	529	105	1,391	87,336
4400 Mechanical Performance of Structures and Equipment	414,024	27,464	44,508	17,755	10,484	4,678	660	560	1,414	1,689	523,661
4500 Control	131,293	24,708	26,707	38,713	7,065	2,201	365	379	1,443	1,466	234,909
4600 Mechanical Measurements	188,444	30,089	30,588	28,273	4,790	4,562	625	168	4,092	1,924	294,164
<b>5000 Energy and Conversion Use</b>											
5100 Transport Sciences	381,836	93,743	109,805	47,730	19,496	4,731	2,549	0	6,150	2,291	669,938
5200 Propulsion/Combustion Technology	361,624	124,911	90,399	30,057	23,297	8,084	8,919	50	4,962	3,492	655,894
5300 Large Scale Energy Usage	65,763	130,116	14,097	23,045	31,230	396	695	340	1,175	1,174	268,505
5400 Energy Conversion/Electric Power	170,444	49,587	41,421	13477	12,234	200	905	0	1,272	199	289,738

dollars in thousands

FY 1983 - 1998 PHASE I and PHASE II AWARDS by TECHNOLOGY AREA and AGENCY

Technology Area	DOD	DOE	NASA	HHS	NSF	DOT	EPA	ED	DOA	DOC	Total
<b>6000 Environment &amp; Natural Resources</b>											
6100 Ocean Science	9,138	2,395	2,974	0	2,098	50	1,746	0	0	2,359	20,759
6200 Environmental Protection Technology	293,841	69,509	73,390	50,479	23,177	8,646	20,131	0	6,626	6,618	552,854
6300 Water Management	122,205	29,173	27,432	17,949	15,886	1,196	13,368	0	8,983	3,298	239,890
6400 Earth Sciences	96,133	31,742	7,350	9,427	13,108	1,144	2,513	608	8,430	924	172,448
6500 Environmental Protection Technology	41,040	14,183	3,749	4,906	4,242	889	13,867	287	855	0	85,096
<b>7000 Life Sciences</b>											
7100 Medical Instrumentation	163,977	32,039	25,570	520,635	12,660	2,924	569	15,624	3,533	2,123	779,855
7200 Biotechnology and Microbiology	111,454	32,258	16,532	683,176	24,781	1,559	1,854	342	17,417	1,132	890,555
7300 Behavioral Sciences	318,478	42,084	23,411	184,656	13,280	7,679	2,224	17,800	6,670	2,036	619,605
7400 Physiology and Miscellaneous	29,871	6,469	14,944	94,106	14,173	867	534	955	38,220	2,121	202,260

dollars in thousands

DISTRIBUTION of FY 1983 - 1998 PHASE I and PHASE II AWARDS AMONG TECHNOLOGY AREAS

Computer, Information Processing, Analysis	Phase I	Phase II
Computer and Communication Systems	343,500	930,267
Information Processing and Management	255,569	688,115
Signal and Image Processing	187,585	514,311
Systems Studies	41,884	118,195
Mathematical Sciences	43,034	133,229

Electronics	Phase I	Phase II
Microelectronics	164,616	476,126
Electronics Device Performance	917,902	1,937,255
Electronic Equipment and Instrumentation	168,688	490,192
Electromagnetic Radiation/Propagation	513,559	1,390,146
Microwave and Millimeter Wave Electronics	30,214	96,616
Optical Devices and Lasers	327,058	920,565

Materials	Phase I	Phase II
Advanced Materials	1,006,290	2,144,303
Materials Processing and Manufacturing	115,738	294,059
Coatings, Corrosion and Surface Phenomena	133,699	316,563
Materials Performance	62,804	166,265
Fundamentals and Instrumentation	32,606	86,879

Mechanical Performance of Vehicles, Weapons, Facilities	Phase I	Phase II
Hydrodynamics	4,713	10,097
Aerodynamics	110,497	347,106
Acoustics	24,598	62,738
Mechanical Performance of Structures and Equipment	145,984	377,677
Control	60,279	174,630
Mechanical Measurements	80,562	213,602

dollars in thousands

(multiple technology areas assigned to awards)

DISTRIBUTION of FY 1983 - 1998 PHASE I and PHASE II AWARDS AMONG TECHNOLOGY AREAS

<b>Energy and Conversion Use</b>	
Transport Sciences	178,392 491,546
Propulsion/Combustion Technology	186,998 468,896
Large Scale Energy Usage	81,918 186,588
Energy Conversion/Electric Power	79,479 210,260
<b>Environment &amp; Natural Resources</b>	
Ocean Science	5,675 15,084
Environmental Protection Technology	147,061 405,793
Water Management	77,796 162,095
Earth Sciences	49,057 123,390
Environmental Protection	27,020 58,076
<b>Life Sciences</b>	
Medical Instrumentation	227,290 552,565
Biotechnology and Microbiology	270,439 620,116
Behavioral Sciences	167,432 452,174
Physiology and Miscellaneous	63,992 138,268

dollars in thousands

