TOOLS FOR ENHANCING SMALL BUSINESS COMPETITIVENESS IN THE DALLAS AREA: A REVIEW OF FEDERAL PROGRAMS

FIELD HEARING

BEFORE THE

COMMITTEE ON SCIENCE
HOUSE OF REPRESENTATIVES

ONE HUNDRED EIGHTH CONGRESS

SECOND SESSION

JANUARY 23, 2004

Serial No. 108–39

Printed for the use of the Committee on Science

Available via the World Wide Web: http://www.house.gov/science

U.S. GOVERNMENT PRINTING OFFICE
91–365PS WASHINGTON : 2004

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512–1800; DC area (202) 512–1800
Fax: (202) 512–2250 Mail: Stop SSOP, Washington, DC 20402–0001

COMMITTEE ON SCIENCE

HON. SHERWOOD L. BOEHLERT, New York, *Chairman*

RALPH M. HALL, Texas
LAMAR S. SMITH, Texas
CURT WELDON, Pennsylvania
DANA ROHRABACHER, California
JOE BARTON, Texas
KEN CALVERT, California
NICK SMITH, Michigan
ROSCOE G. BARTLETT, Maryland
VERNON J. EHLERS, Michigan
GIL GUTKNECHT, Minnesota
GEORGE R. NETHERCUTT, JR., Washington
FRANK D. LUCAS, Oklahoma
JUDY BIGGERT, Illinois
WAYNE T. GILCHREST, Maryland
W. TODD AKIN, Missouri
TIMOTHY V. JOHNSON, Illinois
MELISSA A. HART, Pennsylvania
J. RANDY FORBES, Virginia
PHIL GINGREY, Georgia
ROB BISHOP, Utah
MICHAEL C. BURGESS, Texas
JO BONNER, Alabama
TOM FEENEY, Florida
RANDY NEUGEBAUER, Texas

BART GORDON, Tennessee
JERRY F. COSTELLO, Illinois
EDDIE BERNICE JOHNSON, Texas
LYNN C. WOOLSEY, California
NICK LAMPSON, Texas
JOHN B. LARSON, Connecticut
MARK UDALL, Colorado
DAVID WU, Oregon
MICHAEL M. HONDA, California
BRAD MILLER, North Carolina
LINCOLN DAVIS, Tennessee
SHEILA JACKSON LEE, Texas
ZOE LOFGREN, California
BRAD SHERMAN, California
BRIAN BAIRD, Washington
DENNIS MOORE, Kansas
ANTHONY D. WEINER, New York
JIM MATHESON, Utah
DENNIS A. CARDOZA, California
VACANCY
VACANCY
VACANCY

CONTENTS

January 23, 2004

TOOLS FOR ENHANCING SMALL BUSINESS COMPETITIVENESS IN THE DALLAS AREA: A REVIEW OF FEDERAL PROGRAMS

FRIDAY, JANUARY 23, 2004

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE,
Washington, DC.

The Committee met, pursuant to call, at 10 a.m., in the Bill J. Priest Institute Conference Center, Room 2200, Dallas County Community College, Dallas, Texas, Hon. Nick Smith [Acting Chairman of the Committee] presiding.

COMMITTEE ON SCIENCE
U.S. HOUSE OF REPRESENTATIVES

"Tools for Enhancing Small Business Competitiveness in the Dallas Area: A Review of Federal Programs"

Friday, January 23, 2003
10am
Bill J. Priest Institute Conference Center
Room 2200
Dallas County Community College

Witness List

Mr. Joseph Montes
Regional Administrator
and
Mr. Lavan Alexander
District Director in Dallas-Fort Worth
Small Business Administration

Ms. Jo Anne Goodnight
SBIR and STTR Program Coordinator
National Institutes of Health

Dr. Da Hsuan Feng
Vice President for Research
University of Texas at Dallas

Dr. Robert Slocum
Chair and Chief Technical Officer
Polatomic

Dr. Oliver Murphy
President
Lynntech, Inc.

Section 210 of the Congressional Accountability Act of 1995 applies the rights and protections covered under the Americans with Disabilities Act of 1990 to the United States Congress. Accordingly, the Committee on Science strives to accommodate/meet the needs of those requiring special assistance. If you need special accommodation, please contact the Committee on Science in advance of the scheduled event (3 days requested) at (202) 225-6371 or FAX (202) 225-0891.
Should you need Committee materials in alternative formats, please contact the Committee as noted above.

FIELD HEARING CHARTER

COMMITTEE ON SCIENCE
U.S. HOUSE OF REPRESENTATIVES

Tools for Enhancing Small Business Competitiveness in the Dallas Area: A Review of Federal Programs

FRIDAY, JANUARY 23, 2004
10:00 A.M.–12:00 P.M. (CST)
BILL J. PRIEST INSTITUTE CONFERENCE CENTER
DALLAS COUNTY COMMUNITY COLLEGE
DALLAS, TEXAS

1. Purpose

To increase awareness of the Small Business Innovation Research (SBIR) Program and the Small Business Technology Transfer (STTR) Program, and to learn more about the opportunities that these programs offer to small businesses, especially those owned by minorities and women, in the Dallas area.

2. Witnesses

Mr. Joseph Montes is Administrator of Region VI for the Small Business Administration (SBA) in Dallas, Texas. Mr. Montes will be accompanied by **Mr. Lavan Alexander,** District Director in the Dallas-Fort Worth area for the Small Business Administration.

Ms. Jo Anne Goodnight is Director of SBIR and STTR for the National Institutes of Health (NIH) in Bethesda, Maryland.

Dr. Da Hsuan Feng is Vice President for Research and Graduate Education and Professor of Physics at the University of Texas at Dallas.

Dr. Robert Slocum is Chairman and Chief Technical Officer for Polatomic, Inc, an energy company based in Richardson, Texas.

Dr. Oliver Murphy is President of Lynntech, Inc. of College Station, Texas.

3. Overarching Questions

The hearing will address the following overarching questions:

- In what ways are the SBIR and STTR programs designed to be of assistance to small businesses that wish to do research and develop innovative products either for the government or the private sector?
- What is the University of Texas at Dallas doing to assist high technology small businesses and how does this relate to the work of the Small Business Administration?
- What is the track record of the SBIR and STTR programs in the Dallas area, including with minority and women-owned businesses, and what is being done to enhance the program's relationship in the area and with under-served populations?

4. Appendix

Small Business Innovation Research Program, Congressional Research Service Report, December 5, 2003

Summary

In 1982, the Small Business Innovation Development Act (P.L. 97–219) established SBIR programs within the major federal research and development (R&D) agencies. The intent of the effort was to increase government funding of small, high technology companies for the performance of R&D with commercial potential. Federal departments with an R&D budget of $100 million or more are required to set aside part of this amount to finance the SBIR activity. From its inception in FY 1983 through FY 2002, over $13.5 billion in awards have been made for more than

70,000 projects. The original program was extended several times and is currently scheduled to sunset on September 30, 2008.

Program Description

The Small Business Innovation Research program is designed to increase the participation of small, high technology firms in the federal R&D endeavor. Congressional support for the initiative was predicated upon the belief that while technology-based companies under 500 employees tended to be highly innovative, and innovation is essential to the economic well-being of the United States, these businesses were under represented in federal R&D activities. Agency SBIR programs guarantee this sector a portion of the government's research and development budget to compensate for what was viewed as a preference for financing large corporations.

Current law requires that every federal department with an R&D budget of $100 million or more establish and operate an SBIR program. A set percentage of that agency's extramural research and development budget—originally at 1.25 percent, now at 2.5 percent—is to be used to support mission-related work in small companies. (It should be noted that P.L. 97–219 excluded appropriated funds for defense programs in the Department of Energy from that agency's extramural R&D calculations.) In addition, all departments with R&D spending above $20 million are directed to establish goals for financing small business R&D at levels higher than the previous year.

The objectives of the SBIR program include stimulation of technological innovation in the small business sector, increased use of this community to meet the R&D needs of the government, additional involvement of minority and disadvantaged individuals in the process, and expanded commercialization of the results of federally-funded R&D. To achieve this, agency SBIR efforts involve a three-phase activity. In the first phase, awards up to $100,000 (for 6 months) are provided to evaluate a concept's scientific or technical merit and feasibility. The project must be of interest to and coincide with the mission of the supporting organization. Projects that demonstrate potential after the initial endeavor can compete for Phase II awards of up to $750,000 (lasting one-two years) to perform the principal R&D. Phase III funding, directed at the commercialization of the product or process, is expected to be generated in the private sector. Federal dollars may be used if the government perceives that the final technology or technique will meet public needs. P.L. 102-564, a subsequent 1992 reauthorization of the program, directed agencies to weigh commercial potential as an additional factor in evaluating SBIR proposals. This is to encourage funding of projects that may have market applicability rather than those that meet only the needs of government.

Ten departments have SBIR programs including the Departments of Agriculture, Commerce, Defense (DOD), Education, Energy, Transportation, and Health and Human Services; the Environmental Protection Agency; the National Aeronautics and Space Administration (NASA); and the National Science Foundation (NSF). The Departments of Homeland Security and Housing and Urban Development are expected to begin participating in FY 2004. Each agency's SBIR activity reflects that organization's management style. Individual departments select R&D interests, administer program operations, and control financial support. Funding can be disbursed in the form of contracts, grants, or cooperative agreements. Separate agency solicitations are issued at established times.

The Small Business Administration (SBA) established broad policy and guidelines under which individual departments operate SBIR programs. The agency monitors and reports to Congress on the conduct of the separate departmental activities. Criteria for eligibility in the SBIR program include companies that are independently owned and operated; not dominant in the field of research proposed; for profit; the employer of 500 or less people; the primary employer of the principal investigator; and at least 51 percent owned by U.S. citizens or lawfully admitted permanent resident aliens. The SBA operates a computer system to link SBIR awardees with venture capital firms. P.L. 106–554 mandated the establishment of two data bases, one for government and one for the public, that provide information on SBIR programs across departments.

A pilot effort designed to encourage commercialization of university and federal laboratory R&D by small companies was created by P.L. 102–564, reauthorized through FY 2001 by P.L. 105–135, and extended through FY 2009 by P.L. 107–50. The STTR program provides funding for research proposals that are developed and executed cooperatively between a small firm and a scientist in a research organization and fall under the mission requirements of the federal funding agency. Up to $100,000 in Phase I financing is available for one year; Phase II awards of $500,000 may be made for two years. Financial support for this effort comes from a 0.15 per-

cent set-aside of the R&D budgets of departments that spend over $1 billion per year on research and development. According to the provisions of P.L. 107–50, in FY 2004 the set-aside will increase to 0.3 percent and the amount of individual Phase II awards will increase to $750,000. The Departments of Energy, Defense, and Health and Human Services, NASA, and NSF participate in the STTR program.

Implementation

The General Accounting Office (GAO) is legislatively directed to assess the implementation of the Small Business Innovation Development Act, as amended, and has issued a series of reports documenting its findings. A 1987 study found that both the evaluation and selection processes were sufficient to "reasonably" insure awards were based on technical merit. It was also determined that the majority of agencies were not awarding Phase I grants and contracts within the six-month time frame required by the SBA guidelines. Another GAO report the following month surveyed the participants and noted that most were "generally satisfied" with the administration of SBIR programs.

In 1989, GAO reported that agency heads found the SBIR effort to be beneficial and met the organization's R&D needs. Most indicated that the ". . .SBIR programs had developed new research areas, placed more emphasis on the application of research results, and led to wider use of small businesses as research performers." The study concluded that projects were, for the most part, of high quality. At DOD and NASA, however, SBIR efforts stressed R&D to meet agency mission requirements in contrast to other SBIR programs that focused on commercialization for private sector markets. All of the departments stated that SBIR projects, when compared with other research activities, had greater potential to result in new products and processes.

Testimony presented by GAO in 1991 stated that the program ". . .clearly is doing what Congress asked it to do in achieving commercial sales and developmental funding from the private sector." An SBA study found that approximately one in four SBIR projects will result in the sale of new commercial products or processes. Another GAO report issued in May 1992 noted that despite a short time frame and the fact that many SBIR projects had not had sufficient time to mature into marketable technologies and techniques, ". . .the program is showing success in Phase III activity." As of July 1991, almost two-thirds of the projects already had sales or received additional funding (primarily from the private sector) totaling approximately $1.1 billion.

The 1992 study also identified several issues for possible further congressional exploration. According to GAO, DOD placed less emphasis on commercialization than other agencies and utilized the SBIR program primarily to address the department's R&D needs. Questions were raised about the requirements for competitive bidding when companies looked to federal departments for Phase III contracts after successfully completing Phases I and II. GAO noted that clarification of the Competition in Contracting Act of 1984 (as amended) might be necessary. In addition, there was disagreement over whether the federal agency or the small firm should continue to work on technology development after the cessation of SBIR project funding. GAO also concluded that firms receiving multiple Phase II awards tended to have lower Phase III sales and less additional developmental support. The reasons for this remained unclear, but the suggestion was made that these companies may have focused on securing funds through SBIR awards rather than through commercialization of their R&D results.

A March 1995 GAO report found that multiple Phase II funding had become a problem, particularly at NSF, NASA, and DOD. Among the reasons cited were the failure of companies to identify identical proposals made elsewhere in violation of the mandatory certification procedure; uncertainty in definitions and guidelines concerning "similar" research; and lack of interagency mechanisms to exchange information on projects. Several recommendations were made to address duplication. GAO testimony presented in March 1996 indicated that the SBA had taken steps to implement these suggestions. The study also determined that the quality of research appeared to have "kept pace" with the program's expansion, although it was still too early to make a definitive judgment. Factors supporting this assessment included the substantive level of competition, more proposals deemed meritorious than could be funded by agencies, and appraisals by departmental SBIR personnel indicating the high quality of submissions.

Another GAO study, released in April 1998, noted that between 35–50 percent of SBIR projects had resulted in sales or additional private sector investment. Despite earlier indications of problems associated with multiple award winners, this report found that such firms have similar commercialization rates as single awardees. Critical technology lists were being used to determine agency solicitations and there was

little evidence of participation by foreign firms. While several agencies had new programs to assure continuity in funding, there were indications of possible inaccuracies in defining the extramural R&D budgets upon which the set-aside is based.

The June 1999 GAO analysis reported that SBIR awards tend to be concentrated both geographically and by firm despite widespread participation in the program. "The 25 most frequent winners, which represent fewer than one percent of the companies in the program, received about 11 percent of the program's awards from fiscal year 1983 through fiscal year 1997." Businesses in a small number of states, particularly California and Massachusetts, were awarded the most number of projects. The study also noted that while commercial potential is considered by all agencies, each has developed different evaluation approaches. Other goals, including innovation and responsiveness to agency mission, still remain important in determining awards.

GAO also has evaluated the STTR program. A January 1996 report found that, in general, federal agencies favorably rated the quality of winning proposals (in the first year) and that most projects had commercial potential, although the costs might be high. The government had taken steps to avoid potential conflicts of interest between federal laboratories and departmental headquarters. There was no indication that this pilot effort was competing for proposals with the established SBIR activity or ". . .reducing the quality of the agencies' R&D in general." Instead it was credited for encouraging collaborative work. Yet, GAO noted that because the programs are so similar, there are questions whether or not a separate activity is necessary. Any real evaluation of success in technology transfer, however, could not be accomplished for several years because of the time needed to bring the results of R&D to the commercial marketplace. These findings were reiterated in testimony given by GAO in May and September 1997.

A June 2001 GAO study of all companies which received STTR awards between FY 1995 and FY 1997 noted the participant's belief that both the firms and the research institutions contributed to expanded R&D although the private sector was more influential in determining the direction of the research. The companies ". . .reported about $132 million in total sales and about $53 million in additional developmental funding." They identified 41 new patents and the creation of 12 new spin-off firms. Further, the awardees preferred that the STTR program remain separate from the SBIR activity.

Awards

From its inception in FY 1983 through FY 2001, over 64,248 awards have been made totaling more than $12 billion. The table below summarizes the funding and the number of projects selected for the SBIR program as provided by the SBA; information on the STTR program is contained in the subsequent chart.

SBIR Program: Dollars Awarded and Projects Funded

Fiscal Year	Dollars Awarded (millions)			Awards		
	Phase I	Phase II	Total*	Phase I	Phase II	Total*
FY1983	44.5	—	44.5	686	—	686
FY1984	48.0	60.4	108.4	999	338	1,337
FY1985	69.1	130.0	199.1	1,397	407	1,804
FY1986	98.5	199.4	297.9	1,945	564	2,509
FY1987	109.6	240.9	350.5	2,189	768	2,957
FY1988	101.9	284.9	389.1*	2,013	711	2,724
FY1989	107.7	321.7	431.9*	2,137	749	2,886
FY1990	118.1	341.8	460.7*	2,346	837	3,183
FY1991	127.9	335.9	483.1*	2,553	788	3,341
FY1992	127.9	371.2	508.4*	2,559	916	3.475
FY1993	154.0	490.7	698.0*	2,898	1,141	4,039
FY1994	220.4	473.6	717.6*	3,102	928	4,030
FY1995	232.1	601.9	834.1*	3,085	1,263	4,348
FY1996	228.9	645.8	916.3*	2,841	1,191	4,032
FY1997	277.6	789.1	1,106.7*	3,371	1,404	4,775
FY1998	262.3	804.4	1,066.7	3,022	1,320	4,342
FY1999	299.5	797.0	1,096.5	3,334	1,256	4,590
FY2000	302.0	888.2**	1,190.2	3,166	1,330	4,496
FY2001	317.1	977.3	1,294.4	3,215	1,533	4,748
FY2002	411.5	1,023.4**	1,434.9	4,243	1,577	5,820

*Includes modifications to previous awards and funds set aside for proposals in negotiation.
**Dollars obligated can include modifications to previous year's awards

STTR Program: Dollars Awarded and Projects Funded

Year	Dollars Awarded (millions)			Awards		
	Phase I	Phase II	Total	Phase I	Phase II	Total
FY1994	18.9	—	18.9	198	—	198
FY1995	23	10.7	33.7	238	22	260
FY1996	22.7	41.8	64.5	238	88	326
FY1997	24.2	44.9	69.1	260	89	349
FY1998	19.7	45.1	64.8	208	109	317
FY1999	24.3	40.6	64.9	251	78	329
FY2000	23.9	45.9	69.8	233	95	328
FY2001	24.2	53.2	77.4	224	113	337
FY2002	36.4	55.4	91.8	356	114	470

Chairman SMITH. I am going to do some preliminary, and maybe even I will make some of my comments to you folks.

I am Nick Smith, a Member of Congress from Michigan, who has been on the Science Committee for 12 years, and it just seems to me that since government is in a particular sort of a crunch situation right now, because we are spending a lot of money on homeland security. So, that means that the oversight of every program, including the two programs we are going to discuss today, we are going to look very carefully at, are ways to be more efficient, to be more productive, how can we help small business more, and at the same time try to make sure taxpayers get their bang for the buck.

I see the organizer of this meeting, and we're not on record yet, Eddie Bernice, but we will be when you take your seat.

Mr. BARRISH. All right, thank you, Congressman Smith. My name is Jim Barrish, I'm the Director of Technology Assessments Program.

Chairman SMITH. Jim, sorry, I didn't know you were going to do that.

Mr. BARRISH. No problem. I'd like to say a few words first, and welcome you all here to the Bill J. Priest Institute. One of the processes of this hearing today, what we'd like to do is, many of you will have questions and we are going to try to if you could jot those down on a piece of paper and pass them forward they will be picked up by Ms. Harrington here, she just raised her hand. She's going to be passing out some little note pads, so we'd appreciate if you could do that, and that will help us to keep an orderly manner of the question and answer process.

Congresswoman Johnson and Congressman Smith are just about ready to go, but first off I'd like to have the President of Bill J. Priest Institute welcome you here and say a few words. The President is Dr. Glen Downs.

Dr. DOWNS. Good morning. I'm going to just say just a welcome, and I know the Congressmen and Congresswoman have much to do and much to accomplish this morning. We want to first of all welcome you and our very good friend, Congresswoman Johnson, who has supported us so well, and we are delighted to have a Michigan man with us today as well. So, thank you.

But, welcome to the Bill J. Priest Institute, and we're delighted to have you here, and we are always pleased with what the STTR efforts are doing, and we are looking forward to our conference coming up in May on the STTR conference on May the 11th. So, I wanted to make sure you put that down.

But, welcome this morning, and just from a logistics standpoint, restrooms, if you need those, are down the hall to the right, so make yourselves at home, and if we can help you in any way here this morning be sure to call us.

Thank you very much.

Mr. BARRISH. Okay.

Chairman Smith, we'll turn it over to you and Eddie Bernice.

Chairman SMITH. Well again, thank you all for coming this morning, and any ideas or suggestions that you have that you don't get a chance to somehow convey this morning, please feel free to contact Congresswoman Johnson or myself. I mean, what we are

trying to do is make sure the program is running as effectively and efficiently as it can, both the SBIR and the STTR program.

We want to make sure that we are maximizing and developing the kind of research that's going to be most helpful, both to government and to the private sector.

It seems to me that research is one of our keys in developing the kind of products that people around the world are going to want to buy, developing the kind of products that we in government can make, that we can use and be more efficient in what we are trying to produce as a government, and developing the kind of research that's going to allow us to find more efficient ways to develop those products.

So, the future of our economy that's under very strong competition right now from other countries around the world is the challenge that our kids and our grandkids are going to have in the future.

I'd like to especially thank Eddie Bernice Johnson for arranging this hearing today, this Science Committee hearing.

This Science Committee has four full committees. This is the Research Subcommittee of Science. We take a lot of pride, I think, in our good relations in the Science Committee between Democrats and Republicans. The Representative and I, particularly, I think, work together too, and we've accomplished some good bills for the National Science Foundation, probably one of our largest responsibilities.

Federal agencies, of course, with research dollars of over $100 million are obligated to be part of the SBIR program, and if an agency has over a billion dollars then they are required to spend part of that money in the STTR program.

The SBIR and the STTR programs, the goal is to promote economic growth and to allow government to act more effectively and more efficiently for the products that they buy.

The initial funding is distributed competitively. SBIR and STTR programs help eliminate some of the financial barriers to research and development efforts of small businesses that are so important for increasing revenue and ultimately creating jobs. So, in addition to how it can help small business and economic development in this area of the country, we are going to take back your suggestions and ideas of how it can help in the United States, and also how can we do it more effectively. Is there a chance that we might take some of the eventual profits from a company that has been stimulated by taxpayer dollars going into being part of the research effort to come back as a revolving fund or to come back possibly with what Dr. Slocum has suggested in terms of being a mentor for other companies and giving some of that some of your time and encouraging other companies how to get involved in this government program.

We'll be looking at how the money that you get is received as a small business, does that go on your tax returns as income? Is it also eligible for the research development tax credit, and so we are interested and probably, or at least I've got some questions, Eddie Bernice, on the whole ramifications and how do we do a better job.

With that, let me again appreciate the chance to be here and thank Eddie Bernice again for arranging and organizing this hear-

ing, and so with that, Congresswoman, I would turn the microphone over to you.

Ms. JOHNSON. Thank you very much, Mr. Chairman, and thank you for coming to this sunny day in Texas. I know it's not like this in Michigan right now, and you won't be here long, but do enjoy.

Chairman SMITH. Well, and just to interrupt, I do, I've got a meeting in Pittsburgh and my plane leaves at 12:40, so I'll try not to talk long and I'll turn it over to you.

Ms. JOHNSON. Okay, thank you very much, and let me thank the Dallas County Community College District for hosting us, and all of the panelists who have come, and all of you who are availing yourselves for this information.

Can you hear me? Now, can you hear me? Is that better? Okay, now am I sounding a little bit more clear.

Again, let me thank the Dallas County Community College District for hosting us today, and I want to thank my chair, Mr. Smith, for traveling here from Michigan. We all stay so busy and I knew that he would be, as we all are. And, I thank the panelists for being here, and you.

I think it really is an important hearing to increase the awareness of the Small Business Innovation Research, the SBIR program as we call it, and the Small Business Technology Transfer, which we call the STTR program, and to learn about the opportunities that these programs offer to small businesses, especially those owned by minorities and women.

We want to thank Mr. Jim Barrish, who has worked very hard in putting all the logistics together. He's accustomed to me coming down and borrowing these facilities. And finally, I'm going to cut my prepared remarks short and simply submit them to the record so that we can go ahead and get started.

I want to apologize for being a little bit late. I started out going to be here early, but an accident on the freeway slowed me down a bit, and there's only way out from where I live.

This is a funding vehicle which is vastly under tapped by small businesses in this metroplex, and by research universities. So, when the State of Texas is viewed as a whole, it does not do badly under the SBIR program, but when we look at this area we find that we are not taking advantage of it.

Texas received a total of 540 grants worth of $106 million out of $1.4 billion awarded nationwide in 2002. So, when one looks regionally within the state it's a different story, less than 20 north Texas companies have taken advantage of this.

So, I believe that for our region this is a particularly important funding source, and there are 700 hardware suppliers for the Department of Defense, and many of them are hardly Raytheon-like companies, far less than a billion dollars in revenue, and far less than 400 employees. So, I know that we have plenty of companies who can take advantage of this.

Without further comment, I'm going to turn this back over to Mr. Smith so we can proceed with our witnesses.

Chairman SMITH. Would you like to introduce the witnesses?

Ms. JOHNSON. Okay.

We have Mr. Joseph Montes, who is a Region Administrator, and Mr. Lavan Alexander, who is the District Director of the Dallas-

Fort Worth Small Business Administration, and I'm delighted that they were able to come, especially Mr. Alexander who got a very late invitation. Ms. Jo Anne Goodnight, who is the Program Coordinator for the National Institutes of Health for the SBIR and the STTR Programs. Dr. Feng, who is Vice President for Research at the University of Texas at Dallas, and I tell you he is very active. We are in touch very often. I am delighted you are here. Dr. Robert Slocum, who is Chair and Chief Technical Officer of the Polatomic, which I'm assuming is one of the businesses, and Dr. Oliver Murphy, who is President of Lynntech, Incorporated.

Chairman SMITH. These are people that are coming in, that are teleconferencing in from the Small Business Administration. In fact, I'll grab your mike, Eddie Bernice.

Ms. JOHNSON. Okay, I was wondering who was teleconferencing.

Chairman SMITH. The teleconferencing, besides the Science Committee in Washington, teleconferencing in from the Small Business Administration, Victor Klingelhofer, Maurice Swinton, and Brad Berry, all from the Small Business Administration.

And, with that, we will proceed, and without objection the full text of every witness' testimony will be included in the record. This record is made available to all Members of the Science Committee, so even though there are only two of us here today this information will be available, not only to all the Members of our subcommittee, but all the Members of the Science Committee, and I would ask that the witnesses try to limit their presentation to five to seven minutes, so that maybe we can get on and have a little more time for questions, and with that, Dr. Murphy, we'll start with you, unless David Finger, my Science Committee staff, told me that we are going to start with Mr. Alexander.

Mr. ALEXANDER. What we are going to do is start with the Regional Administrator, who will just do one statement to cover both. The other we'll put on record.

Chairman SMITH. So, Mr. Montes.

STATEMENT OF JOSEPH MONTES, ADMINISTRATOR OF REGION VI FOR THE SMALL BUSINESS ADMINISTRATION in DALLAS, TEXAS; ACCOMPANIED BY LAVAN ALEXANDER, DISTRICT DIRECTOR, DALLAS-FORTH WORTH, SMALL BUSINESS ADMINISTRATION

Mr. MONTES. Thank you, Mr. Chairman, Congresswoman Johnson, for inviting the U.S. Small Business Administration (SBA) to testify at your hearing this morning.

The Small Business Innovation Research (SBIR) program, as you know, is a highly-competitive program that encourages small business to explore their technological potential and provides the incentive to profit from its commercialization.

Small businesses need only to certify that they meet the program's eligibility criteria to participate in the SBIR and Small Business Technology Transfer (STTR) programs.

In 1992, the Congress enacted Public Law 102–64, which authorized the STTR program, a companion program to SBIR. In 2002, Public Law 107–50 reauthorized the STTR program through Fiscal Year 2009.

Even though the SBIR program was a success, Congress felt that more could be done to link small businesses with creative ideas and technology at the universities' non-profit scientific and educational institutions and federal laboratories. This collaboration will result in a better commercialization rate for federally-sponsored research conducted at non-profit institutions.

Both programs share the same philosophy, to use federally-funded research and development requirements to promote technological innovation by small businesses and strengthen the American economy.

Small businesses that have been successful in the SBIR and STTR programs have been those that have submitted proposals demonstrating both a high level of technical merit and the ability to use available resources such as subcontractors and laboratories to assist in developing and delivering the required research.

Following submissions or proposals, agencies make SBIR and STTR awards based on small business qualification, degree of innovation, technical merit and future market potential. Small businesses that receive awards then begin, as you know, a three-phase program. Phase I for the SBIR program is essentially the start-up phase. Awards of up to $100,000 for approximately six months duration support exploration of the technical merit or feasibility of an idea or technology. Phase II then awards of up to $750,000 for up to two years, which expand Phase I results. The Phase II award decision process requires, among other things, substantive consideration of a proposal's commercial potential. Phase III is, essentially, the commercialization process. At that phase, no SBIR funds support the program.

Like SBIR, the STTR program is structured in three phases. STTR goes beyond the SBIR program, in that it involves cooperative research and development performed jointly by a small business and a research institution.

Although the project is a joint effort, the small business exercises overall management, control and responsibility for the project.

I should note that in this past year, as part of the overall government program review process initiated by the Office of Management and Budget, the SBIR/STTR programs of the Departments of Defense and Commerce were reviewed with the Program Assessment Rating Tool. Those reviews and corresponding recommendations will be published in conjunction with the release of the President's Fiscal Year '05 budget.

Some of the successful companies here in Texas who have participated in the SBIR and STTR programs are: Knowledge Based Systems of College Station, Texas, which commercialized a knowledge based software tool that facilitates optimization model development; Polatomic, Incorporated, of Richardson, developed a magnetometer developed under an SBIR award to fill the U.S. Navy's need for a high-performance sensor for detection and localization of magnetic targets of interest for anti-submarine warfare; and OmniSite Bio Diagnostics of Austin, which has developed technologies extended into human diagnostics, therapeutics, home care and pharmaceutical sectors, in addition to homeland defense, biological warfare, veterinary, agricultural and environmental markets.

In Fiscal Year '02, the most recent year for which data is available, the State of Texas ranked ninth among all states, the District of Columbia, and Puerto Rico, in terms of total dollars received from SBIR program funding. That year, 220 SBIR awards were made to small, high-tech businesses in the State of Texas totaling $53 million, 11 awards totaling $2,752,000 were made to businesses that certified that they were minority owned, 23 awards totaling $4 million were made to businesses that certified that they were woman owned. The 220 SBIR awards made to firms in Texas represent awards to 89 unique businesses.

In Fiscal Year '02, the State of Texas ranked fifth among all the states, the District of Columbia, and Puerto Rico, in terms of total dollars received from STTR program funding. That year, 21 STTR awards were made to small, high-tech businesses in the State of Texas, totaling $4.3 million, three awards totaling $700,000 were to businesses that certified that they were minority-owned, one award, totaling $483,000, was made to a firm that certified that it was woman owned. The 21 total STTR awards made to firms in Texas represent awards to 20 unique businesses.

This concludes my presentation. Thank you very much, Mr. Chairman.

[The prepared statement of Mr. Montes follows:]

PREPARED STATEMENT OF JOSEPH MONTES
FOR VICTOR G. KLINGELHOFER
ASSOCIATE DEPUTY ADMINISTRATOR
OFFICE OF GOVERNMENT CONTRACTING AND BUSINESS DEVELOPMENT
U.S. SMALL BUSINESS ADMINISTRATION

Thank you for inviting me to discuss the Small Business Innovation Program and the Small Business Technology Transfer Program.

The Small Business Innovation Development Act of 1982, Public Law 97–219 (as amended) directs the U.S. Small Business Administration (SBA) to establish policy for monitoring, evaluating, and reporting on accomplishments of the Small Business Innovation Research (SBIR) program. Public Law 106–554 reauthorized the program through September 30, 2008.

The SBIR program is a highly competitive program that encourages small business to explore their technological potential and provides the incentive to profit from its commercialization. Small businesses need only certify that they meet the following eligibility criteria to participate in the SBIR and Small Business Technology (STTR) programs:

(a) The concern must be organized for profit, although it can take the form of a sole proprietorship, partnership, limited liability company, corporation, association, trust, cooperative or joint venture;

(b) The concern must be 51 percent owned and controlled by one or more U.S. citizens or permanent resident aliens and must have a significant place of business in and operate primarily within the U.S.;

(c) Principal researcher must be employed more than 50 percent by the small business; and

(d) The concern's size limit must be 500 employees or fewer.

In 1992, the Congress enacted Public Law 102–564, which authorized the STTR program, a companion program to SBIR. In 2002, Public Law 107–50 reauthorized the STTR program through FY 2009. Even though the SBIR program was a success, Congress felt that more could be done to link small businesses with creative ideas and technology at universities, non-profit scientific and educational institutions, and federal laboratories. This collaboration would result in a better commercialization rate for federally sponsored research conducted at non-profit institutions. Both programs share the same philosophy to use federally-funded research and development requirements to promote technological innovation by small businesses and strengthen the American economy.

Small businesses that have been successful in the SBIR and STTR programs have been those that have submitted proposals demonstrating both a high level of technical merit and the ability to use available resources such as subcontractors and laboratories to assist in developing and delivering the required research. Many of the unsuccessful proposals submitted to the programs have lacked technical merit, did not address the research effort fully, attempted to perform the research effort on their own without having the necessary internal resources to accomplish this effort, and/or dud not include all of the necessary forms, certifications and or other documents required by the requesting procuring agency. I am certain that testimony of my colleagues at the National Institutes of Health and the National Science Foundation can provide additional information on this issue from their experience.

Following submission of proposals, agencies make SBIR and STTR awards based on small business qualification, degree of innovation, technical merit, and future market potential. Small businesses that receive awards then begin a three-phase program.

Phase I for the SBIR program is essentially the start-up phase, involving a solicitation of contract proposals or grant applications to conduct feasibility-related experimental or theoretical R/R&D related to describe agency requirements. Awards up to $100,000 for approximately six-months duration support exploration of the technical merit or feasibility of an idea or technology.

Phase II awards of up to $750,000, for up to two years, expand Phase I results. The Phase II award decision process requires, among other things, substantive consideration of a proposal's commercial potential.

Phase III refers to work that derives (from, extends, or logically concludes effort(s) performed under prior SBIR funding agreements. This comprises the period during which Phase II innovation moves from the laboratory into the marketplace. No SBIR funds support this phase.

Like SBIR, the STTR program is structured in three phases. Phase I in the STTR program is funded at up to $100,000 for a one-year period. Phase II funds Phase I projects that have the most potential for further development at up to $750,000 for up to an additional two years. Under Phase III, no federal STTR funding is provided to bring the innovation to the commercial marketplace.

STTR goes beyond the SBIR program in that it involves cooperative research and development performed jointly by a small business and a research institution. Although the project is a joint effort, the small business exercises overall management, control, and responsibility for the project.

Since inception of the program, over 12,000 awards have been made totaling $549 million. Minority/disadvantaged firms have received 312 awards totaling $63.5 million.

SBA's role in the SBIR and STTR programs is to:

- Develop, coordinate, issue and update the policy directive.
- Develop and administer information and outreach programs for the SBIR and STTR programs.
- Develop and maintain a source and information file of interested small businesses.
- Survey, monitor and report on each agency's SBIR and STTR programs.
- Report annually to Congress on each agency's SBIR and STTR program.

The SBIR and STTR programs continue to demonstrate that, with program support from the Federal Government, small high-tech firms can convert basic ideas and research into commercial products. This partnership between the Government and private sector has proved to be remarkably effective in some areas.

Over a 20-year period, federal agencies participating in the SBIR program have awarded more than 69,000 awards worth over $13.3 billion to thousands of small high-tech companies. Minority/disadvantaged firms have received over 8,000 awards totaling $2.9 billion. Awards have been made to firms in all 50 states, Puerto Rico and the District of Columbia.

I should note that in this past year, as part of the overall government program review process initiated by the Office of Management and Budget, the SBIR/STTR programs of the Departments of Defense and Commerce were reviewed with the Program Assessment Rating Tool (PART). Those reviews and corresponding recommendations will be published in conjunction with the release of the FY 2005 President's Budget.

The SBA, through its Federal and State Technology Partnership (FAST) program, requires that applicants to the program address in their proposal submissions for funding how they will provide outreach and technical assistance to minority and women-owned firms within their respective states. This criterion is weighted and

evaluated by a peer review panel that selects the grantees for the FAST program. The SBA also has been the lead agency for the past five years in an initiative to provide outreach and technical assistance to the Historically Black Colleges and Universities (HBCUs), Small Disadvantaged, Minority and Women-owned businesses. Through a partnership between the Environmental Protection Agency (EPA), Defense Advanced Projects Agency (DARPA) and the SBA, representatives at various HBCUs were engaged by the co-sponsoring federal program managers to train them in the program administration and technical components of the SBIR and STTR programs. This has enabled the HBCUs to become mentors within their given states or regions and assist in increasing the participation level of the underrepresented groups. This initiative has proven to be very successful. Both the EPA and DARPA have acknowledged increases in their programs by small disadvantaged, minority and women-owned businesses. Other participating federal agencies have also witnessed an increase in the number of proposals received for their agencies SBIR and STTR programs.

Some of the successful companies in Texas who have participated in the SBIR and/or the STTR programs are:

(1) Knowledge Based Systems, Inc, College Station, Texas, commercialized a knowledge based software tool that facilitates optimization model development;

(2) Polatomic, Inc., Richardson, Texas, developed a magnetometer developed under an SBIR award to fill the U.S. Navy's need for a high performance sensor for detection and localization of magnetic targets of interest for Anti-Submarine Warfare; and

(3) OmniSite BioDiagostics, Inc, based in Austin, Texas, has developed technologies extending into human diagnostic, therapeutic, home care, and pharmaceutical sectors, in addition to homeland defense, bio-warfare, veterinary, agricultural, and environmental markets.

Additional stories on the awards that have impacted businesses in Texas and elsewhere can be found in the SBA's SBIR and STTR Annual Reports to Congress, and also on the SBA's SBIR website at *www.sba.gov/sbir* listed under the information for the Federal and State Technology Partnership Program (FAST). The SBA will also forward copies of the most recent SBIR and STTR Annual Reports to the Members of this hearing.

In Fiscal Year 2002, the most recent year for which data is available, the state of Texas ranks ninth among all states, the District of Columbia, and Puerto Rico in terms of total dollars received from SBIR program funding. That year, 220 SBIR awards were made to small, high-technology businesses in the State of Texas totaling $53,422,476. Eleven awards totaling $2,752,756 were made to businesses that certified that they were minority-owned. Twenty-three awards totaling $4,250,893 were made to businesses that certified that they were woman-owned. The 220 total SBIR awards made to firms in Texas represent awards to 89 unique businesses.

In Fiscal Year 2002, the state of Texas ranks fifth among all states, the District of Columbia, and Puerto Rico in terms of total dollars received from STTR program funding. That year, 21 STTR awards were made to small, high-technology businesses in the State of Texas totaling $4,353,693. Three awards totaling $699,333 were made to businesses that certified that they were minority-owned. One award totaling $483,781 was made to a firm that certified that it was woman-owned. The 21 total STTR awards made to firms in Texas represent awards to 20 unique businesses.

Thank you for the opportunity to provide you this written testimony.

Chairman SMITH. Thank you.

Ms. Goodnight.

STATEMENT OF MS. JO ANNE GOODNIGHT, PROGRAM COORDINATOR, OFFICE OF EXTRAMURAL RESEARCH, NATIONAL INSTITUTES OF HEALTH, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, BETHESDA, MARYLAND

Ms. GOODNIGHT. Good morning, Mr. Chairman, Congresswoman Johnson, and Members of the Committee receiving the written record.

My name is Jo Anne Goodnight. I am the Coordinator of the Small Business Innovation Research and Small Business Tech-

nology Transfer programs at the NIH, National Institutes of Health, and also for the Public Health Agencies in the Department of Health and Human Services. On behalf of the NIH, I am pleased to have the opportunity to provide an overview of the NIH SBIR and STTR programs.

My long statement focuses primarily on the role that SBIR and STTR plays in the NIH research agenda, ways small businesses can take advantage of the research funding opportunities these programs offer, and I'll end with a few of our success stories.

The NIH constitutes about 98 percent of the Department's entire SBIR and STTR program activity. In addition, of the 11 participating federal agencies our department contributes the second largest amount of SBIR and STTR funding.

In Fiscal year 2003, the NIH SBIR and STTR budget was about $557 million. However, NIH tends to invest more than the minimum statutory requirement, resulting in actual obligations of $564 million. NIH made about 2,000 SBIR awards, amounting to $533 million, and 152 STTR awards, amounting to $31 million.

The State of Texas received from NIH a total of 81 SBIR awards, for a total of $19.1 million, and seven STTR awards amounting to $2 million in Fiscal Year 2003. Of these, Dallas received six SBIR grant awards and one STTR award, totaling about $1.4 million.

The NIH mission is to uncover new dollars that will lead to better health for everyone. The SBIR and STTR programs help us accomplish the mission, particularly in the goal of translating scientific findings and advances from the test tube to the medicine cabinet.

Through a competitive three-phase award system, the programs provide qualified small business concerns with opportunities to propose innovative ideas, to explore their technological potential, and to profit from commercialization of federally-funded R&D projects that are relevant to our mission. We've watched the programs evolve through stages of infancy when a Phase I award was but $50,000 for six months, through some trials and tribulations of adolescence, into a mature, yet now invigorated program.

NIH has 23 institutes and centers that participate in the SBIR and STTR programs, and each of these awarding components has a research mission with well-defined priorities. Examples of the types of research we support include, but certainly are not limited to, biodefense, biosensors, nanotechnologies, proteomics, imaging, bioengineering, behavioral research, computational biology and telemedicine technology.

While we issue solicitations for projects on specific topics relevant to each Institute and Center, we also encourage small businesses to propose investigator-initiated research ideas relevant to our mission. Investigator-initiated ideas are the cornerstone of the NIH research portfolio, including projects supported by the SBIR and STTR programs.

Now, for a company to obtain an SBIR or STTR award, it must take several steps. Start with an innovative idea with commercial potential. Understand our agency's mission and areas of research we support. Discuss the idea with our relevant program staff. Submit the application for a scientific and technical merit review. Discuss with program staff the outcome of the review and obtain guid-

ance for the next steps. Meet the eligibility criteria for a small business concern as defined by the Small Business Administration and demonstrate research integrity.

While there are 11 federal agencies that participate in a national SBIR program, it's not a one-size-fits-all program, given our varying missions and needs. Procedures that distinguish the NIH SBIR and STTR programs from those at other agencies are primarily a result of the degree of flexibility that the SBA has provided to accommodate the changing nature of biomedical and behavioral research.

What has made our program so appealing are the opportunities for firms to propose R&D in the fields that have the most biological promise, rather than to restrict their ideas to projects that can only be conducted under a prescribed amount of time and money. Other distinguishing features of the NIH SBIR and STTR programs include multiple submission dates, allowability of amended application, and gap funding options.

NIH has taken steps to enhance and streamline of programs, particularly, with regard to bridging the gaps between the phases and enhancing our outreach endeavors. Within the State of Texas, NIH was pleased to be a major participant at yesterday's Southwest SBIR and STTR Forum, hosted by UH SBDC, Bio Houston, Rice University and Houston Technology Center.

Last June, NIH participated in an SBIR and STTR ATP Workshop in Dallas, hosted by the Dallas Forum of Biomedical Technology and the North Texas SBDC, an event that was attended by about 140 participants, and we're looking forward to participating in similar events this May.

A number of NIH SBIR and STTR projects have resulted in significant improvements to our nation's health and an increased productivity of other researchers. I would like to describe just a few successes in particular that exemplify the kind of SBIR and STTR research that NIH supports.

Looking back now more than 20 years to one of the earliest SBIR projects that NIH supported, funding allowed OPTIVA Corporation in the State of Washington to develop a nine-volt powered toothbrush, the Dentifreeze Dispensing Sonic Brush, which we have all come to know as the Sonicare Toothbrush. In addition to the health benefits, this project resulted in a $300 million business and the creation of over 500 jobs. OPTIVA was sold to Philips Electronics in 2000.

Plexon, Inc., in Dallas, Texas, received an NIH Phase I and Phase II award to develop an automated procedure for detecting and separating extracellular neural action potentials, or spikes, in real time. A diagram is included in my written statement for the record to portray this technology, which has applications to aid physically-impaired individuals. In addition to providing insight into the basic brain function, this technology has broad implications in the development of interfaces for direct brain-machine communication and prosthetic devices for nervous system impaired individuals. Plexon has grown from a small, one-person company, to a 20-employee company of a highly-focused team of engineers, biophysicists and neuroscientists, with R&D and technical expertise. Joint R&D activities are being conducted with the University of

North Texas, as well as other research institutions. Plexon's sales have reached the $3 million per year mark, and their customers include over 75 domestic and international academic research labs, research hospitals, pharmaceutical companies and military research labs.

There are two additional success stories that are in my written statement, from Nano Matrix, Incorporated, in Dallas, Texas, as well as MicroFab Technologies, Incorporated, in Plano, Texas.

Thank you for the opportunity to describe how NIH has utilized the programs and benefitted from them, and I'd be pleased to answer any questions you may have.

[The prepared statement of Ms. Goodnight follows:]

PREPARED STATEMENT OF JO ANNE GOODNIGHT

Good morning Mr. Chairman, Congresswoman Johnson, and Members of the Committee. My name is Jo Anne Goodnight. I am the Coordinator of the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Programs at the National Institutes of Health (NIH) and for the Public Health agencies in the Department of Health and Human Services. On behalf of the NIH, I am pleased to have the opportunity to provide an overview of the NIH SBIR and STTR Programs. My statement focuses on eight areas:

- the role SBIR and STTR plays in the NIH research agenda,
- the types of research NIH supports under SBIR and STTR,
- steps a company needs to take to obtain an SBIR or STTR award,
- features that distinguish the NIH SBIR and STTR programs from those at other agencies,
- common strengths and weaknesses in NIH SBIR and STTR application,
- the effectiveness of these Programs,
- efforts to enhance the Programs, and, finally,
- a few of our NIH SBIR and STTR "success" stories.

The NIH is the principal operating component within the Department of Health and Human Services participating in the SBIR and STTR program. We constitute about 98 percent of the Department's entire SBIR program activity. In addition, of the 11 participating federal agencies, our Department contributes the second largest amount of SBIR and STTR funding. In fiscal year (FY) 2003, the NIH SBIR/STTR budget was about $557 million. However, NIH chose to invest more than the minimum statutory requirement, resulting in actual obligations of $564 million. NIH made about 2000 SBIR awards (grants and contracts) amounting to $533 million and 152 STTR awards amounting to $31 million. The State of Texas received a total of 81 SBIR awards (amounting to $19.1 million) and seven STTR awards (amounting to $2.0 million) in FY 2003. Of these, Dallas received six SBIR grant awards and one STTR award, totaling nearly $1.4 million. In FY 2003, about 24 percent of all Phase I SBIR applicants and 44 percent of all Phase II SBIR applicants were funded; 27 percent of Phase I STTR and 43 percent of Phase II STTR applicants received awards.

Role SBIR and STTR Plays in the NIH Research Agenda

The NIH mission is to uncover new knowledge that will lead to better health for everyone. In the course of that mission, NIH uncovers new knowledge about the prevention, detection, diagnosis, and treatment of disease and disability through the support and conduct of biomedical and behavioral research. The SBIR Program, first authorized in 1982, and the STTR Program, authorized in 1992, play a role in the NIH scientific research and development (R&D) arena. Through a competitive, three-phase award system, the Program provides qualified small business concerns with opportunities to propose and develop innovative ideas. The Program encourages small businesses to explore their technological potential and provides the incentive to profit from commercialization of federally-funded R&D projects.

The SBIR and STTR programs, now more than 20 years old, have become fully integrated into the overall scientific programs and goals of the NIH. The SBIR and STTR programs help accomplish the NIH mission to improve human health—particularly in the goal of translating scientific findings and advances from the "test tube to the medicine cabinet" as well as through the development of innovative

products or services that speed the process of discovery, reduce the cost of medical care, and improve research tools.

We have watched the program evolve through stages of infancy when a Phase I award was $50,000 for six months, through some trials and tribulations of adolescence, and into a mature, yet invigorated program. The NIH continues to serve the legislative intent of stimulating technological innovation in the small business research community as well as enhancing collaborative efforts with the academic research community. In addition, we strive to foster and encourage the participation of women, minority and disadvantaged persons in this program, improve the Federal Government's dissemination of information about the SBIR program, and increase the private sector's commercialization of technology developed through federal R&D.

Types of Research NIH Supports Under SBIR and STTR

NIH has 23 Institutes and Centers that participate in the SBIR/STTR Program. Each of these awarding components has a research mission with well-defined priorities that address science and health from a specific perspective, disease area (e.g., cancer) or area of concern (e.g., aging). Given 23 different awarding components, it is not difficult to imagine the breadth and depth of science that NIH supports. Some of the topic areas identified in our grant solicitation include, but are not limited to, biodefense, biosensors, nanotechnologies, bioinformatics, imaging technologies, bioengineering, behavioral research, computational biology, telehealth technologies, and proteomics/genomics. While we issue solicitations for projects on specific topics relevant to each Institute and Center (IC), we also encourage small businesses to propose investigator-initiated, mission-related and commercially-viable research ideas. Investigator-initiated ideas are the cornerstone of the NIH research portfolio, including projects supported by the SBIR/STTR programs.

Seven Effective Steps to Obtain an SBIR or STTR Award

A company must take several steps to obtain an SBIR/STTR award:

1) Start with an innovative idea with commercial potential.
2) Understand our agency's mission and areas of research we support. These are described in the grant and contract solicitations and on the websites of the NIH ICs.
3) Contact relevant program staff to discuss the project and identify a potential "fit" in an IC's programmatic area.
4) Submit an application for scientific and technical merit review.
5) Discuss with program staff the outcome of the review and obtain guidance for next steps.
6) Meet the eligibility criteria for a small business concern as defined by the Small Business Administration.
7) Demonstrate research integrity.

Features That Distinguish the NIH SBIR/STTR Programs From Those at Other Agencies

There are several features that distinguish the NIH SBIR and STTR Programs from those at other agencies. These features are primarily a result of the degree of flexibility that the Small Business Administration (SBA) has provided to permit functional accommodations to support each agency's mission outcomes.

Award amounts and project periods. What have made our Programs so appealing are the opportunities for firms to propose R&D projects with truly revolutionary outcomes rather than restrict their ideas to projects that can only be conducted under a prescribed amount of time and money. Our experience is that the conduct of certain types of biomedical and behavioral research, such as nanotechnology, clinically-related studies, vaccine development, and drug discovery does not routinely lend itself to prescribed maximum time and dollar levels. These are exceptions, but such projects can be important steps in integrally involving small businesses in some of the most exciting, cutting-edge research. The latitude supported by the SBA encourages companies to propose R&D in fields that have the most biological promise.

Submission dates and amended applications. Other distinguishing features of the NIH SBIR/STTR Programs relate to "closing" or submission dates and amended applications. NIH offers multiple submission dates through the calendar year. In addition, an applicant, if unfunded, may submit up to two revised applications on any of the three submission dates. Entrepreneurs innovate constantly, so in an effort to foster technological innovation, we provide opportunities throughout the year, a

minimum of three dates, for small businesses to submit a new or revised Phase I (feasibility study) or a Phase II (full R&D project) application.

Gap funding options. Another feature that distinguishes NIH form other SBIR/STTR agencies concerns the lag time that typically occurs between Phase I and Phase II, and between Phase II and Phase III. To address one of the most difficult issues faced by researchers in the small business community, namely the gap in funding between Phase I and Phase II, we offer a Phase I/Phase II Fast-Track review option in which applicants submit a Phase I and Phase II simultaneously for concurrent review. We realize that the Fast-Track mechanism is not appropriate for all applicants or for all types of research. Therefore, NIH offers alternative avenues such as no-cost award extensions, supplemental awards, and most recently, competing continuation awards, all of which provide bridge funding between the phases. Examples of projects that would benefit from uninterrupted funding include those that involve maintenance of transgenic mice colonies or newly established cell lines and those that include pre-clinical or clinical trials necessary to generate data for FDA approval.

Common Strengths and Weaknesses in SBIR/STTR Applications

All NIH grant applications undergo an external peer review process involving two sequential steps that are required by law. The first step is performed by Scientific Review Groups, composed primarily of non-federal scientists, physicians, and engineers (from academia and industry) selected for their expertise and stature in particular scientific fields. The second step is performed by the National Advisory Council or Board of the potential awarding component to which the grant application is assigned. Applicants receive a written summary of the deliberations of the peer review. These analyses are very useful in pointing out the strengths and weaknesses of the proposed research. Some of the most common weaknesses can be categorized in the following areas:

- Lack of innovation
- Inadequately defined test of feasibility
- Unconvincing case for commercial potential and societal impact
- Diffuse, superficial, or unfocused research plan
- Lack of sufficient experimental detail
- Questionable reasoning in experimental approach
- Failure to consider potential pitfalls and alternatives
- Lack of experience with essential methodologies
- Unfamiliarity with relevant published work
- Unrealistically large amount of work proposed

Turning those weaknesses around, common strengths include projects that are truly innovative and have strong commercial potential and societal import, those that include a clear feasibility test as well as realistic and achievable milestones, and those that have a clearly conceived experimental approach that includes sufficient experimental detail, alternative strategies, and appropriate facilities and expertise to conduct the proposed research.

Effectiveness of the NIH SBIR and STTR Program

We are pleased that reports issued previously by the General Accounting Office and the Small Business Administration indicate that the NIH SBIR program has one of the highest rates of commercialization. Results of a recent study commissioned by our agency to evaluate the NIH SBIR Program indicate that through the SBIR Program, small businesses have contributed to the NIH mission of improving human health through biomedical and behavioral research, while enhancing the commercial potential and societal import of their technological innovations. The *National Survey to Evaluate the NIH SBIR Program Report* (PDF) and *Appendices* (PDF) detail the study and include program results from companies that received Phase II awards between 1992 and 2001. Seven hundred sixty-eight SBIR awardees participated in the study, describing their experiences with the SBIR program and their project outcomes. Even those projects that have not realized the goal of commercialization have generated information for the equally important purpose of contributing to the knowledge base of science through peer-reviewed publications. A few results of that study are worth highlighting:

- Eighty-seven percent of the awardee respondents reported producing 670 new or improved products, processes, usages, and/or services in support of the NIH mission.

- Technological achievements also included 2,20$ technical articles, 666 patents, 2,850 conference presentations, 453 copyrights, 252 awards, and 322 trademarks.
- Fifty-two percent of awardees received 1,465 additional Phase I or Phase II awards related to continued development and exploitation of their core technology. Of the 399 awardees who won additional SBIR awards, 40 percent also received non-SBIR funding.
- Eighty-six percent reported success in disseminating SBIR supported technology and information among populations using and receiving health and health care resources.
- Seventy-three percent of awardee respondents reported commercializing new or improved products, processes, usages, and/or services in health-related fields.
- Other evidences of commercialization include 48 drugs and medical devices receiving FDA approval, 281 awardees receiving additional funding from non-SBIR sources, and 436 having ongoing or completed marketing activities.

While commercialization is an important goal and outcome to SBIR/STTR, it is also important not to overemphasize commercialization. There is an element of risk associated with projects funded in the SBIR and STTR Programs. The nature of biomedical and behavioral research is changing and becoming more complex and multidisciplinary. Considering that the eleven federal agencies that participate in the SBIR/STTR programs have very different R&D needs, NIH appreciates the flexibility that these programs offer to allow funding for bath projects that will have near-term commercial potential and those that are far more complex, high-risk or longer-term.

NIH Efforts to Enhance and Streamline SBIR/STTR Programs

NIH has taken steps to enhance and streamline the programs, particularly with regard to bridging the gap between Phase II and Phase III, tracking Program outcomes, and enhancing our outreach efforts.

Bridging the gap between Phase II and Phase III. Certain types of biomedical and behavioral research require clinical evaluation and federal regulatory approvals before Phase III (commercialization stage) can ever be realized. NIH offers an opportunity to eligible Phase II awardees to seek competing continuation Phase II awards for projects in which the conduct of clinical investigations and federal regulatory approvals will ultimately be required to realize the potential of the product being researched and developed. A recipient of an NIH SBIR/STTR Phase I and Phase II award normally receives no more than $1 million and three years of support. If the intended commercialized product is a medical device, drug or biologic, this amount often represents a small fraction of the funds necessary to complete the studies required for approval and licensing by the Food and Drug Administration (FDA) or other federal agencies. Yet, the process of moving promising new products from bench to bedside typically takes more than a decade. These are precisely the products with potential to contribute significantly to the economy of the Nation and to the health of our nation. It is the intent of the SBIR and STTR Phase 11 competing continuation grants to support such research and development.

Tracking Program Outcomes. With the completion of the 10-year retrospective study of the NIH SBIR Program, we are looking forward to the development of a dynamic project monitoring system to track outcomes from supported projects. Such a data tracking system will enable NIH administrators to better determine the outputs and outcomes from projects supported through the SBIR and STTR mechanisms. Clearly, commercialization is a major goal of the SBIR and STTR Programs. However, for NIH awardees, there is often a lengthy time of seven to ten or even 12 years before commercialization is realized, a period that routinely extends well beyond NIH support. Thus, commercialization may be one metric for judging program success, but other measures will be considered as indicators of success, such as published papers, patents, FDA testing/approvals of drugs and devices, and the use of the technology in other research projects.

Enhancing our Outreach Efforts. Communication is ate essential element of the NIH application, review and award process. Indeed, it is the common thread that runs through the seven steps a company needs to take to obtain an SBIR or STTR award. NIH is making efforts to enhance small business competitiveness through numerous grant writing seminars throughout the year. We recently provided such a seminar for a rapidly growing organization called "Women Entrepreneurs in Science and Technology." NIH also participates in the National SBIR/STTR Conferences, at least

one of which is annually held in a rural state or a state that has not received a large share of SBIR/STTR funding. Proposal writing workshops are frequently offered as pre-conference sessions at these meetings. On June 23–24, 2004, NIH will host its 6th Annual SBIR/STTR Conference at which over 900 attendees axe expected. A major feature of this conference is a grant writing session dedicated to assist potential applicants in preparing a competitive application.

In addition, NIH staff routinely participate in regional and state-wide conferences to provide information about the NIH application, review and award processes and potential funding opportunities. Last June, NIH and about three other agencies participated in the SBIR/STTR/ATP Workshop in Dallas, an event attended by about 140 participants. We are looking forward to a similar event in Dallas to be held May 2004.

In response to the heightened interest of research institutions to learn more about the SBIR and STTR Programs, we have incorporated sessions focused on university-industry partnership opportunities. We will continue our efforts to raise awareness in States, and research institutions within them, to promote the SBIR and STTR Programs. Broad dissemination of information about these Programs is also being accomplished through an NIH SBIR/STTR ListServe message system, encompassing over 11,000 subscribers from the small business community, academia, State entities, professional societies, and others. NIH established a separate ListServe of SBIR and STTR awardees to inform them of important grant-related policies and procedures.

In recent years, many of the agencies participated in a multi-state outreach endeavor called "SWIFT: SBIR—Where Innovation Focuses Technology." The Federal Program managers traveled by bus, moving to a new State each day, to inform small businesses and research institutions of STTR and SBIR funding opportunities. The first year, SWIFT I "Field of Dreams" tour focused on the Midwest states. In 2001, the SWIFT II "Patriot" tour focused on northeast states. SWIFT III, held in May 2002, kicked off in Texas and moved eastward through the southern states. Most recently, the SWIFT IV tour visited states in the upper northwest region of the country. This year, September 2004, SWIFT V is expected to tour the States of Michigan, Indiana, Illinois, Missouri, Tennessee, and Kentucky. We are beginning to see the fruits of these outreach endeavors reflected through higher quality applications and increased submissions and awards.

NIH SBIR/STTR Success Stories

A number of NIH SBIR and STTR projects have resulted in significant improvements to our nation's health and in increased productivity of other researchers. I would like to describe several successes in particular that exemplify the kind of SBIR/STTR research NIH supports.

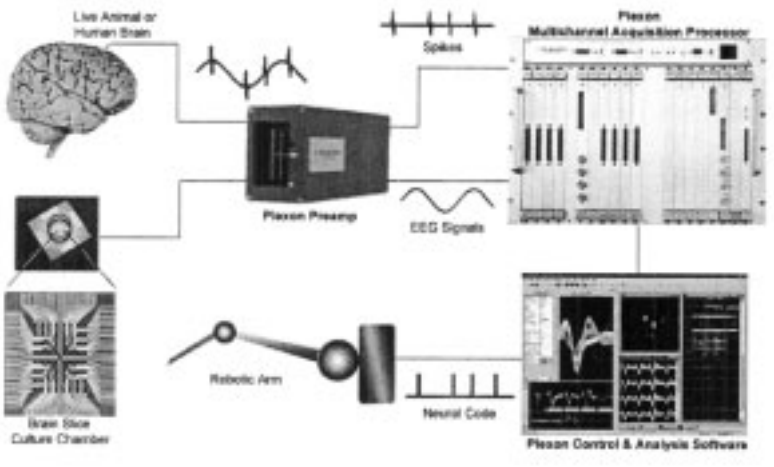
Optiva Corporation (WA)

Looking back more than 20 years to one of the earliest SBIR projects that NIH supported, funding allowed Optiva Corporation to develop a novel power toothbrush, the Dentifrice Dispensing Sonic Brush, which we have come to know as the "Sonicare" toothbrush. In addition to the health benefits, this project resulted in a $300 million business and the creation of over 500 jobs. Optiva was sold to Philips Electronics in 2000.

Plexon Inc. (Dallas, TX)

Plexon Inc. (formerly Spectrum Scientific, a proprietorship), founded in 1984, supplies tools for basic brain and nervous system communication research, neural biosensors for drug and environmental screening, brain-machine interfaces, and neuroprosthetics for the growing neurotechnology industry. Plexon received Phase I and Phase II SBIR funding (1989–1993) from the NIH (National Institute of Neurological Disorders and Stroke) to develop an automated procedure for detecting and separating extra-cellular neural action potentials (spikes) in real time. These SBIR awards enabled Plexon to develop a unique neural data acquisition system far beyond anything previously attempted at the time. Such an accomplishment has applications to aid physically impaired individuals.

As shown in the diagram below, individual electrodes implanted in the brain or mounted in a brain slice culture chamber often detect spikes from multiple neurons. Each neuron generates characteristically distinct spike waveform shapes. Plexon's hardware and software solutions use advanced pattern recognition and cluster analysis algorithms to discriminate and assign individual waveforms to specific neurons. In addition to providing insight into basic brain function, this technology has broad implications in the development of interfaces for direct brain-machine communication and prosthetic devices for nervous system-impaired individuals.

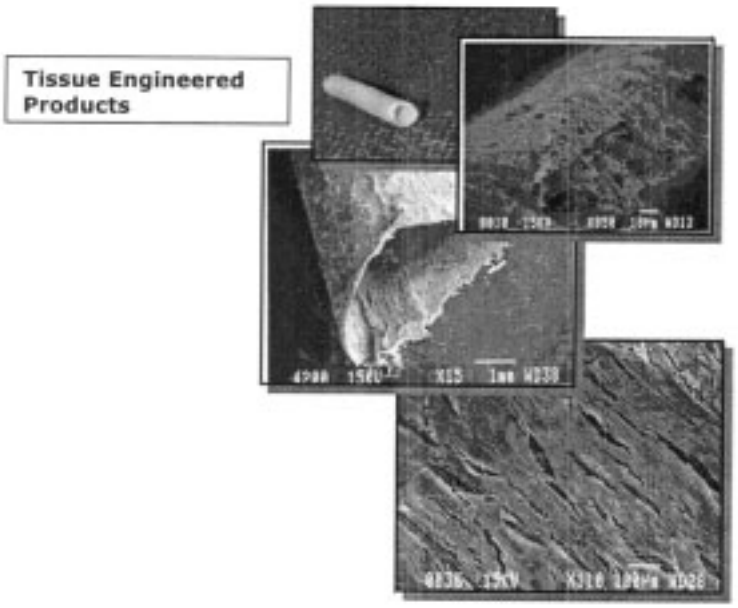


By 1995, Plexon had delivered about 10 systems with most sales to neurophysiologists studying learning, memory, and motor behavior in the nervous system of animals. Up to this time the average number of employees at Plexon was three. Interest in the Multichannel Acquisition Processor (MAP; product name) data acquisition system started to grow, and by 1999 the number of installed systems world-wide reached 60.

Today, Plexon employs 20 people and sales have reached the $3M/year mark. Plexon has grown from a small one-person company to a highly focused team of engineers, biophysicists, and neuroscientists with R&D and technical expertise. Plexon's customers include over 75 domestic and international academic research labs, research hospitals, pharmaceutical companies, and military research labs. The company was recently named as a participant of a $26 million contract to Duke University by the Defense Advanced Research Projects Agency (DARPA) for the development of next-generation brain-machine interface technology. Joint R&D activities are also being conducted with the University of North Texas, California Institute of Technology, Massachusetts Institute of Technology, Vanderbilt University, University of Michigan, Oregon Health & Science University, and others. Company president, Harvey Wiggins, notes, "We have funded our own growth from sales and never used VC or other equity funding. The number of installed systems is above 250. Plexon is the primary brain interface equipment supplier to the major neuroprosthetics research groups in the U.S."

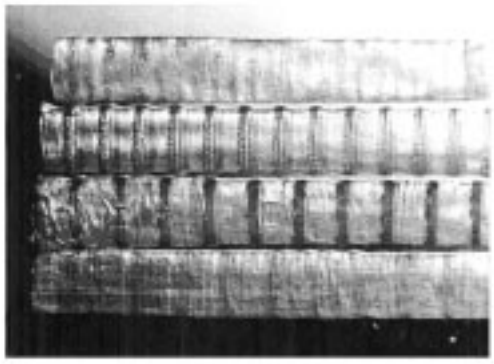
NanoMatrix Inc. (Dallas, TX)

NanoMatrix Inc. and collaborators at Virginia Commonwealth University have received SBIR funding from NIH to use a process called electrospinning to produce a biological and biochemical environment that biomimics that found in normal tissues and organs. The Company's core technology of electrostatic spinning of connective tissue proteins is aimed at mimicking the three dimensional architectural structure that is essential for the body's natural growth and repair processes. For example, Dr. Gary Bowlin, bioengineer at VCU notes that "patients do not always have spare veins for bypass surgery, and even when they do, complications can arise due to rejection. What is needed is an "off-the-shelf' blood vessel of known size and characteristic. The new technology would enable natural human blood vessels to be grown from collagen. Collagen is a natural substance in the body, so cells are in a happy environment and start to grow." The technology was licensed to NanoMatrix for further development. In addition to the cardiovascular applications, this potentially revolutionary technology offers numerous other possibilities—for diabetic patients who often lose blood vessels due to vascular disease, for skin replacement, and for bone regeneration. The following link provides a video that demonstrates the potential of this technology for living coronary artery: http://www.nanomatrix.biz/demo.asp



MicroFab Technologies, Inc. (Plano, Texas)

MicroFab Technologies, Inc. has used SBIR funding to develop and commercialize new technology aimed at enabling high-payoff applications for microdispensing and precision printing of bioactive materials (DNA, proteins, reagents) and other materials used in biomedical device and diagnostics manufacturing. The figures below illustrate biosorbable polymer conduits for nerve regeneration (1mm diameter) and 1mm stainless steel tubes that mimic stents (for cardiac artery implant) printed with a polymer/drug coating (fluorescent die used). SBIR funding from NIH and other federal agencies has led to both direct and indirect commercialization of biomedical applications. Direct commercial success includes sales of equipment for DNA array manufacturing and instrumentation for proteomic discovery. Indirect commercialization success includes application of equipment and processes developed in a tissue engineering project (nerve regeneration conduits) to coating of stents with polymers and drugs for six commercial companies.



1mm stainless steel tubes that mimics stents for cardiac artery implant

Conclusion

Thank you for the opportunity to describe how NIH has utilized the Programs and benefited from them. I would be pleased to answer any questions you may have.

BIOGRAPHY FOR JO ANNE GOODNIGHT

Ms. Goodnight currently holds the position as the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Program Coordinator of the National Institutes of Health (NIH) and the Department of Health and Human Services (DHHS) Public Health Service. She has held this position, which is located in the NIH Office of Extramural Research (OER), Office of the Director, since March 1999. Prior to joining OER, she served in positions encompassing research, program administration and program management. During nearly 20 years of Government service she has held positions in the U.S. Department of Agriculture (USDA), the Food and Drug Administration, and now the NIH. As part of her Virginia Tech education (1978–1983), she spent four years conducting research as a Cooperative Education student at the USDA's Animal Parasitology Institute. While at NIH, she has been a part of the National Cancer Institute's (NCI) Intramural Research Program as a research scientist (1989–1994) and the NCI's Extramural Research Program (1994–1999). As an intramural scientist, she published over 20 studies about the selective involvement of Protein Kinase C in differentiation and neoplastic transformation. She joined the NCI's Extramural Research Program in 1994 where she served as a Special Assistant to the Director, Division of Cancer Biology and Program Director for SBIR/STTR grants that supported studies in the field of cancer biology, cancer genetics, and cancer immunology as well as the SBIR/STTR Program Policy Coordinator for the entire NCI. She was appointed as the NIH SBIR/STTR Program Coordinator in 1999 where she continues today.

She was intimately involved in the development and implementation of the NIH SBIR/STTR Fast-Track Program and continues to develop other programs that assist the small business community in commercialization of their technologies. She has been an invited participant in numerous SBIR/STTR Conferences to discuss funding opportunities for small businesses through the NIH. She also has provided written and oral testimony at Congressional hearings related to the reauthorization of the SBIR and STTR Programs.

Ms. Goodnight has received several national awards including an NIH Merit Award (1998) for her "exemplary contributions in the administration and coordination of the extramural research programs of the Division of Cancer Biology," a Tibbetts award (2002) from the Small Business Administration for her "leadership role in making the SBIR and STTR programs more accessible, more relevant, and more effective," and an NIH Merit Group Award (2003) in "recognition of outstanding performance and service to the National Heart Lung and Blood Institute's SBIR Evaluation Group."

Ms. Goodnight received a Bachelor of Science degree in Microbiology from Virginia Tech in 1983.

Chairman SMITH. Thank you.

Dr. Feng, good to see you.

STATEMENT OF DR. DA HSUAN FENG, VICE PRESIDENT FOR RESEARCH AND GRADUATE EDUCATION, PROFESSOR OF PHYSICS, UNIVERSITY OF TEXAS AT DALLAS

Dr. FENG. Chairman Smith and Congresswoman Eddie Bernice Johnson, first I want to commend you for the leadership of bringing SBIR and STTR so much on the radar screen for the region. I'm also honored to be invited here.

The University of Texas of Dallas aims to be a regional and national economic engine, with strengths in intellectual information technology, nano technology, biotechnology, especially brain research and sickle cell research, which Congresswoman Eddie Bernice Johnson has played an enormous role in assisting us in building that program.

It is also geographically situated in one of the most technological centers and economical volatile regions of the United States at the moment, the Dallas-Fort Worth region. Therefore, as a member of the UTD's Senior Management Team, it cannot be more timely for me to participate in this hearing on a subject with obvious and enormous impact, to say a few words about it, and to learn from my colleagues and from you.

I also want to specifically, since I see there are many, many small company executives here, I would like to welcome you to communicate with me to see how the University of Texas at Dallas, who has been very enthusiastic about working with you, like the way you have been working with Polatomic, so that we can go on with developing more economic prosperity around this region.

Mr. Chairman, it has often been stated that the economic livelihood of our nation lies in small businesses. Time and again, small businesses were the source of innovation agility. One simply cannot take small businesses for granted when talking about economic development.

Mr. Chairman, I have also often said, and I cannot recall who was the first who say that, that vision without funding is hallucination. The very first barrier that these small technological businesses encounter would be to find suitable funding. In principle, they could seek venture capital or angel funding, or any kind of business venture funding, this is at best an arduous search for start-up small companies who need research dollars. This is why SBIR and STTR are so critical.

From a research university perspective, suitable collaborations between industry and university partners have long been understood as being critical to the ongoing success of universities. What is only recently being understood is that the powerful potential of partnering with small businesses, as defined as having fewer than 500 or 400 employees, with universities and SBIR and STTR programs.

As Vice President for Research at one of the fastest growing research universities in the Metroplex, I am immensely pleased to say that nowadays there is more and more recognition of this collaborative potential among my colleagues within the university.

Mr. Chairman, the telecom business in the '90's was certainly an economic boom for the region, a significant fraction of our most scientifically and technologically talented manpower worked for many of the powerful mega and international telecommunication compa-

nies in the Metroplex. Since this implosion in 2001, many of these talented individuals had to find ways to sustain their livelihood, for those who continued and probably struggled to remain in the region many managed to form start-up companies. It is probably a cruel fact of life that the downturn of the telecom economy also means that the expertise of these talented individuals that accumulated while working for the mega companies was perceived to be of little or no direct economic values.

And, Mr. Chairman, we all know that perception is reality in the real world. Hence, the successful ones tends to leverage the expertise to significantly add values to the other businesses and other industries. Obviously, to do so they needed to be in a research collaboration with individuals who have different expertise and who can do many of the laboratory studies which small start-up businesses will have a difficult time in accomplishing.

One source of such research talents clearly lies in research universities. Mr. Chairman, it is for this simple fact that made small business and research universities such good partners, and I, as Vice President for Research, am committed to bring this about as much as I can.

As I mentioned earlier, the ability of research universities to act as partners to small companies gives students and faculty an opportunity to explore possibilities for products or ideas developed by small companies. The idea that Polatomic has been on campus for over 15 years has been an enormous intellectual source for our faculty and for our university in general.

While a small company is certainly capable of doing of this research, it is more cost effective and intellectually exciting to partner with outstanding university researchers who also have access to brilliant young minds called graduate students.

The SBIR grants are an invaluable way for small businesses looking to develop these partnerships, because they provide the economic ability to continue research with the assistance and resource of a university.

Finally, Mr. Chairman, the SBIR and STTR provide many powerful opportunities to small businesses. The program can find early-stage development projects that might otherwise not get funding, as well as an option to research ideas, reduce the risk, and to gather the data, test information needed to attract venture capital funding eventually.

A university can provide valuable assistance to small companies in making both of these objectives a reality. The companies are strengthened for the work the universities do, and the universities are strengthened because the students and faculty get a chance to do a variety of diverse and intellectually-exciting and challenging projects.

Thank you, Mr. Chairman.

[The prepared statement of Dr. Feng follows:]

PREPARED STATEMENT OF DA HSUAN FENG

Chairman Smith and Congresswoman Eddie Bernice Johnson:

First, I want to commend you for your leadership. I also am honored to be invited here today to give a testimony about SBIR and STTR. The University of Texas at Dallas aims to be a regional and national economic engine. It is geographically situ-

ated in one of the most technological-centric and economic volatile regions of the United States, the Dallas-Fort Worth Metroplex. Therefore, as a member of UTD's Senior Management team, it cannot be more timely for me to participate in this hearing on a subject with obvious and enormous impact, to say a few words about it and to learn from my colleagues and from you.

Mr. Chairman, it has often been stated that the economic livelihood of our nation lies in "small businesses." Time and time again, small businesses were the source of innovation agility. One simply cannot take small businesses for granted when talking about economic development.

From a research university perspective, sustainable collaborations between industry and university partners have long been understood as being critical to the ongoing success of universities. What is only recently being understood is the powerful potential of partnering small businesses—as defined as having fewer than 500 employees—with universities and the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs. As Vice President for Research of one of the fastest growing research universities in the Metroplex, I am immensely pleased to say that nowadays there is more and more recognition of this collaborative potential.

Mr. Chairman, the telecom business of the Nineties was certainly an economic boom for our region. A significant fraction of our most scientifically and technologically talented manpower worked for many of the powerful mega- and international telecommunication companies in the Metroplex. Since its implosion in 2001, many of these talented individuals had to find ways to sustain their livelihood. For those who continued, and probably struggled, to remain in the region, many managed to form startup companies.

It is probably a cruel fact of life that the downturn of the telecom economy also means that the expertise of these talented individuals that accumulated while working for the mega-companies was perceived to be of little or no direct economic values (and Mr. Chairman, we all know that "perception is reality" in the real world!). Hence, the successful ones tend to leverage their expertise to significantly add values to other businesses. Obviously, to do so, they needed to be in research collaboration with individuals who have different expertise and who can do many of the laboratory studies which small startup businesses will have a difficult time accomplishing. One source of such research talents, clearly, lies in research universities. Mr. Chairman, it is for this simple fact that made small businesses and research universities such good partners.

Mr. Chairman, I have often said (and I cannot recall who was the first to say this) that "VISION WITHOUT FUNDING IS HALLUCINATION." The very first barrier these small technological businesses encountered would be to find suitable FUNDING. In principle, they could seek Venture Capital (VC) or Angel Funding, or any kind of "business venture" funding. This is at best an arduous search for startup small businesses who need "research dollars." This is why SBIR's and STTR's are so critical.

As I mentioned earlier, the ability of universities to act as a research partner to small companies gives students and faculty an opportunity to explore possibilities for a product or idea developed by a small company. While a small company is certainly capable of doing some of its research, it is much more cost-efficient, and intellectually exciting to partner with outstanding university researchers, who have access to brilliant young minds (call graduate students). The SBIR grants are an invaluable way for small businesses looking to develop those partnerships because they provide the economic ability to continue research with the assistance and resources of a university.

During the fiscal year 2002, fewer than 20 companies in North Texas applied for SBIR grants—540 grants with a total of $106,844,952—were awarded to Texas companies. In contrast, 2,394 grants, with a total of $598,525,294, were awarded in California. This contrast suggests a lack of understanding in the program by Texas small businesses. As small business becomes familiar with many advantages of the SBIR program, universities will be able to use their research talents to assist small businesses and make them more economically viable while strengthening the educational opportunities of both faculty and students.

Finally, Mr. Chairman, the SBIR and STTR provide many powerful opportunities to small businesses. The program can fund early stage development projects that might otherwise not get funding as well as an option to research ideas, reduce the risk and to gather the data/test information needed to attract venture capitalist funding. A university can provide valuable assistance to small companies in making both of those objectives realities. The companies are strengthened for the work the universities do and the universities are strengthened because the students and faculty get a chance to do a variety of diverse projects.

BIOGRAPHY FOR DA HSUAN FENG

Vice President for Research and Graduate Education and Professor of Physics, University of Texas at Dallas

After completing his elementary and secondary education in the Republic of Singapore, Dr. Feng received his undergraduate education from Drew University in New Jersey and doctorate in Theoretical Physics from the University of Minnesota. Prior to joining the Physics Department of Drexel University in 1976, where he eventually became the M. Russell Wehr Professor of Physics, he was a United Kingdom Science Research Council fellow at the Department of Theoretical Physics of the University of Manchester (1972–74) and a Senior Scientist at the Center for Nuclear Studies of the University of Texas at Austin (1974–76). During his tenure at Drexel University, he served for two years as Program Director of Theoretical Physics at the National Science Foundation (1983–85) and visiting Professor of the Niels Bohr Institute of the University of Copenhagen (1979–80).

Feng is an expert in mathematical physics, nuclear physics, nuclear astrophysics, quantum optics, fundamental issues of quantum mechanics, network architecture and computational physics. He has been a consultant to the theoretical physics groups of Los Alamos National Laboratory, Oak Ridge National Laboratory, Brookhaven National Laboratory and United Kingdom's Daresbury Laboratory.

In 1997–1998, Feng served as technical advisor to Congressman Curt Weldon, currently Vice Chair of the House Armed Services and senior Member of the House Science Committee, regarding South Africa, Central Europe, (especially Hungary) and China. He was a member of the Congressional Delegation to East Asia (January and March of 1997) and Central Europe in December of 1999.

From April of 1998 until December of 2000, he was on leave-of-absence from Drexel University to serve as the Vice President and HUBS (Hospitals, Universities, Businesses and Schools) General Manager of Science Applications International Corporation (SAIC), a multi-national, $6.1 billion and 41,000 employees Fortune 500 high technology company.

From 1998–2000, Feng worked on the HUBS project. The HUBS project was inspired by the political leadership of the "Four States" (Delaware, New Jersey, Maryland and Pennsylvania) and is designed to be the catalyst and the integration of information systems in that region. From FY98 to FY03, the project received over $60 million of federal funding.

On December 9, 2000, Feng resigned from both Drexel University and SAIC to assume the position of Vice President for Research and Graduate Education and Professor of Physics at the University of Texas at Dallas.

Feng's objective at the University of Texas at Dallas, as designated by the President and the Provost, is to rapidly build the research breath and depth of the University. As the first VP for Research and Graduate Education, Feng devised the following mission statement for his position:

> *"The Office of the Vice President for Research and Graduate Education of the University of Texas at Dallas (UTD) identifies areas of intellectual importance, promotes the university as an economic and innovation engine as well as further activates UTD's development as a world class university. In addition, the office promotes the university's "knowledge" products and collaborates synergistically with local, regional, national and international corporations and governments to enhance the global vision and impact of science and technology."*

The goal is to drive the University to be a major international research University. Taking into account the size of UTD and resources, he articulated three concentrations of excellence for UTD in this decade: digital communications, advanced materials and instrumentations and last but not least, disease centric post genomic research.

Feng is responsible for successfully recruiting and securing the funds for the James Von Ehr Distinguished Chair in Science and Technology for Dr. Alan MacDiarmid, the 2000 Nobel Laureate in Chemistry. He also painstakingly recruited the nanotechnology research team of Honeywell Corporation in New Jersey. This team is now the backbone of UTD's rapidly growing nanoscience program. In addition, Feng also initiated a SPRING (Strategic Partnership of Research in Nanotechnology) project, which linked together, besides UTD, Rice University, the University of Texas at Austin, the University of Texas at Arlington. For FY03 and FY04, Feng worked closely with the Congressional delegation of Texas to secure $6 Million and $10 Million, respectively, for SPRING funding. He also founded the Medical Device Action Group, a regional effort to promote interdisciplinary research

in this technological arena. Research funding for UTD increased from $16 Million to $28 Million during the past three years.

Very recently, he recruited Dr. Russell Hulse, Nobel laureate in physics in 1993, as a Visiting Professor of science and technology to UTD.

Feng has published more than 190 scientific papers, edited more than 20 books, mentored five Ph.D. students and four post-doctoral fellows, and served as editor of four scientific journals.

Feng's other professional affiliations include:

- Past-President of Monte Jade Science and Technology Association of Mid-Atlantic States, a rapidly growing chapter of a national organization of Chinese Americans entrepreneurs, with over 300 multi-national corporation as members
- Business Board Chairman of D'Trends Inc,, a leading Bio-informatics company in San Ramon, California
- Special advisor to the Editor-in-chief of *Korean American Science and Technology Network* (which is read by 15,000 Koreans globally)
- Member of the Industrial Advisory Board of the Interactive Multimedia Intelligent Tutoring Center of Temple University
- Former member of the Computer Science/Engineering Technical Evaluation Advisory Task Force of the Provost and President of the University of South Carolina
- Former member of the United States Department of Education (2000) Field Initiated Studies Technology Panel
- Special advisor to the Greater Philadelphia Association of Chinese Computer Professionals, a fast growing association of this community in the region
- Past Vice Chairman of the Board of CyberFone Inc.
- Board member of the Texas Nanotechnology Initiative
- Vice Chairman of the Board of the Alan G. MacDiarmid Institute of Jilin University
- Advisor for the National Engineer Week Asian American Award Banquet (Feb. 23, 2002, Dallas)
- Honorary Advisor of the Chinese Institute of Engineers/USA–DFW and Association of Chinese Professionals (DFW)
- Honorary/Guest professor of Jilin University, Fudan University, Lanzhou University, Southwest Jiaotong University, Nanjing University
- Honorary Research Fellow of the Institute of Nuclear Research (Shanghai)
- External Advisory Board of the Chinese Institute of Engineers/USA–GNYC
- Technical Advisory Board, Taiwan Nanotechnology Initiative
- Serve as the University Coordination Co-chair for the Space and Missile Defense Command Technology Center in Huntsville, Alabama.
- Science Advisor to New Economy Strategies
- Member of the International Advisory Committee of International Conference on Advanced Materials for Technologies 2003
- Member of the International Organizing Committee of the International Conference on Physics Education & Frontier Research 4th OCPA Joint Meeting of Chinese Physicists World-Wide
- 2003 Member of the University of Texas Chancellor's Higher Education Act Working Group
- Chairman of the "Ad Hoc Southern United States Action Committee to Assist Chinese People to Fight Against SARS"
- Vice President (for North America) of the American Europe Academy of Sciences
- DFW MIT Forum Advisory Board member
- International Steering Committee (ISC) of International Network for Engineering Education and Research (iNEER)
- Member of the Scientific Board of Advisors of Genesis Campus, an accelerator and early stage venture capital firm

Recent awards include:

- In 1996, Feng was elected "Fellow of the American Physical Society" "For outstanding contributions to the understanding of nuclear structure physics, par-

ticularly for the applications of the coherent states to physics and nuclear physics"

- Distinguished Friend of Chung Yuan Christian University (Taiwan)
- 1999 Millennium Award for Vision and Leadership in Technology, TechFEST '99 in Allentown, Pennsylvania
- 1999 Delaware Valley (Pennsylvania) Technical Recruiting Network TECHIE Award
- 2000 Institute Service Award of the Chinese Institute of Engineers–USA (CIE–USA)
- 2000 Distinguished Alumni Award from his alma mater Drew University of Madison, New Jersey
- 2001 Science and Technology Award of the Greater Dallas Asian American Chamber of Commerce
- 2002 DFWTechbiz twelve persons to watch list
- 2002 Life Time Achievement Award from the Association of Chinese American Professionals
- Recipient of the 2003 Inside Collin County (Texas) Business 21 for the 21st Century award
- Honorary member of the Board of Trustees of Nanjing University
- Dallas Section of IEEE 2003 Chairman Award for "outstanding promotion of engineering awareness and research."

Chairman SMITH. Thank you, Dr. Feng.

Dr. Slocum.

STATEMENT OF DR. ROBERT E. SLOCUM, CHAIRMAN AND CHIEF TECHNICAL OFFICER, POLATOMIC, INCORPORATED, RICHARDSON, TEXAS

Dr. SLOCUM. Chairman Smith and Congresswoman Johnson, it's a great pleasure for me to be here to present testimony on the SBIR program, because it's become a very significant part of our—at Polatomic. It's permitted the formation of a world-class research and development team to solve what I call large company problems of significant national interest in a small company environment.

I'd like to direct my comments today to that part of the hearing entitled on the challenges of enhancing small business competitiveness in the Dallas area, and I refer to this as promises and perils. I'll begin with the promises of the SBIR program, and if I could have the slide up, please.

Polatomic is proud of its record for developing SBIR Phase I and Phase II contracts. However, competitiveness must be judged by successful transitions to Phase III projects, such as those that might show up here in a minute.

Mr. Chairman, let me just point out one of these, the Phase III project now in progress for the AN/ASQ–233 submarine detection center. The Multi Mode Magnetic Detection System using this system was designed in response to the Chief Naval Operations Initiative for guiding an unmanned aerial vehicle to deliver a torpedo on a shallow water submarine, the submarine. ONR awarded us in late FY03 an $11.4 million contract under Littoral Antisubmarine Warfare Future Navy Capabilities Project. Estimates of the worldwide sales for this system is between $500 million and a billion dollars, based on past experience. This is promise.

Now, let me turn to the perils shown in our next slide. The peril number one for an SBIR company is funding fluctuations or line item budget instabilities, once you get Phase III. Our $11 million contract was to have FY04 funding of $5.5 million in August, by

September it was set to $3.5 million, by October $1.5, and by the end of December $.5 million. The funding decreases of this kind are very destructive for a small company, it must recruit the staff and obtain the facilities to perform a $5 million job, and then have the funding in that way.

It would be helpful to have a cooperative venture between the Small Business Administration, SBIR and the Navy, and DoD, to establish buffer zone funding to restore Phase III funding for promising SBIR projects.

Now, peril number two is predatory moves by large foreign and U.S. companies that attempted to do what I call "roll overs," to take the technology away from you for free or, basically, put the small business out of business. Polatomic learned in December that a Canadian defense contractor, CAE, with sales greater than $1 billion, was attempting to persuade the Navy to replace us in the MMNBS project with CAE, although they have never demonstrated any comparable magnetic detection technology. Their proposal is basically that our $11 million contract be cancelled, that CAE come in and be allowed to catch up, to develop a new sensor from 30-year old technology to compete with us, and ONR and NAVAIR is supposed to support them in doing this work. It allows CAE to make a foreign company non-competitive buy-in to the U.S. anti-submarine warfare market, based on a CAE promise to use their company money, up to $9 million, to buy into this program.

If this happens, and the CAE proposal is accepted, it will eliminate a U.S., SBIR, small business, with outstanding performance, in a system that's preparing for a fly test that meets all requirements in this fiscal year. It will present major technical and cost risks to the Navy, and it will force the Navy to abandon a national magnetic asset, Polatomic, and get a new technology from Canada.

It is a sole-source magnet, it's a supplier of a 30-year old design, and most important to the Dallas area it will permit moving $500 million to a billion dollars in sales to a foreign country.

To put it in simple terms, Polatomic is faced with the task of defending an outstanding Phase III SBIR program, set for transition to the fleet from an attack by a Canadian company—Canadian government, attempting to buy into the U.S. market with Canadian dollars that could have been used to support the U.S. effort in Iraq.

In the face of a threat like this, of this magnitude, who can help us? That's the question.

In conclusion, I'd like to say that for an SBIR program to get full return on its investment, and provide maximum economic benefits for the Dallas area, the SBIR small business must make successful product transitions to Phase III and also manufacture its products. To paraphrase Dr. Feng, SBIR Phase I and Phase II vision without Phase III funding is a hallucination. In order for Polatomic to be competitive and recapture the $1 billion Navy magnetic protection business from CAE, and bring the business to the Dallas area, the Small Business Administration, the Navy, SBIR and congressional support is needed to see that this threat is countered and the Phase III transition money is provided to carry on with this excellent Phase III project.

The SBIR program can be a significant element for moving Dallas toward a vision of fulfilling the biblical mandate that every per-

son has daily work for dignity and fair rewards to care for your family. It can support the coupling of a vision of Committee Member Johnson and local leaders such as Albert Black and Don Williams, for building high-tech small businesses from the resources of the City's southern sector, and at the same time coupling into the vision of building high-tech small business from the ruins of the telecom nuclear winter out in my area of North Dallas.

I want to express my appreciation to the Committee for this chance to share this with you.

[The prepared statement of Dr. Slocum follows:]

PREPARED STATEMENT OF ROBERT E. SLOCUM

Testimony on the Small Business Innovation Research (SBIR) Program and the related Small Business Technology Transfer (STTR) Program, and to learn more about the opportunities that these programs offer to small businesses in the Dallas area.

1. *Describe the research that Polatomic received SBIR funding to perform.* The primary area of research at Polatomic funded by ONR and NASA is advanced laser magnetic field measurement systems. Polatomic has advanced the state-of-the-art for magnetic field sensors used for detecting submarines (Airborne Antisubmarine Warfare), countermeasures for locating and protecting ships from buried sea mines (Mine Countermeasures), protecting the U.S. fleet with undersea magnetic sensors (Undersea Surveillance) and magnetic instruments for space research (NASA Planetary and Earth Science programs). Polatomic has become the world leader in laser magnetometers. A second research area supported by SBIR funding is research and development of metal nanostructures for polarizing light and biohazard detection nano chips (Telecom and laboratory polarizing optical filters and Homeland Defense biohazard detection).

2. *Do you consider Polatomic's SBIR-funded project to have been successful?* Yes, very successful technically but the jury is still out on transitioning to fleet Navy hardware capable of fording quiet subs in shallow waters or replacing dolphins in mine hunting. Under SBIR sponsorship Polatomic has emerged as the world leader and a national asset in the area of laser magnetic detectors. Polatomic is transitioning this technology to solve significant U.S. Navy problems in the fleet and solve NASA instrumentation problems for significant space missions and Earth science investigations. Polatomic developed an optical coating that polarizes light that is used to fabricate optical filters sold through international distribution. Development of the polarizing coating led to formation of a spin off company, Integrated Photonics, Inc., formed with five former members of the Materials Division of Bell Laboratories. Continued SBIR support over the last fifteen years has enabled Polatomic to achieve steady growth as a small business in the Telecom Corridor of Richardson, TX, where up to 100,000 jobs were lost in the Telecom sector. The SBIR program will allow Polatomic to recapture the DOD Magnetic Detection business lost by Raytheon and reclaim the possible $1 billion in revenues for the Dallas area if transition money is reinstated.

   The SBIR awards enabled Polatomic to attack and solve large-company problems in a small company environment with university collaboration such as University of Texas–Dallas NanoTech Institute. On January 20 a collaborative SBIR proposal with the Nano-Tech Institute of the University–Dallas was submitted to NSF for a Biohazard detection nanochip. Polatomic now collaborates with UT–D whenever possible but in the past has included Caltech, University of Missouri-Rolla and the University of Central Florida and the Optical Science Center of the University of Arizona.

3. *Has Polatomic commercialized any of the technologies developed under the SBIR program?* Polatomic is proud of its record for research and development of technology under Phase I and Phase II SBIR contracts. The success of these projects can be judged by the successful transitions to Phase III projects that are aimed at further transitions to the Navy fleet, NASA space missions and commercial products. Highlights of the Phase III SBIR accomplishments include the following:

   - $11 million FY04 award for Multi Mode Magnetic Detection System using Polatomic AN/ASQ–233 for guiding an unmanned aerial vehicle to deliver a torpedo on a shallow water submarine. Agency—Office of Naval Research

under Littoral Antisubmarine Warfare Future Naval Capabilities project. Note that selection for ONR FNC project indicates intention to transition to the fleet. Laser magnetometer flight demonstration in Navy P3–C showed sensitivity improved by a factor of 30 over current Navy Magnetic Detector Set AN/ASQ–81.

- $6.7 million FY04 award for a laser magnetometer system for Undersea Surveillance. Agency—Office of Naval Research under Littoral Antisubmarine Warfare Future Naval Capabilities project for Seaglider/Distributed Autonomous Detection System for fleet perimeter defense.
- $25 million FY02 award for IDIQ Contract. Agency—Naval Air Systems Command for Phase III contracts; used by Navy and DARPA for Underground Facilities Detection tests.
- $1.4 million Instrument Incubator Program for space magnetometer development. Agency—NASA Division of Earth Solid Earth and Earth Hazards. Selected for space flight instrument development in FY05 under New Millennium Program.
- Polatomic Laser Space Magnetometer selected by Jet Propulsion Laboratory for "Inside Jupiter" Mission proposal to NASA (in progress).

4. *How critical has the SBIR program been to Polatomic's growth and success?* The SBIR program has been a critical factor for the growth and success of Polatomic, Inc. SBIR awards have enabled Polatomic to start with a single person in 1982 and assemble a highly qualified team of scientists and engineers to attack and solve high priority "large company" problems in a "small company" environment without significant outside venture capital investors. Since DOD and NASA acquisition cycles are relatively slow for new sensor systems (Navy) and space instruments (NASA), conventional venture investors pull back from slow payback investments and push elsewhere for rapid returns on their investments. SBIR is viewed by Polatomic as a patient investor interested in providing advanced technology solutions to very significant problems for the Government and commercial customers. Polatomic also sees SBIR as an investor deserving a significant return on their investment in terms of major problems solved and commercial successes benefiting the DFW area. During Polatomic's first decade (1982–1991), local business, university and government leaders in Richardson, TX, had their attention and resources focused on recruiting large Telecom companies such as Nortel and Alcatel. Very little energy was left for nurturing small businesses and the SBIR program filled that gap. Following the Telecom "Nuclear Winter" and elimination of tens of thousands of Telecom jobs, small high tech businesses in the North Dallas area represent a significant path to recovery that can become a leader for technology growth in other sectors of the city. The Phase I and Phase II contracts and grants have enabled Polatomic to solve problems left unsolved by other major U.S. corporations, and the Dallas area will receive the financial benefits of this success.

5. *Have you encountered any conflicts between the research goals of the federal agency that issued Polatomic the SBIR grant and the business plan of your company, and if so, please describe?* The key to success is understanding your customer's problem, then proposing and executing an innovative yet reasonable solution within the available budget and schedule. Large company experience helps to keep this "customer focus." Agreement about the research goals and desired results is not the problem. The problem is the schedule and funding for reaching these goals. Government customers have all the time in the world relative to a small company. Funding gaps and delays between Phase I and Phase II can be as much as six months to a year, and even longer for Phase III projects. This can be disruptive or sometimes fatal to a small company.

6. *What recommendations do you have for ways to improve the SBIR program, and if so, what are they?* The SBIR system is very workable "as is" although the ever expanding size of the program is creating periodic delays and snags. One major problem is the long gap (six months or more) between the conclusion of Phase I and the award announcements for Phase II. It is often difficult to hold a team together through this funding gap. Preparation of a winning proposal for small businesses new to the SBIR process is a fairly complex and confusing exercise. I propose that "entry level SBIR" small businesses could use help getting started from funded local or state SBIR organizations and business schools working in conjunction with successful SBIR winners who serve as consultants and mentors. Preliminary state or regional funding to get these new businesses trained would improve the SBIR success rate for the Dallas area.

In order for the SBIR Program to get the full return on its investment and provide maximum economic benefits for the Dallas area, the SBIR small company can use some additional protection at the Phase III project level, particularly for Phase III transition programs within DOD. The two prominent problem areas are erratic and unreliable funding for Phase III contracts with DOD agencies that are currently (FY04) experiencing large fluctuations in funding. The second area where help would be appreciated is small business protection from attempts by large U.S. and foreign companies who attempt to "roll over" Phase III small businesses to capture superior competing technology developed under SBIR awards or put a small business out of business. Two case studies can be taken from the following two current challenges faced by Polatomic:

- Example #1—A major problem is transition from Phase II to a successful Phase III program. Polatomic proposed and was awarded a Phase III ONR Contract for $11 million with $5.5 million in first year that was reduced to $3.5 million before start of FY 2004 and by the end of December 2003 was reduced to $0.75 million. The budget fluctuations reflect the reality of the cost of the Iraq engagement, but it is costly and destabilizing for a small company that must recruit staff and obtain facilities to prepare to perform on the contract and then have the funding recalled or slipped into the out-years. It would be very helpful to small businesses receiving Phase III contracts if a "funding buffer zone" could be created to stabilize DOD budget line items intended to fund Phase III SB1R projects that represent true advances in the state of the art and are slated to transition to the fleet.
- Example #2—Predatory moves by large foreign and U.S. companies to attempt "roll overs" are a serious threat to the success of Phase III SB1R efforts. The Polatomic ASW laser magnetometer has been selected for the Office of Naval Research Future Naval Capabilities Program in Littoral Antisubmarine Warfare and an $11 million contract has been signed with Polatomic. Polatomic learned in December 2003 that a Canadian defense contractor (CAE) with sales greater than $1 billion is trying to persuade the U.S. Navy to cancel the contract won competitively by Polatomic and award it to them even though they have not demonstrated any comparable magnetic detection technology. This proposal from CAE to the Navy will allow CAE to buy into the U.S. advanced ASW market by spending CAE company funds (a significant fraction of the $11 million Polatomic contract) to obtain U.S. Navy sponsorship and guidance to try to bridge the 25 year technology gap between CAE and Polatomic. This is a risky attempt to catch up with the Polatomic AN/ASQ–233 developed under SBIR sponsorship. By making the change from the Polatomic AN/ASQ–233 (to be flight tested this fiscal year) and starting over with CAE, the Navy would incur schedule delays and raise performance and cost risks to acquire a system technically inferior to the Polatomic AN/ASQ–233. By selecting CAE the Navy would eliminate Polatomic as a small business supplier of a truly advanced MMMDS System and shift the magnetics detection technology base to Canada beyond U.S. Navy control. By shifting this technology to Canada, the Dallas area will lose the potential of $500 million to $1 billion in revenues to Canada. Put in simple terms, Polatomic is faced with the task of defending an outstanding Phase III Navy SBIR FNC transition program from attack by a Canadian company subsidized by the Canadian government attempting to buy into the U.S. ASW market with Canadian dollars that could have been used to support the U.S. efforts in Iraq. In the face of a threat of this magnitude to Polatomic, who can help us?

7. *How would you rate the level of technical and administrative support that Polatomic received throughout the SBIR grant process?* Overall, the SBIR staffs assigned to our grants and contracts have done a very good job considering the limitations of their particular agency. The surprise is the large number of people in the SBIR program with a true passion to help small businesses succeed. I have been fortunate to work under sponsors such as Carol Van Wyk (Naval Air Systems Command) and Ritchie Coryell (National Science Foundation) who are deeply concerned with the success of high performing, small companies who are recipients of SBIR grants and contracts. The administrative process for submitting proposals and reporting progress is adequate. A major source of problems has come from the edict requiring Internet submission of proposals through Government web capabilities that are inadequate, resulting in jam-ups and delays. The Grantee Training Conferences sponsored by NSF is worthwhile even for experienced SBIR participants. I propose that this type of pre-proposal conference be held in the Dallas area on a regular basis to cover Phase I, Phase II and Phase

III program and proposal success. I would also propose that our SBIR advocates participate in the Phase III transition phase funding decisions at the FNC level to insure continuity.

BIOGRAPHY FOR ROBERT E. SLOCUM

Robert E. Slocum founded Polatomic, Inc., in 1982 and serves as Chairman and Chief Technical Officer. His technical specialty is application of atomic and nuclear physics to magnetic and optical instrumentation. He is also a consultant in the area of strategic planning and new product development. He specializes in development of helium magnetometers and the application of solid state lasers for optical pumping sources. Polatomic has been awarded more than thirty SBIR contracts by NASA/JPL, the Naval Air Systems Command, the Naval Sea Systems Command, the National Science Foundation, and the US Special Operations Command. Dr. Slocum has served as Principle Investigator for each of these contracts. In November 1991, NASA selected Polatomic to design and prototype the scalar helium magnetometer (SHM) for the Cassini mission to the planet Saturn. From 1959 to 1982, Bob worked at Texas Instruments. He served as Project Physicist on the low-field helium magnetometer flown on the Mariner IV and V Spacecraft and directed production research for the AN/ASQ–81 helium magnetometer sensor. Dr. Slocum is the inventor of the diode laser-pump source for helium magnetometers, the nuclear free precession Helium 3 magnetometer and the Planar Thin-Film Polarizer. He holds patents on these devices and has published numerous papers on optically pumped magnetometers, including an invited paper on the past and future of resonance magnetometers presented at the International Magnetics Conference. Bob received his BS in 1960 and M.E.P. in 1963, both in Engineering Physics from the University of Oklahoma. He received his Ph.D. in Atomic Physics from the University of Texas at Austin in 1969.

Publications and Papers

1. "Advances in Optically Pumped Helium Magnetometers for Space and Earth Science." (Invited paper with E.J. Smith at IXth IAGA Workshop on Geomagnetic Observatory Instruments, Slovakia 12–18 June 2000.) *Contributions to Geophysics and Geodesy,* 30, No. 2 (2000).
2. "The Helium Magnetometer: An Instrument Providing Exceptional Sensitivity, Accuracy and Versatility," (with E.J. Smith and R.J. Marquedant), Chapman Conference—Measurement Techniques for Space Plasmas, Santa Fe, NM, April 1995.
3. (Invited) "Advances in Laser-Pumped Helium Magnetometers for Space Applications," 1990, 8th Topical Conference on High Temperature Plasma Diagnostics. Hyannis, MA, May 1990, published in *Review of Scientific Instruments,* October 1990, 2984.
4. "Nd:LNA Laser Optical Pumping of 4He: Application to Space Magnetometers." Published in *Journal of Applied Physics,* December 15, 1988, Page 6615.
5. "New Near-Infrared Polarizer for Laser Applications," (with D. Andrychuk), *Proc. of SPIE,* 740 (1987).
6. "Evaporative Thin Metal Films As Polarizers," (1983), *SPIE,* Vol. 307, Polarizers and Applications, 25.
7. "Application of Helium Isotope to a NMR Gyro," (with D.D. McGregor), published in *Optical Engineering as Proceedings of Conference on Laser Inertial Rotation Sensor,* 1978.
8. "Evaporated Metal Films as Polarizing Optical Coatings," *Journal of the Optical Society,* 63, 1283 (1973)—Abstract. Presented at the 1973 Annual Meeting of the Optical Society of America, Rochester.
9. "Transverse Relaxation Times for He 3 Nuclei by Free Precession Method," *Bulletin of American Physical Society* 4, 487 (1974). Presented at the APS Washington, DC meeting.
10. "A Nuclear Free Precession Magnetometer Using Optically Polarized He3 Gas," *IEEE Transactions on Magnetics,* Vol. MAG–10, 528 (1974). Presented at the International Magnetics Conference, Toronto.
11. "Measurement of the Geomagnetic Field Using Parametric Resonances in Optically Pumped He4," (with D.D. McGregor), *IEEE Transactions on Magnetics,* Vol. MAG–10, 532 (1974). Presented at the International Magnetics Conference, Toronto.

12. (Invited) "Measurement of Weak Magnetic Fields Using Zero-Field Parametric Resonance in Optically Pumped He4," (with B.I. Marton). *IEEE Transactions on Magnetics,* Vol. MAG–9, 221 (1973). Presented at the International Magnetics Conference, Washington, DC.
13. "Zero-Field Level Crossing Resonances in Optically Pumped He4," *Bulletin in the American Physical Society,* 17, 1127 (1972). Presented at the San Francisco meeting of the APS Division of Electron and Atomic Physics (1972).
14. "Zero-Field Level-Crossing Resonances in Optically Pumped He4," *Physical Review Letters* 29, 1642 (1972).
15. "Self-Oscillating Magnetometer Utilizing Optically Pumped He4," with P.C. Cabiness and S.L. Blevins, *Rev. Sci. Instruments* 42, 763 (1971).
16. "Advanced Optically Pumped Sensors for Detecting Small Changes in Magnetic Fields," Proceedings of the Magnetic Anomaly Detector Symposium Naval Ordnance Laboratory, White Oak (1971).

Patents:

"Radiation Source for Helium Magnetometers." Issued 1991.

"Light Polarizing Material Method and Apparatus." Filed February 1973. Issued 1975.

"Light Polarizer Comprising Ellipsoidal Metal Particles on Surface of Transparent Sheet and Method of Making the Same." Issued June 1992.

Doctoral Dissertation

"Orientation Dependent Resonance and Nonresonance Effects in Optically Pumped Helium 4," University of Texas at Austin, 1969.

Chairman SMITH. The appreciation is ours.

Dr. Murphy.

STATEMENT OF DR. OLIVER J. MURPHY, PRESIDENT, LYNNTECH, INCORPORATED, COLLEGE STATION, TEXAS

Dr. MURPHY. Thank you, Mr. Chairman, Congresswoman Johnson. I thank you for allowing me the opportunity to testify today before you regarding the Small Business Innovation Research Program and the related STTR program.

I am the co-founder and President of Lynntech, Inc., a small business specializing in the development and commercialization of new technologies. The company is located in College Station, the home of Texas A&M University. The company was founded in 1987, and since that time the business activities of the company have focused on the development and commercialization of new technologies in a number of key areas of vital important, both for our security and economic growth in this country.

Early stage development of technologies in the critical areas that we are working in have been supported by funds received from the Federal Government through the SBIR program. As to the technical feasibility of various technologies have been established, the company was successful in obtaining advanced technology development funding through other Federal Government programs such as Broad Agency Announcements, some PRDAs and other agency solicitations. Subsequently, in a number of cases, advanced hardware developments that yielded prototype devices were created as a result of establishing relationships with intermediate-sized and large-sized industrial corporations. These have resulted in successful commercial products and processes.

The goal of the company from day one, and still is, is to commercialize products and services derived from successfully developed

new technologies. The company's commercialization plan includes licensing arrangements, spinoffs, joint ventures and outright sale of developed technologies where appropriate. A number of these commercialization mechanisms have been successfully expedited by the company, and have involved technologies developed with SBIR funding.

And, in the interest of time, I have described two of them in my extended testimony, and I will leave it for the record.

Critical to the success of Lynntech in developing and commercializing new technologies has been its participation in and support by the SBIR programs of almost all of the Federal Government departments and agencies. The company has received Phase I, Phase II, and Phase III awards from departments and agencies that issue both contracts and those that issue grants. This has allowed the company to maintain a sustained technology development effort for a number of critical technologies, for instance, such as fuel cells, that are recognized to be of vital importance to the national security and to the country's economic future.

The existing SBIR and STTR programs are, indeed, novel models for funding technology development and commercialization within small businesses. However, they can be improved, enhanced, and expanded upon, so as to stimulate regional or local economic development, and even to give a greater return to the taxpayer.

To further improve the SBIR and STTR programs, I would like to recommend the following. There should be more extensive participation of federal agencies in SBIR Phase III activities, and, indeed, this was referred to earlier by my colleague, Dr. Slocum.

There should be more extensive coaching and business support for SBIR/STTR funded small businesses so as to increase the level of commercialization activities.

There should be greater participation by state agencies in providing resources to SBIR/STTR funded small businesses that are complimentary to the existing federal SBIR/STTR programs.

There should be expanded regional conferences and workshops that provide information about these programs and sources of assistance for existing, as well as start-up small businesses.

It should be required, in my opinion, that business schools of federally-funded colleges and universities should interact with SBIR and STTR funded small businesses.

And finally, courses on new ventures and entrepreneurship should be established at all colleges and universities in this country.

Mr. Chairman, I thank you for your time.

[The prepared statement of Dr. Murphy follows:]

PREPARED STATEMENT OF OLIVER J. MURPHY

INTRODUCTION

Mr. Chairman, Congresswoman Johnson, Members of the Committee, I thank you for allowing me the opportunity to testify before you regarding the Small Business Innovation Research (SBIR) Program, the related Small Business Technology Transfer (STTR) Program, and the opportunities that these programs offer to small businesses in the United States, and in particular in the State of Texas.

My name is Oliver J. Murphy, co-founder and President of Lynntech, Inc., a small business specializing in the development and commercialization of new technologies. Lynntech is located in College Station, the home of Texas A&M University. I have actively participated in research and development work, as well as technology devel-

opment and commercialization efforts, for over twenty years, first in academia, second in a large corporation, and finally in a small business. Having experienced all three working environments, I am convinced that employee satisfaction, growth, creativity, and productivity are greatest in small businesses. Small businesses are good for the United States because they create a growing number of jobs each year in this country and develop an increasing amount of new technologies as evidenced by the number of U.S. patents attributed to this business sector. In order to maintain economic growth and to enhance our standard of living in this country through the decades to come, as a society we must devote the necessary resources to foster the growth of existing small high technology businesses and to create new small businesses at a faster pace. A significant amount of these resources can be made available to those small businesses through the SBIR and STTR programs. Improved and enhanced variants of these programs are essential for the creation and growth of a major segment of small high technology based businesses in this country.

Since, to a large extent, venture capitalists no longer make seed round investments in start-up technology based ventures, increasingly small businesses face the challenge of securing the needed capital to demonstrate the technical and commercial feasibility of their concepts or ideas. Over the last decade venture capitalists have made only later stage investments in small technology based companies after the technical and commercial risks have been minimized or almost eliminated. In many cases this has led the principals of new, start-up technology development ventures to raise seed capital from family and friends, which in most cases is insufficient to reach desired milestones and leads to the failure of many such ventures. The unique and essential aspect of the SBIR and STTR programs is that they provide to for-profit small businesses the difficult to obtain early stage financial support necessary to develop high-risk, high-payoff technologies. Solicitations for proposals, issued at least annually, by participating Federal Government Departments and Agencies encompass the complete spectrum of technologies from aerospace to biotechnology and nanotechnology. This eliminates any technology bias or so-called "picking winners" by the Federal Government.

With the continued downsizing of most large industrial corporations and increasing pressure on management teams to meet or exceed the next quarterly earnings expectations, long range research and technology development efforts within many of these corporations have been reduced significantly over the past ten to fifteen years. To maintain a technological and competitive edge to their products in what is rapidly becoming a global economy, large companies need to have access to the latest developed technologies. It has been recognized more and more each year that a ready source of proven high technologies for these large companies exists within many SBIR and STTR funded small businesses throughout the country. Through either acquisitions, strategic relationships, or licensing arrangements, commercialization of many of these developed technologies is accomplished by large corporations.

Alternatively, commercialization is achieved by the small businesses themselves by raising additional capital in the public markets and/or as the result of venture capital investments, such investments and raising of capital being made after the initial SBIR funding has been spent. Because of the growing trend of a short-term business focus and the increasing tendency to avoid technology risk within large industrial organizations in this country, the need for small, high technology businesses and their ability to obtain technology development funding from State and Federal Government entities, such as that made available through the SBIR and STTR programs at present, will be essential for the generation of jobs in the future and the creation of wealth and prosperity in this State and the other States.

The existing SBIR and STTR programs are models for funding technology development and commercialization within small businesses that can be improved, enhanced, and expanded upon so as to stimulate regional or local economic development and give greater returns to the taxpayer. To illustrate the opportunities offered by the SBIR and STTR programs, I will outline below the experiences of Lynntech with these programs.

LYNNTECH'S EXPERIENCE WITH THE SBIR AND STTR PROGRAMS

Lynntech was founded as a small, high technology business in 1987 and incorporated as a Texas Corporation. At the time of organizing the company, the founders were employees of Texas A&M University. However, the company did not initiate full time business activities until January of 1990, after its two initial employees resigned their positions at Texas A&M in December 1989. Since that time the business activities of the company have focused on the development and commercialization of new technologies in four primary areas: (i) environmental technologies; (ii) electrochemical energy conversion and storage; (iii) corrosion and materials science; and, (iv) biomedical/bioengineering. Early stage development of technologies

in these key areas has been supported by funds received from the Federal Government through the Small Business Innovation Research (SBIR) Program. After the technical feasibility of various technologies have been established, the company has been successful in obtaining advanced technology development funding through other Federal Government programs such as, Broad Agency Announcements (BAAs), Program Research and Development Announcements (PRDAs), and other Agency solicitations. Subsequently, in a number of cases, advanced hardware developments that yielded prototype devices were created as a result of establishing relationships with intermediate-size and large-size industrial corporations. These have resulted in successful commercial products and processes. The goal of the company from the day it was founded is to commercialize products and services derived from successfully developed new technologies. The company's commercialization plan includes licensing arrangements, spinoffs, joint ventures, and outright sale of developed technologies where appropriate. A number of these commercialization mechanisms have been successfully exploited by Lynntech and involved technologies developed with SBIR funding.

Critical to the success of Lynntech in developing and commercializing new technologies has been its participation in and support by the SBIR programs of almost all of the Federal Government Departments and Agencies. The company has received SBIR Phase I, Phase II, and Phase III awards from Departments and Agencies that issue contracts, and from those that award grants. This has allowed the company to maintain a sustained technology development effort for a number of technologies, such as fuel cells, that are recognized to be of vital importance to national security and to the country's economic future. Fuel cell power sources have multiple applications for which large markets are a few years to over a decade away. After learning how to work with the various Government Departments and Agencies over the first few years of being in business, the SBIR experience from proposal submission, contract negotiation, contract or grant administration, and reporting have been very good. A marked improvement has occurred over the years with regard to receiving payments from various Agencies under the SBIR program, in particular, for contracts having progress payments.

A measure of success in developing new technologies within Lynntech under the SBIR program is to record the number of issued U.S. patents assigned to the company. To date Lynntech has received 80 U.S. patents and in some cases corresponding foreign patents. Securing the intellectual property rights for developed technologies is essential to achieve subsequent successful commercialization of those technologies. Another measure of success that is monitored is the total number of employees in the company at the end of each year. From two employees at the beginning of 1990, new hires have been added each year that the company has been in business giving a total of 149 employees at the end of 2003. Of these 109 were full time employees and 40 were part time as well as being undergraduate students at Texas A&M University. As a result of the SBIR and STTR programs, Lynntech is the leading high technology development and commercialization company in the Bryan/College Station region. The economic impact of the company in the region, which has surprisingly few similar high technology small businesses in view of the presence of Texas A&M University, is quite significant. To further illustrate the opportunities offered and the benefits received by participating in the SBIR and STTR programs, I will provide two examples of technologies developed and successfully commercialized at Lynntech under the SBIR program.

FUEL CELL TEST SYSTEMS

Fuel cells generate electricity through a chemical reaction between oxygen in the air and a fuel, such as hydrogen or methanol. As a result, they are quite efficient and clean; discharging only benign byproducts such as water vapor. These devices have the potential to power everything from laptop computers to manufacturing plants. Thus, for over the past 15 years extensive development of various fuel cell technologies for a variety of applications has been carried out by universities, national laboratories, and large as well as small companies both here in the United States and abroad. Developers of the various fuel cell technologies require advanced, fully automated, computer-controlled test equipment to determine the performance of fuel cell components such as electrocatalysts, as well as fuel cell stacks and fuel cell power systems.

State-of-the-art fuel cell test equipment was invented by Lynntech in the early to mid-1990s with funding for the design, fabrication, and testing stemming from a Phase II SBIR contract with NASA's Glenn Research Center. To match the requirements of individual fuel cell developers, Lynntech developed a modular approach on designing the test equipment (see Attachment I), enabling custom solutions with standard equipment. Since 2001, Lynntech Industries, Ltd., a spin off from

Lynntech, Inc., has been manufacturing and selling a complete range of fuel cell test systems world-wide to meet the needs of customers in the rapidly growing market of fuel cells. Commercial sales of fuel cell test equipment were almost $2 million in 2003. Part of an experienced management team was put in place in Lynntech Industries in 2003 which is now actively pursuing venture capital to aggressively exploit this very significant business opportunity. This "success story" was written up in the NASA Spinoff 2003 Booklet (see Attachment II).

ELECTROCHEMICAL OZONE GENERATION TECHNOLOGY

Ozone has a long history associated with the treatment of drinking water at municipal water treatment plants. More recently, it has been used as the final treatment step in the preparation of potable bottled water. Ozone is known to be a potent disinfectant and is very effective for destroying a broad range of harmful microbiological species that may be present in water, food ingredients, and on surfaces such as flexible medical endoscopes. Ozone generation devices that have been used for decades include ultraviolet lamps and corona discharge generators, both of which require a source of oxygen gas to produce ozone. However, these methods of ozone generation suffer from a number of drawbacks including performance, reliability, durability, scalability, and cost.

In the early to mid-1990s with SBIR funding from NASA, Department of Health and Human Services, and the Department of Defense, Lynntech developed a new electrochemical method for the production of ozone from water and investigated the suitability of using it in a variety of applications. The electrochemical method provided many distinct advantages which are not available from the earlier mentioned ozone generation technologies. After securing the intellectual property associated with the electrochemical ozone generation technology, Lynntech initiated commercialization activities in the late 1990s. This resulted in the establishment of a strategic relationship between WaterPik Technologies, Inc., and Lynntech in 1999. A joint product development effort was undertaken by both companies to enable the use of the technology in consumer home products. This lead to the completion of an exclusive license agreement between the companies in early 2000 and the successful launch of the first consumer product namely the Aquia™ for residue-free sanitization in the home in late 2001. WaterPik's Aquia™ product is shown and described in Attachment III.

The Aquia™ sanitizing system is a revolutionary household appliance introduced by WaterPik Technologies, Inc., that creates an all-natural, non-toxic sanitizing solution that is safe to use on food and surfaces to kill harmful germs. Aquia™ has been proven effective for use as a food contact surface sanitizes, non-food contact surface sanitizes and as an anti-bacterial rinse for fruits and vegetables. Aquia™ also significantly reduces the risk of bacterial cross-contamination during food preparation involving raw meats and poultry. Aquia™, which represents a new category in household products, creates activated oxygen, also referred to as ozone, by converting ordinary tap water into "ozone-infused" water through a patented electrochemical process. For years, ozone has been used commercially with the processing of produce and meats and in water purification but the necessary equipment was not economical for household use until Aquia™ was developed. The ozone-infused water produced by Aquia™ is more powerful than chlorine and can effectively kill 99.9 percent of common bacteria including *E. coli, Salmonella, Staph, Listeria* and *K. Pneumonia.*

CONCLUSIONS AND RECOMMENDATIONS

In addition to the two technologies described above, Lynntech is in the process of commercializing a number of other technologies developed with SBIR funding. SBIR funding has been vital and essential to the growth and success of Lynntech over the past decade. Technologies in the embryonic stage of development at present will fuel future growth on being successfully commercialized either through spinoffs, joint ventures, or licensing arrangements. Most of Lynntech's SBIR funded projects have been successful from a technical perspective and it is anticipated that many of them will also be successful economically.

Over the past ten years, Lynntech has worked with numerous technical and administrative personnel from various Federal Government Departments and Agencies. With very few exceptions, I would rate the level of technical and administrative support that Lynntech received, on numerous SBIR awards, as very good. In particular, the degree of interaction and contributions made by Contracting Officers Technical Representatives from the mission directed Agencies (e.g., DOD Agencies and NASA) were very good and extremely beneficial. I have not encountered any conflicts between the research goals of federal agencies that made SBIR awards to Lynntech and the business plan of the company. However, it must be pointed out

that specific pieces of hardware delivered to a government agency for their use may not be relevant as a commercial product. It is the underlying technology, processes, and know-how accumulated during the SBIR project that can be used for the creation of useful commercial products.

To further improve the SBIR and STTR programs, it is recommended that:

- There should be more extensive participation of federal agencies in SBIR Phase III activities;
- There should be more extensive coaching and business support for SBIR/STTR funded small businesses so as to increase the level of commercialization activities;
- There should be greater participation by State agencies in providing resources to SBIR/STTR funded small businesses that are complimentary to the existing federal SBIR/STTR programs;
- There should be expanded regional conferences and workshops that provide information about the SBIR/STTR programs and sources of assistance for existing and start-up small businesses that are either participating or would like to participate in the SBIR and STTR programs;
- It should be required that business schools of federally-funded colleges and universities should interact with SBIR and STTR funded small business; and
- Courses on new ventures and entrepreneurship should be established at colleges and universities.

ATTACHMENT I

Various Modules Representing Lynntech's Product Line of Fuel Cell Test Equipment

Products to enable the development of fuel cell power sources

ATTACHMENT 2

Putting Fuel Cells to the Test

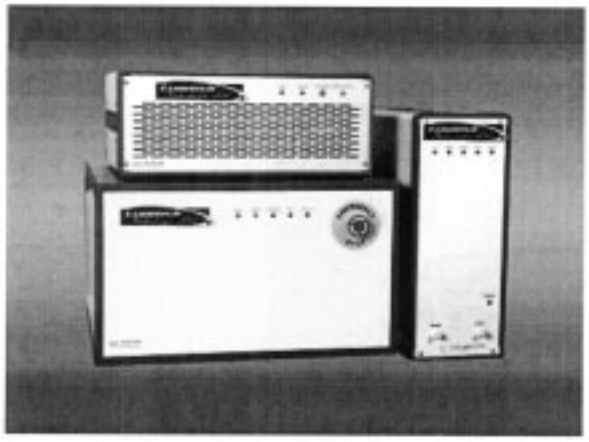
If research has its way, an electrochemical device capable of converting energy into electricity and heat will become the impetus behind the next generation of automobiles, superseding the internal combustible engine found under the hoods of vehicles that rule the road today.

The thought of fuel cell technology being able to accomplish such a feat may be dismissed as too futuristic by some, but the truth is that fuel cells have been in play as a source of propulsion since the 1960s, when NASA first used them to generate power onboard the Gemini and Apollo spacecraft for extended space missions. Even more unknown is the fact that fuel cells were and continue to be a source of drinking water for astronauts in orbit, since they produce pure water as a by-product.

NASA is recognized for providing fuel cell technology with the initial research and development it required for safe, efficient use within other applications. Fuel cells have garnered a great deal of attention as clean energy converters, free of harmful emissions, since being adopted by the Space Program. Along with automobile manufacturers, universities, national laboratories, and private companies of all sizes have tapped into this technology.

While the primary fuel source for a fuel cell is hydrogen, there are several different types of fuel cells, each having different energy conversion efficiencies. Alkaline Fuel Cells (AFCs), which use a solution of potassium hydroxide in water as their electrolyte, were one of the first classes of fuel cells developed and are still depended upon during Space Shuttle missions. Phosphoric Acid Fuel Cells (PAFCs), considered the most commercially developed fuel cells, are used in hospitals, hotels, and offices, and as the means of propulsion for large vehicles such as buses. Proton Exchange Membrane Fuel Cells (PEMFCs) are similar to PAFCs in that they are acid-based (although the acid is in the form of a proton exchange membrane), but they operate at lower temperatures (about 170 °F, compared to 370 °F) and have a higher power density.

Molten Carbonate Fuel Cells (MCFCs) operate at high temperatures (1,300 °F) to achieve sufficient conductivity. Solid Oxide Fuel Cells (SOFCs), like MCFCs, operate at high temperatures (2,000 °F), but are more ideal for using waste heat to generate steam for space heating, industrial processing, or in a steam turbine to create more electricity. Lastly, Direct Methanol Fuel Cells (DMFCs) use methanol directly as a reducing agent to produce electrical energy, eliminating the need



Various modules representing Lynntech, Inc.'s product line of fuel cell test equipment.

for a fuel processor, thus increasing the possibilities for a lighter, less expensive fuel cell engine.

Developers of the various fuel cell technologies require advanced, fully automated, computer-controlled test equipment to determine the performance of fuel cell components, such as electrocatalysts, proton exchange membranes, and bipolar plates, as well as fuel cell stacks and fuel cell power systems. Since 2001, Lynntech Industries, Ltd., an affiliate of College Station, Texas-based Lynntech, Inc., has been manufacturing and selling a complete range of fuel cell test systems worldwide to satisfy customers' demands in this rapidly growing market.

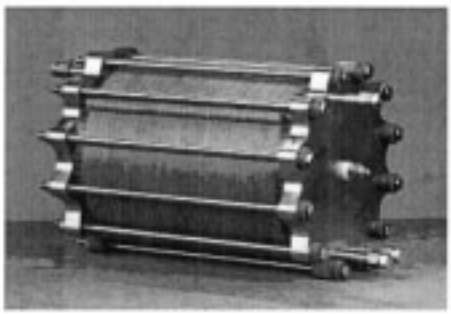
The fuel cell test equipment was invented by Lynntech, Inc., in the early-to-mid 1990s, with funding for design, fabrication, and testing stemming from a Phase II **Small Business Innovation Research (SBIR)** contract with NASA's Glenn Research Center. Glenn awarded the company the SBIR with the intent of utilizing the resulting technology to strengthen NASA's Reusable Launch Vehicle and Space Power programs. First year commercial sales of the fuel cell test equipment were in excess of $750,000, verifying NASA's expense as a sound investment. The test system arising from the work with Glenn has been patented by Lynntech, Inc., and continues to be upgraded to meet current standards.

Lynntech Industries' testing system comes equipped with software called FCPower,™ declared by the company as the most powerful and flexible program for testing in the industry. FCPower enables plug-and-play recognition of hardware, multiple levels of user control, complete automation of configuration and testing, customizable display, and data acquisition and exporting. Even more, the software incorporates safety features that allow for combustible gas monitoring and automatic shutdown of instruments and fuel supply lines.

To match the requirements of individual fuel cell developers, Lynntech Industries adopted a modular approach on designing the test equipment, enabling custom solutions with standard equipment. This entitles customers to select specific modules they may need for any given fuel cell application. Accordingly, Lynntech Industries provides a selection of "all-in-one" test systems and function-specific modules. The components of the company's fuel cell test system include an electronic loadbank; a reactant gas humidifier; gas mixing, handling, and metering systems; instrumentation input/output; methanol and hydrogen test kits; tail gas handling; thermal management; and a cell voltage monitoring buffer board.

It remains uncertain when exactly the average consumer will be able to fully appreciate the impact that fuel cells are making to preserve the environment, but Lynntech, Inc., and Lynntech Industries are in position to bring this moment of realization one step closer to reality.

FCPower™ is a trademark of Lynntech Industries, Ltd.
Flightweight™ is a trademark of Lynntech, Inc.



A variety of fuel cell components, like the Lynntech Flightweight™ Fuel Cell Stack shown here, require top-of-the-line test equipment to determine their performance.

ATTACHMENT III

Safe, natural solution.

The new AQUIA™ Sanitizing System for infant/toddler areas from Waterpik™ turns ordinary tap water into a safe and natural sanitizer with more germ killing power than chlorine. Using the same proven technology used to purify bottled water, the AQUIA System infuses ordinary tap water with activated oxygen (ozone) to create "oxygen-rich" water.

This oxygen-rich water is a powerful household sanitizer that kills over 99% of bacteria on contact* And fewer germs mean less strain on your baby's developing immune system.

Unlike harsh chemical cleaners, the AQUIA's oxygen-rich water leaves no toxic residue. It's completely safe to use everywhere in the house, including nursery and kitchen areas. Perfect for sanitizing crib rails, high chairs, changing tables, toys, anything little hands might touch!

AQUIA™
KILLS GERMS NATURALLY

waterpik
www.waterpik.com

*Use as directed.

Imagine ordinary tap water with more germ killing power than chlorine.

The new AQUIA™ Kitchen & Food Sanitizing System from Waterpik turns ordinary tap water into a safe and natural sanitizer that kills over 99% of bacteria—including E.coli and Salmonella. Using the same proven technology that has been used for decades to purify water, the AQUIA™ Sanitizing System infuses ordinary tap water with activated oxygen (ozone) to create "oxygen-rich" water. This oxygen-rich water is a powerful sanitizer, but leaves no chemical residue. It's completely safe to use everywhere in the kitchen. And it's the only sanitizer that can be used directly on fruits, vegetables and any food preparation surface!* **waterpik**

AQUIA™
kills germs naturally*

BIOGRAPHY FOR OLIVER J. MURPHY

WORK EXPERIENCE:

1990–present—President and co-founder, Lynntech, Inc.

1987–1990—Assistant Director, Center for Electrochemical Systems & Hydrogen Research, Texas A&M University

1984–1987—Project Leader, The Standard Oil Company, Warrensville Research Center, Cleveland, Ohio

1980–1984—Research Associate/Senior Scientist, Department of Chemistry, Texas A&M University

EDUCATION:

1980—Ph.D. (Electrochemistry): University College Cork/National University of Ireland, Ireland

1977—M.Sc. (Electrochemistry): University College Cork/National University of Ireland, Ireland

1976—H.Dip.Ed.: University College Cork/National University of Ireland, Ireland

1975—B.Sc. (Chemistry): University College Cork/National University of Ireland, Ireland

PROFESSIONAL SOCIETY MEMBERSHIPS:

Electrochemical Society

International Society of Electrochemistry

American Electroplaters and Surface Finishers Society

International Association for Hydrogen Energy

PUBLICATIONS:

Books and Book Chapters:

1. *"Electrochemistry in Transition: From the 20th to the 21st Century,"* (with S. Srinivasan and B.E. Conway), Plenum Press, New York (1992).
2. *"The Electrochemical Splitting of Water."* In: "Modern Aspects of Electrochemistry," eds., J. O'M. Bockris, R.E. White and B.E. Conway, Plenum Press, New York (1983), Vol. 15, Ch. 1.
3. *"Spectroscopic Characterization of the Passive Film on Iron Before and After Exposure to Chloride Ion."* In: "Electrochemistry in Transition: From the 20th to the 21st Century," eds., O.J. Murphy, B.E. Conway and S. Srinivasan, Plenum Press, New York (1992).

Refereed Journal Articles:

Over 50 refereed journal articles in national and international journals and over 60 technical presentations at national and international technical conferences. In addition, invited speaker at numerous regional and national Small Business Innovation Research (SBIR) Conferences.

PATENTS:

Over 50 issued U.S. patents and corresponding foreign patents.

1313 Research Parkway
College Station, Texas 77845
(979) 693-0017 Phone
(979) 694-8536 Fax

January 22, 2004

Chairman Nick Smith
Subcommittee on Basic Research
Committee on Science
U.S. House of Representatives
2305 Rayburn HOB
Washington, DC 20515-2207

Dear Chairman Smith:

I am providing testimony to the Subcommittee on Basic Research at the hearing entitled, *"Tools for Enhancing Small Business Competitiveness in the Dallas Area: A Review of Federal Programs"* to take place on Friday, January 23, 2004 at 10:00 a.m. in the Bill J. Priest Institute Conference Center at Dallas County Community College.

In keeping with procedures governing witness testimony, I wish to disclose the sources and amounts of federal funding (by agency and program) received by Lynntech, Inc., which directly supports the subject matter on which I am testifying before the subcommittee. The relevant data is presented in Tables 1 and 2 which are included as attachments to this letter.

Sincerely,

Oliver J. Murphy
President

DISCUSSION

Chairman SMITH. Thank you all very much.

There's a lot of business people out here, so I'm going to start with a little sort of sermon, preaching, science and math test scores internationally are the seed corn for our researchers in this country. In the United States in K–12 we rank near the bottom in our science and math scores. And, it just seems to me that as a pocketbook interest on the part of business, certainly on the part of government, we've got to do a better job in encouraging our kids to be interested and stimulated in science and math, and to be involved in it as they go through their further education.

I want to start, I think, with a question maybe to all witnesses. What percent of resulting products go to or are sold to the Federal Government or state government, versus the private sector? Do we have any figures on that, Mr. Montes, from SBA, or does Victor Klingelhofer?

Mr. MONTES. I think Victor Klingelhofer in Washington, they monitor compliance and statistics such as that in Washington. Would you like that now?

Chairman SMITH. Yes, either way, whatever Jim is the best way to do it. If they've got a response, if they haven't, David, follow up on that.

In the meantime, Ms. Goodnight, what percentage of your research effort goes to public versus private sector?

Ms. GOODNIGHT. For us, because we are a granting agency predominantly, I would say a great majority would go to the public sector. We actually did a study that is posted on our web site, a national survey to evaluate the SBIR program between 1992 and 2001. From those results it appears that the majority are going to the private sector, because at the end of the day we don't.

Chairman SMITH. Private sector, not public sector.

Ms. GOODNIGHT. I'm sorry, public sector, because we do not buy what it is they are developing at the end of the project.

Chairman SMITH. I would think if it helped, I would think eventually it's going to hospitals and health care providers.

Ms. GOODNIGHT. Right, and physicians, and some of the major——

Chairman SMITH. Which I call the private sector.

Ms. GOODNIGHT. ——and some of it may come back to the research institutions, if they are developing improved research tools.

But, my point is that our agency is not buying back what's being developed.

Chairman SMITH. Yes, right.

Dr. Slocum, Dr. Murphy, in your involvement what percentage is sold to government?

Chairman SMITH. Yes, Polatomic is 100 percent DOD and NASA right now. We did a spinoff of our nanotech business into integrated photonics and joined with five people from Bell Laboratories formed a new company, and that's aimed at the private sector.

Chairman SMITH. And, Dr. Murphy.

Dr. MURPHY. Yes, the same in our case, Mr. Chairman, most of our products and services are to the private sector, a spinoff com-

pany sells products worldwide. We export to Europe and Asia, and we have a number of licenses.

Chairman SMITH. Dr. Slocum said the public sector, most of yours goes back to the Department of Defense, Navy.

Dr. SLOCUM. Yes, but we did a spinoff to a separate company that markets worldwide.

Chairman SMITH. All I'm really interested in is the end product, does the end product go into commercial market use or does it go back to the Federal Government?

Dr. SLOCUM. Well, we are 100 percent in Polatomic going into the government sector. In the other company we are going virtually 100 percent into the private sector, into the commercial area.

Chairman SMITH. And, what is that product?

Dr. SLOCUM. It's optimal filters and biohazard potential.

Chairman SMITH. Dr. Murphy.

Dr. MURPHY. We are 100 percent at the moment into the private sector.

Chairman SMITH. And, let's see, Mr. Klingelhofer of SBA, do we have a figure nationally?

Mr. KLINGELHOFER. We do not currently——

Chairman SMITH. I think we are going to ask you to send us that answer, because our technology sees you very clearly, but the transmission is a little bit weak.

Mr. KLINGELHOFER. Is this better, Mr. Chairman?

Chairman SMITH. Yes, that's good.

Mr. KLINGELHOFER. We do not currently track those numbers at the SBA. We will, however, research it.

Chairman SMITH. And so, what do you consider the goals of the program? As these different agencies develop their parameters of what they are looking for, how do they know what to decide if it's research, basic and applied, that's eventually going into the marketplace I guess I'm just a little curious of the tendency of the different agencies to say, well, this is what our agency needs, this is how we are going to send out the request for projects coming in.

Mr. KLINGELHOFER. Mr. Chairman, we have developed a new database which will go on-line.

Chairman SMITH. You have to talk in the mic somebody said. That didn't work quite well.

I'm going to bypass that and ask you, Ms. Goodnight, in NIH what is the number of requests versus the dollar allocations? Do we have a lot more requests for projects than the dollars that you make available?

Ms. GOODNIGHT. We do, indeed. Actually, about 24 percent of our Phase I SBIR applicants are funded, and about 44 percent of our Phase II applicants are funded.

Chairman SMITH. And, how does that gel with the requirement that you set aside a certain amount of your total research dollars for this program?

Ms. GOODNIGHT. The way it gels is, we are receiving, especially now, we have a large increase in the numbers of applications to our agency and other agencies are seeing the same, that is, in fact, why we chose this year to exceed the minimum requirement, because we had many more projects than we had funds to support if we were only to go with the minimum 2.5 percent. And, for us that's

a floor, and we have the option to exceed that minimum requirement, and we do exceed it, because we want to fund the best science.

Chairman SMITH. Representative Johnson, you remember the hearing, we had one hearing where one of the witnesses said that in the private sector, because so much pressure was coming from their Board of Directors and investors, they really didn't get involved in applied research unless it looked like they could have results in five or six years, and so it seems to me that that means that there needs to be some action on the part of State and Federal Government to try to be encouraging, whether it's through the tax system, or whether it's more effort in these kind of programs.

I spoke last week or week before last to the Industry University Collaborative Research Program effort, which helps a little bit with the application of some of our knowledge. And, I'm going to turn this over to you, Congresswoman Johnson, before I get into too much of my speech making mode, but somehow we've got to be a little more selfish with our research dollars in this country to try to make sure results as an advantage to workers and businesses in the United States, and that's part of what I hope to get from this hearing, how do we do it?

Ms. JOHNSON. Thank you.

Chairman SMITH. And, which Dr. was it, who has to leave at 11:15? Dr. Feng, and Dr. Slocum and I, have to leave at 11:15.

Ms. JOHNSON. Okay.

Dr. Feng, it's obvious from your testimony that a vibrant high-technology small business community could bring substantial research contracts to the University of Texas at Dallas. Does your institution function as a subcontractor on any SBIR grant?

Dr. FENG. Currently, I think we have about four of them as subcontractors to SBIR grants. What I would like to actually emphasize and underscore to the small businesses here, is not to just look at the University of Texas at Dallas as a single entity, but rather consider us as a window to other research universities in the State of Texas, or, in fact, in the Southwest, because we have such good working relationships with all the universities, such as Rice, UT–Austin, Texas A&M, and so on and so forth, including our neighbor UT–Arlington.

So, I would say that there is a tremendous effort that is going on, however, I think that it is still too early to tell whether it's successful or not.

What I would like to see that, in a year or two we are talking about each university working with ten to 20 small businesses in developing these kind of projects.

Ms. JOHNSON. What services does your university supply, or the Consortium of Universities, supply to the companies who wish to get involved in this program?

Dr. FENG. Well, I suspect that we'll look at the kind of activities that's going to come out of SBIRs and STTR. It will be, a lot of them will be in the biotechnology area, because of the tremendous growth of the NIH funding areas. I think the whole idea of homeland security technologies is going to grow significantly, we hope, of course, from the university side to see a clear path within the

homeland security activities, how that can actually benefit the region, as well as for the Nation.

I think the other area that is going to have a lot of progress is the information technology security issues, the IT security issues, where most universities, we, of course, have a lot, but most universities have an enormous amount of strength.

Finally, nanotechnology for this region is becoming one of the hotbeds of the United States. Nanotechnology's collaboration between the four universities, Rice, Austin, Dallas and Arlington, together with our two border universities, UT–Brownsville and UT–Pan Am, have really started very, very well, and we look forward to all the participation, not only in the dry side of the nanotechnology, but also on the wet side of nanotechnology, which means that things such as nano medicine and so on with NIH, I have heard recently, that is promoting very, very actively.

Ms. JOHNSON. And, how does a small business in Dallas, for example, get in touch or receive an SBIR award and learn how to apply? Is there a mentoring program?

Dr. FENG. Well, actually, there is a very good website that people can go to called SBIRworld.com, and you go in there and you find just about all the SBIR information that you need.

We are trying to set up monthly training sessions, not just for the small business, but also for our faculty. Our faculty really don't quite understand the importance of SBIR. I tell the faculty quite often that small business does not mean small money, and that is an important issue, and small business has real technological agility which is very useful for the university faculties to understand how to bring their research into the commercial side.

I often said that I think we miss something when we just talk about R&D, research and development. We should have the second D, which is deployment. Deployment is very bad from the university point of view, we need to work with industry to help us to really bridge that gap.

Ms. JOHNSON. And, a final question, in the past we recognized that people like Bill Gates and Michael Dean dropped out of college in order to have full control of their intellectual property. If a company is working in the field and comes to the university for help, who controls any resulting intellectual property?

Dr. FENG. In the SBIR case, as far as I understand it, it is rather complicated, this is a complicated issue, we probably can talk about it all afternoon, but I think the Federal Government, of course, insists that the intellectual property in this particular case lie in the small business, and, in fact, it would go very quickly for commercialization.

Universities tend to be a little bit more defensive on that, but I think it's getting more and more flexible nowadays in this particular effort.

Ms. JOHNSON. Thank you very much.

Did you want to ask?

Chairman SMITH. Either way.

Dr. Slocum, I think Ms. Goodnight had a reaction maybe to your question?

Ms. GOODNIGHT. Just two quick reactions. One is, because I've got data with me and I'll give you some real numbers to your ques-

tion. We, actually, this year received 4300 applications, and that was about a 33 percent increase over the past year. So, based on the amount of awards, percentage of awards that were made, we clearly are seeing more.

With regard to intellectual.

Chairman SMITH. I'm sorry, what percentage of that, of the applications, were awarded grants?

Ms. GOODNIGHT. Right, so 24 percent of the Phase I SBIRs were awarded, and 44 percent of the Phase II SBIR applicants were awarded.

Chairman SMITH. Dr. Slocum indicated in his testimony that there's a problem with a small business that has so many researchers of keeping them in line while they wait for the bureaucracy and the bureaucrats to come up with the Phase II, or even worse I think you indicated, going from a Phase II to a Phase III, and you agree, Dr. Murphy, that's one of the problems?

Dr. MURPHY. Yes.

Chairman SMITH. Is there any way, Mr. Montes, or the Deputy Administrator in Washington, should we be looking at that problem? If we are saying to a small company we want to help small companies in this effort, but we are going to make it very—you know, it ends up being very inconvenient because of the bureaucratic time line between I and II, and II and III.

Dr. Montes.

Mr. MONTES. Thank you for the promotion, I'm Mr. Montes,

Let me defer that to Victor Klingelhofer, if the microphone is working there, Victor.

Mr. KLINGELHOFER. Is it working now, Mr. Chairman?

Chairman SMITH. Yes.

Mr. KLINGELHOFER. We are undertaking a number of steps to increase the possibility of awards to small businesses. One thing that we are doing is working right now on enhance the program in Fiscal Years '04 and '05. We are currently talking with HUD, the Department of Veterans Affairs, GSA, and Justice so as to increase the band of small business opportunities in with the Federal Government market.

Chairman SMITH. There were a couple. Yes, Mr. Montes.

Mr. MONTES. Mr. Chairman, Ms. Goodnight wanted to address that point as well, but before I turn the microphone over to her, if I can go back to your question regarding the commercialization of whether the end result goes to public entities or private entities, or the commercial private enterprise.

The statutory purpose, and this comes from our policy directive, the statutory purpose of the SBIR program is to strengthen the role of innovative small business concerns in federally-funded research or research and development. Specific program purposes are to, [1] stimulate technological innovation; [2] use small business to meet federal research and development needs; [3] foster and encourage participation by socially and economically disadvantaged small business concerns, and by small business concerns that are 51 percent owned and controlled by women in technological innovation; and [4] increase private sector commercialization, again, private sector commercialization derived from federal research and development.

Chairman SMITH. They make their own research and development.

Mr. MONTES. Exactly, well, not necessarily, not in the case of the Sonic Toothbrush, for example. So, there are the two references there.

Chairman SMITH. That doesn't mean one way or the other.

Mr. MONTES. Right.

Ms. GOODNIGHT. I would just like to comment on what our agency is doing to address this really difficult issue that the entrepreneurs are facing, and that's the gap that typically occurs between Phase I and Phase II, as well as between Phase II and Phase III, if you don't have an agency that's going to be that Phase III customer.

Our agency offers a Phase I/Phase II fast track option, where the applicant can propose to us both Phase I and Phase II simultaneously and get a concurrent review.

There are other agencies who offer similar types of gap funding options, like a Phase IIB. DOD has a fast track, and there might be some other agencies with programs to address the gap.

We also offer no cost extensions and supplemental awards, the most recent of which is a competing continuation Phase II for the types of research that will need to go through regulatory processes, specifically, the Food and Drug Administration.

So, I think our agency is certainly looking at ways that we can address many of these funding gap issues.

Chairman SMITH. Dr. Feng, would you want to make one final 30 seconds, because you have to go in 30 seconds.

Dr. FENG. Thank you very much.

I think that I would encourage the small businesses to contact me, and to see how we can work together in the future.

Chairman SMITH. Well, just as a follow up on that, one or two individuals here today have developed a business consulting effort, where they are charging businesses to get involved in this program. And, it seems to me the Small Business Administration, each one of the agencies, and let's make sure maybe we pass that on to SBA, indeed, and we can follow up on it, it seems to me that the universities should make an extra effort so that businesses don't have to go pay for somebody who could have government help.

And so, the complication of the application process that was in your testimony, both of your testimonies a little bit, I have to question, and you are certainly excused whenever you feel comfortable, Dr. Feng, at what point should we guard against, or at what point does this become a substitute for an effort of a small business to go out and get investors or use their own funds for research that they'd do anyway. And, I'm going to ask you, Dr. Slocum, to comment on that, and then the Small Business Administration and Dr. Murphy.

Dr. SLOCUM. At Polatomic, we regard the SBIRs as investors.

Chairman SMITH. Yes, and does it become a substitute for other private sector money?

Dr. SLOCUM. Well, it turns out when you are doing DOD work or NASA work it moves so slow, and you are working on national priority issues, that you need a patient investor like SBIR.

In the second company that we spun off of Polatomics, when we combined the five people from Bell Laboratories we've been able to raise $7.5 million of venture capital, because that was aimed at a quick turnaround commercial application. It had to be telecom, so it was not the smartest thing I've ever done, but that opens up opportunities on both sides.

Chairman SMITH. And, Dr. Murphy.

Dr. MURPHY. I'd like to answer it this way, Mr. Chairman. Most SBIR companies that receive SBIR funding are trying to prove, assure feasibility, demonstrate feasibility. It's very early stage research and development work, which venture capitalists today will not fund.

There is this lack of ability on the small businesses to be able to access funding from any source until you have shown feasibility, a working model, maybe intellectual properties, et cetera. I don't see it as an alternative to venture capital funding, it's an essential ingredient leading to venture capital funding. And, I think that is critical in this country, we lack that. This SBIR and STTR program is unique, it's very, very, very unique, and will serve us, I think it's serving this country well at the moment, but in the decades to come its full, if you like, its full benefits will be reaped, because large companies, as we well know over the last few decades, are no longer doing this advanced research and development work. We will lack the ability to have new products, new technologies, unless somebody takes up the plow, if you like, to put money into that effort.

Chairman SMITH. I guess as a public policy I personally would like to go spread this money around and encourage more small businesses, should we consider putting some kind of a limit so that one business that now has learned how to get through the bureaucratic ropes of government doesn't monopolize, for lack of a better word, some of the repeat funding? Should we consider some kind of a limit of three Phase I grants, or ten Phase I grants? I mean, that's my question, should we make an extra effort to spread this around, and I'll ask SBA in Washington eventually to maybe get back to me on that question.

Yes, Dr. Slocum.

Dr. SLOCUM. I think that, you know, as a free enterprise person, that as long as you have a meritorious idea that really has promise that it would be unwise for the country to limit it.

I sometimes judge Phase II proposals for the National Science Foundation, and they've got a pretty good filter for catching people that are just riding the system to try to get grants if they are not really interested in getting a Phase III, they are just interested in paying good salaries to a group of researchers. So, they can kind of catch them through their computer scan.

Chairman SMITH. Will Polatomic consider giving part of your net profits that result from this government tap to your research back into a revolving program to fund the program? Maybe, I don't know what percent, maybe one percent, maybe two percent?

Dr. SLOCUM. Well, I think the thing I would respond to, knowing how much difficulty we're having just getting the funding to stay in Phase III, but I think what would be reasonable is to tithe some time back into the community system to mentor, along with groups

like UTD and SBA, to mentor people. We do that informally, because people come to us for help.

Chairman SMITH. I've got to turn this back over to Congresswoman Johnson.

Ms. JOHNSON. Thank you.

Let me just ask one more question on what you were saying to clarify. You mean there should be some type of consortium developed so that the small business people will know that that's a way to access the information?

Dr. SLOCUM. Yes, and I have people that drop out of large companies like TI and when they start on their SBIR and come to me I'm amazed at how little they know about just getting through the process. And so, people that are coming from less sophisticated areas will have a tough time. So, a little bit of help from somebody that's an experienced and successful bidder on SBIR can be a great help, and it doesn't take a lot of time. You can do a lot at just a lunch sometimes.

Ms. JOHNSON. Thank you very much.

I was going to ask Mr. Montes of SBA, it's my understanding that about 15 percent of SBIR grants go to minorities and other under-represented small businesses. Are grants to women owned businesses included in this number?

Mr. MONTES. I believe so, yes, they are. I do have those numbers, but rather than shuffle through a bunch of papers for you here I'll look for them if you want to continue on, I'll get those for you.

Mr. KLINGELHOFER. Congresswoman Johnson, women-owned business numbers are approximately seven percent, seven percent minorities.

Ms. JOHNSON. seven percent of the 15 percent?

Mr. KLINGELHOFER. No.

Chairman SMITH. So, that's two groups, 15 for minority and seven for women, is that correct?

Ms. JOHNSON. So, they are calculated differently?

Mr. MONTES. Yes.

Ms. JOHNSON. Historical Black colleges and universities and other minority serving institutions have a long history in science and technology. In the aggregate, they graduate many of the best and brightest minority scientists and engineers. As a matter of fact, the number one high school in the Nation is in the ghetto here in my district for science and engineering, math, and calculus.

Are the STTR awards being made that involve these institutions, and if not, or if they are, what is the SBA doing to advertise the existence?

Mr. MONTES. Yes, ma'am, principally through the FAST program the SBA has been the lead agency for the past five years in an initiative to provide outreach and technical assistance to HBCUs, small disadvantaged minority and women-owned businesses. Through a partnership between the EPA, DARPA and the SBA, representatives at various HBCUs were engaged by the co-sponsoring federal program managers to train them in the program administration and technical components of the SBIR and STTR programs.

This has enabled the HBCUs to become mentors within their given states or regions, and assist in increasing the participation level of these under-represented groups.

Ms. JOHNSON. Thank you.

Sometime soon, I think maybe April, the National Science Foundation is having sort of a regional workshop for the minority-serving institutions here on campus. Would you consider having a similar type organized workshop for small business at minority-serving institutions, who are maybe within 100 miles driving distance to a location.

Mr. MONTES. Yes, ma'am, absolutely.

Ms. JOHNSON. Okay. I'd like to work with you in putting something like that together.

Mr. MONTES. Great.

Ms. JOHNSON. It really can be very daunting for small businesses to deal with government. What advice do you have for a small high-technology business in the Dallas area that wishes to explore the SBIR opportunities, and how does one begin to know what agency to apply to?

Mr. MONTES. Well, certainly, they could start with our district office here in the Dallas-Fort Worth area. We are technically located in Fort Worth over by DFW Airport. Certainly the university system is a good place to start as well, but also I think that these solicitations, and, perhaps, Ms. Goodnight can tell us how the solicitations are issued, I presume that they are placed on the Internet and can be discovered.

Ms. GOODNIGHT. I think we have to be mindful to keep saying go to the internet. I mean, I'm a real people person. So, what I would offer is, although the SBIRworld.com is certainly a one-stop place to search all ten agencies, now 11 agencies, solicitations, this needs to be a program about people for it to really work effectively.

So, I would encourage those potential applicants to come to the national conferences so they'll find the registration and all the administrivia about that on the SBIRworld.com. But come to the national conferences, one is coming up in April in Atlanta, Georgia, and meet with the program managers, to get a better sense of that agency's mission and culture, et cetera.

And then, they've got a face with a name to go back to and really feel like after they've gone home from those conferences that they can pick up the phone and call my number and I will, you know, answer it. There's no secretary answering my phone.

There's a pretty standard process, even though there are a lot of agencies, and we present the similarities about that process in our general overview at these conferences, and then we go into breakout sessions to go into the nuances. So, it's really a valuable two or three days worth of their time.

NIH is actually having their annual conference, their sixth one, it's free.

Chairman SMITH. Would the lady yield?

Ms. JOHNSON. Will you yield?

Chairman SMITH. No, you have to yield.

Ms. JOHNSON. Oh, I'm sorry, yes.

Chairman SMITH. You mentioned 21 regional areas that NIH has, does this end up giving an advantage to those businesses in those 21 areas?

Ms. GOODNIGHT. There are 23 awarding components, the Institutes and Centers, each one of those has an SBIR allocation.

Chairman SMITH. Does this give an advantage to the businesses in those 23 regional areas, or does the outlying areas of those regions have as much advantage? How many miles or what are we talking about to come to a national meeting?

Ms. GOODNIGHT. To come to a national meeting? We hold those meetings around the country, so I don't know that I fully understand your question, but they are not always held in the same state.

One of those nationals is always held in a rural state. So, sometimes it may only be 50 miles, or ten miles, other times it's going to involve, you know, a plane trip to get to that national.

Chairman SMITH. Okay.

Ms. JOHNSON. Thank you.

You know, in Texas you can travel a thousand miles.

Ms. GOODNIGHT. I've done that recently, just in the past two weeks.

Ms. JOHNSON. And so, there are locations here that are closer to other states than for the rest of the state. So, in a state like this, we would have to have more than one consortium meeting to reach a number of the locations where the small business is concentrated, because we have a large number of small businesses in the state, and I would say probably at least 25 percent of those probably could benefit from some of the nurturing of SBIR.

Mr. KLINGELHOFER. Congresswoman Johnson, I just wanted to point out that over the last five years we've had a number of these events and that small business minority firms who are interested in the program just contact SBA's District Office.

Ms. JOHNSON. We appreciate that so very much. I want you to be mindful that it is very difficult to get to from Dallas, and it's about 300 and some miles. So, we would have to, while we appreciate that and want to keep going, it's 50 miles from Houston which is over 300 miles from here.

We need something up around the University of Texas–Arlington, University of Texas–Dallas, so that the north Texas end of the State would have access to that kind of assistance.

Chairman SMITH. Let me just say for the record, that last comment was by Victor Klingelhofer, the Associate Deputy Administrator for the Office of Government Contracting and Business Development for SBA.

Mr. ALEXANDER. Congresswoman Johnson.

Ms. JOHNSON. Yes.

Mr. ALEXANDER. On May the 11th, the Small Business Development Center here is going to be sponsoring an event. So, that's an opportunity that we will provide additional training, right here in the local area.

Ms. JOHNSON. Thank you very much. This is a very resourceful area right here where we are, that's why I chose this to be a site.

Chairman SMITH. I think for Dr. Slocum the time is about up, and I, but what I would like to do is just briefly, maybe in 30 or

45 seconds, any additional comments any of you would like to make, starting with you, Dr., well, starting at either end.

Mr. MONTES. Nothing here, I'll yield to my colleague.

Ms. GOODNIGHT. I would just encourage the contact, there's a lot of entrepreneurial ideas and talent in this state, across our entire country, and I want to see that momentum continue.

Dr. SLOCUM. I would just like to say a personal word of thanks for this program.

Dr. MURPHY. I'd just like to reiterate that last comment. Thank you.

Chairman SMITH. Well, and thank you, excellent testimony, and it does take a lot of time, and a lot of work, and a lot of effort, so we appreciate all of you, not only being here, but working and developing on the testimony.

I would like to leave the record open and would ask for your consideration on answering in writing any follow-up questions that the staff may have, that our Vice Chairman may have, or that I may have.

And, with that.

Ms. JOHNSON. No, no, don't close yet.

Chairman SMITH. No, no, don't close yet.

Ms. JOHNSON. We would close this portion, but what I'd like to do is pass out the cards so that the audience can write any questions that they might have, and if we can't get them answered in the next 15 minutes we'll take them back with us and make sure they get answered.

So, if you will write your name and address on the back of the card where you have a question, we'll make sure that we get the answers to you.

Chairman SMITH. And, with that, the hearing is concluded.

[Whereupon, at 11:30 a.m., the Committee was adjourned.]