

**REAUTHORIZATION OF THE SBIR/STTR PROGRAM:
THE IMPORTANCE OF SMALL BUSINESS INNOVA-
TION TO NATIONAL AND ECONOMIC SECURITY**

HEARING

BEFORE THE

**COMMITTEE ON SMALL BUSINESS
AND ENTREPRENEURSHIP
UNITED STATES SENATE**

ONE HUNDRED FOURTEENTH CONGRESS

SECOND SESSION

JANUARY 28, 2016

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**REAUTHORIZATION OF THE SBIR/STTR
PROGRAM: THE IMPORTANCE OF SMALL
BUSINESS INNOVATION TO NATIONAL
AND ECONOMIC SECURITY**

THURSDAY, JANUARY 28, 2016

UNITED STATES SENATE,
COMMITTEE ON SMALL BUSINESS
AND ENTREPRENEURSHIP,
Washington, DC.

The Committee met, pursuant to notice, at 10:04 a.m., in Room 428A, Russell Senate Office Building, Hon. David Vitter, Chairman of the Committee, presiding.

Present: Senators Vitter, Fischer, Ernst, Ayotte, Enzi, Shaheen, Cardin, Coons, Hirono, and Peters.

**OPENING STATEMENT OF HON. DAVID VITTER, CHAIRMAN,
AND A U.S. SENATOR FROM LOUISIANA**

Chairman VITTER. Good morning. Let us go ahead and get started. Welcome, everyone, and thanks for joining us for the Senate Small Business and Entrepreneurship Committee's hearing on reauthorizing the Small Business Innovation Research and Small Business Technology Transfer Programs.

We are going to be hearing from, first, a panel of federal officials and then a panel of stakeholders, and I want to thank all of our witnesses today for being here and for your work.

While small businesses are more easily able to adapt to market changes and drive the innovation sector of the economy, it is often very difficult for smaller firms and entrepreneurs to find funding for their new ideas, especially in the critical early stages of R&D. That is why the very existence of SBIR and STTR Programs is crucial.

These programs are vital to the success of many small businesses and have ultimately helped create thousands of new jobs by fostering innovation and stimulating the economy through public-private partnerships. Likewise, they are crucial to federal agencies as those agencies solve some of our biggest science and technology challenges, and giving small innovative firms access to already appropriated federal R&D funding is a win-win for entrepreneurs and for taxpayers.

These programs exist to foster innovation and to facilitate public-private partnerships so that firms have the funding they need to develop new technologies and innovations that help federal agencies meet their R&D needs. The programs not only create jobs, but

also lead to a path for commercialization for many participating firms, which is a crucial key to their success.

These programs have been front and center in improving our nation's capacity to innovate. Over the course of the SBIR Program history, from 1982 to 2014, federal agencies have made over 152,000 SBIR awards to small businesses to develop innovative technologies. The total dollar amount awarded out of existing federal R&D budgets through that SBIR mandate is \$42 billion. In 2014 alone, SBIR has given 5,496 Phase I and Phase II awards worth \$2.2 billion. The SBA is currently reporting an average of 5,000 awards per year.

Our discussion this morning will examine the SBIR/STTR Programs and why they are an effective way to meet national needs while jump-starting entrepreneurs, growing our economy, and creating jobs. The hearing will focus on the successful increase of innovation and how the incentive to commercialize these technologies helps our country's general economy as well as our national security.

As many of you know, Congress last reauthorized the programs in 2011 for a period of six years, so that means the programs are currently set to expire September 30, 2017. As Ranking Member Shaheen and I can both attest, it was a tumultuous process to complete the last reauthorization. Participating agencies and firms had to endure a process that took three years and 14 short-term extensions.

I am optimistic that, working together with Ranking Member Shaheen, we will work to avoid those types of delays that can really cripple innovation and create uncertainty for those small businesses affected. Reauthorizing these programs this year will ensure stability and foster an environment of innovative entrepreneurship by directing more than \$2 billion annually in federal R&D funding to the nation's small firms that are most likely to create jobs and commercialize their products.

SBIR has been a priority of mine this Congress. My bill, S. 2136, the Improving Small Business Innovative Research and Technologies Act, is the only SBIR-related bill reported out of any committee so far this Congress. The bill, which received unanimous support, establishes the Regional SBIR State Collaborative Initiative Pilot Program and will help low-participation states to work together to attract R&D funding for their innovative firms.

The pilot program provides one-year renewable grants of up to \$300,000 to a regional collaborative to address the needs of small business in order to, one, be more competitive in the proposal and selection process for SBIR and STTR Program awards, and two, increase technology transfer and commercialization.

I am grateful to have the support and guidance of Senator Shaheen and look forward to working with her to ensure that this program is included in the reauthorization bill.

Now, let us get today's conversation started. I welcome our expert panelists, who will inform us of their insights into SBIR and STTR Programs, how it has made a difference in their work and the innovative advances of our nation, and provide us with thoughts and opinions on reauthorization.

Again, I want to thank everyone for being here today and look forward to our discussion.

With that, I would like to turn it over to our Ranking Member, Senator Shaheen.

OPENING STATEMENT OF HON. JEANNE SHAHEEN, RANKING MEMBER, AND A U.S. SENATOR FROM NEW HAMPSHIRE

Senator SHAHEEN. Well, thank you very much, Mr. Chairman, and thank you for calling our first hearing of the year to discuss the need to reauthorize both the SBIR Program, the Small Business Innovation Research Program, and the Small Business Technology Transfer Program.

As you have pointed out, these are programs that have had broad bipartisan support, and they have had that support because they have been so effective. The programs work by harnessing the creativity and the ingenuity of America's small businesses to meet the research and development missions of our federal agencies, and they also support the growth of those small high-tech companies that create good jobs in local communities across the country.

And, as you pointed out, the last time we tried to reauthorize these programs, it took three years and 14 short-term extensions, so it is very important, I think, that we are starting early. I think we ought to make these programs permanent so we do not have to go through this process periodically, but that will be part of our discussion as we go forward.

And, you know, we recently—we have been doing military reform hearings in the Armed Services Committee in the Senate and we had a hearing not too long ago talking about R&D within our military. And, one of the things that people express concern about is the declining support for research and development for innovation within the military. But, Dr. Jacques Gansler, who testified, pointed out that the only program that we can consistently count on is the SBIR program, and he called it a no-brainer that we should continue to support this.

In fact, back in 2011, when we were working on reauthorization, Dr. Charles Wessner, who led the National Academies of Science study of the SBIR Programs, testified, and I quote, "The rest of the world thinks this is the greatest thing since sliced bread. The rest of the world is copying it, putting it on steroids, while we are debating it."

Well, hopefully, given the bipartisan support, we are not going to continue to debate it. We are going to move forward, point out again why this is such a good investment at the federal level, and get this reauthorized very quickly.

So, let me, before I conclude, take a minute to welcome one of our next panelists, who is Dr. Bob Kline-Schoder from Creare in New Hampshire. I want to point out Creare, in particular, because back when former Senator Warren Rudman of New Hampshire was working on developing this legislation, and maybe that is one reason I feel so supportive of it, they worked with Creare in thinking about how to structure it so it would really work. And, obviously, there have been a lot of improvements over the years, but I think this is—both SBIR and STTR are things that work and we should continue to support them.

So, thank you very much, Mr. Chairman, for moving forward, and I thank all of the witnesses who are here today.

Chairman VITTER. Thank you, Senator Shaheen.

Our witnesses at this hearing today have administered, promoted, and participated in the SBIR and STTR Programs. They will speak to the successes and challenges of these programs in expanding opportunities for small innovative firms while solving some of the most pressing science and technology challenges U.S. government agencies are trying to address.

The witnesses on our first federal panel are Mr. John Williams, Director of SBA's Office of Innovation and Technology. His primary responsibility is to serve as Senior Principal for the Federal Policy Implementation and Programmatic Oversight of the SBIR and STTR Programs across all 11 participating agencies.

And our second witness is Mr. Robert Smith from the Department of the Navy's Office of Naval Research. In his current capacity, Mr. Smith manages the Navy's SBIR and STTR Programs and assists small businesses in getting their technology fully developed, tested, and inserted into products and services used by the Navy.

I certainly look forward to hearing from you all. Your full written statements will be part of the hearing record, and here, you will have five minutes to present your testimony to the committee.

And, so, Mr. Williams, you may begin.

STATEMENT OF JOHN WILLIAMS, DIRECTOR OF INNOVATION AND TECHNOLOGY, OFFICE OF INVESTMENT AND INNOVATION, U.S. SMALL BUSINESS ADMINISTRATION, WASHINGTON, DC

Mr. WILLIAMS. Chairman Vitter, Ranking Member Shaheen, and distinguished members of the committee, thank you for inviting me here today to discuss the SBIR and STTR Programs, affectionately known as America's Seed Fund.

I would like to begin by formally acknowledging the great work of Dr. Arthur Obermayer, famed entrepreneur, activist, technologist, and philanthropist who passed away three weeks ago. Arthur and his wife, Judy, were honored this past summer at our SBIR Hall of Fame Awards for their seminal work on helping spearhead the creation of the program, working with Senators Kennedy and Rudman. Having the opportunity to work with the entrepreneurial folks like Arthur makes the efficacy and the efficiency of these programs all that much more important and personal to me.

Many of you know me from the rigor, success, and discipline I brought to the Navy SBIR Program. A little over a year ago, I was asked by SBA to provide oversight across the federal agency programs. I accepted that position and now make it my personal mission to ensure that we deliver a quality product to all stakeholders.

At the ceremony where we honored Arthur, we also had the privilege to honor companies like Hydronalix, Flexsys, Orbital ATK, and LiftLabs, companies using SBIR dollars to push frontiers of technology across multiple spectrums, from national security, to material science, to space exploration, and to health care.

Last week, prominently featured in the New York Times, there were two SBIR-funded company CEOs, Nina Tandon of EpiBone

and Eben Bayer of Ecovative Design, discussing their coveted invites to the World Economic Forum at Davos, not an easy ticket to get. They discussed how their companies' promising technologies could help solve pressing challenges in health care and waste reduction and were invited over to that world event to discuss those and find customers.

The SBIR and STTR Programs stimulate our nation's economy and increase our national security by providing seed money to small businesses, funding that is in short supply from other private sources. This funding is critical at a critical time, to make the advance from early stage ideas to product and to future follow-on funding.

The Air Force recently published the most comprehensive study on commercialization of SBIR funding. I have copies of that for the group. This study shows substantial follow-on activities and that they take a variety of forms. It is not a direct path from Phase I to Phase II to Phase III. There is licensing, there is partnering, a variety of ways that the technology moves along, but all of it shows a very high percent of the SBIR dollars go into follow-on research that gets into products and things like that.

SBA's role is to provide programmatic and policy oversight. We work closely with the agencies and the external stakeholders to ensure that the intent of Congress is carried out in the operation of the programs.

Last month, many of you and your staffers attended the SBIR Innovation Awareness Day at the Rayburn Building. The turnout was fantastic and the companies present were truly cutting-edge. None of those companies' groundbreaking efforts are possible without your continued support.

The SBIR and STTR Programs are not only critical components of America's economic growth, they are also the keys to the next generation of science and technology advances. Jobs creation is great, but jobs creation plus innovative research leads to national competitiveness, and that is what sets this great country apart from the rest of the world.

Since 1982, through the SBIR and STTR Programs, 11 agencies have made over 150,000 awards, over \$40 billion in funding. Thanks to this committee, the SBIR and STTR Program was reauthorized, as mentioned, with a lot of pain, but by December of 2011. We look forward to your support to reauthorize it again prior to the 30 September 2017 end.

As SBA's Director of Technology and Innovation, I will continue to work closely with you and our sister agencies to make sure that the SBIR and STTR Programs are priorities in each agency and continue to benefit American small business.

This Senate at this time can send a message going forward that smart, innovative programs can originate from all corners of the United States government. I look forward to working with you to make these programs permanent.

Thank you.

[The prepared statement of Mr. Williams follows:]

**ORAL TESTIMONY OF JOHN WILLIAMS
DIRECTOR OF INNOVATION & TECHNOLOGY
OFFICE OF INVESTMENT & INNOVATION
U. S. SMALL BUSINESS ADMINISTRATION**

**FOR A HEARING ENTITLED “REAUTHORIZATION OF
THE SBIR/STTR PROGRAMS – THE IMPORTANCE OF
SMALL BUSINESS INNOVATION TO NATIONAL AND
ECONOMIC SECURITY”**

**BEFORE THE
SENATE SMALL BUSINESS AND ENTREPRENEURIAL
COMMITTEE**

JANUARY 28, 2016

Chairman Vitter, Ranking Member Shaheen and distinguished members of the committee, thank you for inviting me here today to discuss the SBIR and STTR programs - affectionately known as America's Seed Fund.

I would like to begin by formally acknowledging the great work of Dr. Arthur Obermayer, famed entrepreneur, activist, technologist, and philanthropist, who passed away three weeks ago. Arthur and his wife Judy were honored this past summer at our SBIR Hall of Fame awards for their seminal work on helping spearhead the creation of the program.

Having the opportunity to work with entrepreneurial folks like Arthur makes the efficacy and efficiency of these programs all that much more important and personal to me. Many of you know me from the rigor, success, and discipline I brought to the Navy SBIR program. A little over a year ago I was asked by SBA to provide oversight across federal agency programs. I accepted that position and now make it my personal mission to ensure we deliver a quality product to all our stakeholders.

At the ceremony where we honored Arthur, we also had the privilege to honor companies like Hydronalix, Flexsys, Orbital ATK, and LiftLabs. Companies using SBIR dollars to push frontiers of technology, across spectrums - from national security, to materials science, to space exploration, to pressing healthcare needs.

Last week, prominently featured in the New York Times were 2 SBIR funded companies' CEOs, Nina Tandon of EpiBone and Eben Bayer of Ecovative Design discussing their coveted invites to the World Economic Forum at Davos and how their companies' promising technology could help solve pressing challenges in healthcare and waste reduction.

These programs stimulate our nation's economy and increase our national security by providing seed money to small businesses – funding that is in short supply from private sources. This funding is critical to make the advance from early stage ideas to product and additional investment. The Air Force recently completed the most comprehensive study on commercialization from SBIR funding. This study shows substantial follow-on activities that take place in a variety of forms.

SBA's role is to provide programmatic and policy oversight. We work closely with agencies and external stakeholders to ensure that the intent of Congress is carried out in the operation of the programs.

Last month many of you and your staffers attended the SBIR Innovation Awareness Day at the Rayburn building. The turnout was fantastic and the companies present were truly cutting-edge. None of those companies' groundbreaking efforts are possible without your continued support.

The SBIR/STTR programs are not only critical components of America's economic growth as well they are also the keys to the next generation of science and technology advancements. Jobs creation is great, but job creation plus innovative research leads to national competitiveness and that is what sets this great country apart from the rest of the world.

Since 1982, through SBIR/STTR, 11 agencies have made over 150,000 awards totaling over \$40 billion dollars. Thanks to this Committee, the SBIR/STTR programs were reauthorized in December of 2011 and we look forward to your support to reauthorize it again prior to 30 September 2017. As SBA's Director of Innovation and Technology, I will continue to work closely with our sister agencies to make sure the SBIR/STTR programs are priorities in each agency and continue to benefit American small business. And I will continue to work with you to improve these programs.

Thank You.

Chairman VITTER. Thank you, Mr. Williams.
And now, we will hear from Mr. Smith.

**STATEMENT OF ROBERT L. SMITH, DIRECTOR, DEPARTMENT
OF THE NAVY SBIR AND STTR PROGRAMS, OFFICE OF
NAVAL RESEARCH, ARLINGTON, VA**

Mr. SMITH. Mr. Chairman, Senator Shaheen, and members of the Small Business and Entrepreneurship Committee, thank you for the opportunity to speak to you today about SBIR/STTR, specifically the value the Department of the Navy achieves from the program.

The Department's fleet and force value the SBIR/STTR Program because through the program, American small businesses throughout this country have proven over and over again their ability to quickly provide lean, agile, and innovative solutions to the warfighters' requirements to help ensure our naval warfighters have the best technology solutions available to support military and humanitarian operations today and help achieve even greater mission success tomorrow.

An adage we believe in the Navy is you cannot have successful technology transition into acquisition, commercialization, without a successful company. I am proud that we help companies realize their success. Let me give you three examples.

International Mezzo Technologies in Baton Rouge, Louisiana, thermal management solutions for our electronic components in Navy radars.

Creare from Hanover, New Hampshire, advanced manufacturing technologies and processes.

And Hydronalix from Sahuarita, Arizona, first created the unmanned air vehicle, Silver Fox, used by the Marines in combat, and recently in EMILY, the Emergency Integrated Lifesaving Lanyard system being used for humanitarian operations in the Mediterranean.

Let me talk briefly on metrics that support improving the business of the science such as the solicitation, contracting, funding, and execution of management functions. Ensuring we have timely and accurate data to support sound decisions is key to the effective execution of the program. I do not believe we are producing the reports that you need, and I and the Navy SBIR/STTR Programs stand ready to support, for want of a better term, an SBIR data summit where we can agree on the required data to be collected and development of processes to collect and report the data in the most timely and efficient manner. This data summit can help establish a new baseline for metrics that matter.

For the Navy, an SBIR/STTR metric that does matter is investment of non-SBIR/STTR mission dollars. Beginning with 2010, that investment, those Phase III fundings, is unmatched throughout the Department of Defense and the federal government. Our Phase I awards rebounded in 2014 to 423 awards and continued in 2015 with 390 awards. Awards made to new firms, despite the intense competition for SBIR/STTR awards—some solicitations sometimes garner 30 proposals to each topic—we have averaged 22 percent awards to first-time winners in every solicitation since 2012, due, I believe, to improved outreach.

Reducing award delays. In 2015, the Office of Naval Research piloted a program focused on improving contracting processes. I am happy to say, using the three percent administrative funds that you provided in the 2011 reauthorization, we have been able to reduce Phase II award times from 11.2 months to 4.7 months.

Phase III investment. Three-hundred-and-ninety-four million dollars in non-SBIR/STTR dollars were invested in 145 projects in 2015. That is an average of \$2.7 million per project to mature vitally needed technologies.

As this committee approaches SBIR/STTR reauthorization, consider four factors that have made the Department's SBIR/STTR Program successful.

Culture. Our naval research and development enterprise, including universities and national research organizations, consider SBIR/STTR part of the solution for quickly delivering affordable innovation to our warfighters. In short, Navy acquisition gets it.

Our dedicated professionals make continual improvements to small business assistance, such as improving partnering opportunities with industry and government through our proven SBIR/STTR Transition Program and its annual forum.

Outreach. Through SBA's SBIR Road Tours, national or regional SBIR conferences, and our own command visits to regions throughout the U.S., we look for new entrepreneurs, especially women, veterans, and the disadvantaged, for our SBIR/STTR pipeline.

Leadership. I would be remiss if I did not mention the support the Navy program receives from Mr. Kenya Wesley and the OSD Office of Small Business Programs. Even more significant is the senior leadership support the program receives from Secretary Mabus, Secretary Stackley, the Chief of Naval Operations, the Chief of Naval Research, and Ms. Emily Harman, Director of Navy Small Business Programs, here with me today. These champions provide continuous advocacy for the program, including guidance to our acquisition community.

In conclusion, it is my honor to be part of such a productive and valued program that directly supports our warfighters while also providing solutions to our nation. Performance as mentioned above led Secretary Jacques Gansler to tell the Senate Armed Services Committee recently that SBIR/STTR should be made a permanent program. The Department of the Navy continues to seek improvements in our program, to seek a more diverse vendor base, increase small business integration into Navy business, and leverage small business advances for Navy requirements.

I look forward to working with you and your staff regarding the importance of SBIR/STTR authorities.

[The prepared statement of Mr. Smith follows:]

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THE SENATE COMMITTEE ON SMALL
BUSINESS AND ENTREPRENEURSHIP

TESTIMONY BEFORE

THE SENATE COMMITTEE ON
SMALL BUSINESS AND ENTREPRENEURSHIP

THURSDAY, JANUARY 28 2016

-by-

ROBERT L. SMITH
DIRECTOR, DEPARTMENT OF THE NAVY
SMALL BUSINESS INNOVATION RESEARCH (SBIR)
AND
SMALL BUSINESS TECHNOLOGY TRANSFER (STTR) PROGRAM

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ROBERT L. SMITH
DIRECTOR, DEPARTMENT OF THE NAVY
SMALL BUSINESS INNOVATION RESEARCH (SBIR)
AND
SMALL BUSINESS TECHNOLOGY TRANSFER (STTR) PROGRAM

Mr. Chairman, Senator Shaheen, and distinguished members of the committee, thank you for the opportunity to appear before you today to discuss Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR). The Department of the Navy greatly values our SBIR/STTR program. We are taking a great program and making it better by focusing on improving the business of the science.

Through SBIR/STTR, American small businesses throughout your states have proven over and over again their ability to provide lean, agile and innovative solutions to warfighter requirements – to help our military deal with the big challenges of its defense and humanitarian missions. As Mr. Sean Stackley, Assistant Secretary of the Navy for Research, Development and Acquisition (ASN RDA) said, *“Small Business and a competitive, healthy Small Business industrial base are vital to the long term success and affordability of the Department as well as to our national security. The evidence is overwhelming that where affordability is paramount, a strategy that includes Small Business creates more affordable outcomes and promotes innovation and technical advancement.”*

Two examples of outstanding SBIR/STTR contributions to our Military and our Nation are EMILY and Automated Celestial Navigation:

- EMILY (Emergency Integrated Lifesaving Lanyard), a robotic lifeguard deployed worldwide by Hydronalix, derives from a 1991 Office of Naval Research STTR project to track whale migration. The tracking system, reconfigured as the UAV *Silver Fox*, was deployed in 2007 to provide convoy protection to Marines in Iraq, saving lives. The same basic technology package, reconfigured as EMILY, is supporting first responders throughout the U.S. and other nations, and saving lives now in the Mediterranean Sea’s refugee crisis.
- Trex Enterprises’ Automated Celestial Navigation (ASN) system provides a solution in GPS-denied environments through a fully automated star tracker for imaging individual stars both day and night to enhance navigation capability. Initially focused on Navy challenges, ASN attracted attention across the government: the National Geospatial Intelligence Agency, for example, has ordered 15 systems, with applications in crime fighting and drug interdiction.

Over the last six years, using non-SBIR R&D funds, the Navy has invested an average of over \$500M per year in SBIR/STTR technologies. This investment leads the Department of Defense and the federal government.

There are four primary factors that have made the Navy’s SBIR/STTR program successful:

- Culture – our Naval acquisition community considers SBIR/STTR part of the solution for delivering quality innovation to our warfighters, quickly and cost-effectively.
- Team – with an emphasis on delivering solutions to warfighters, our dedicated professionals make continual improvements to small business assistance through our proven SBIR/STTR Transition Program and its annual Forum, to further partnering with industry and government.

ROBERT L. SMITH
DIRECTOR, DEPARTMENT OF THE NAVY
SMALL BUSINESS INNOVATION RESEARCH (SBIR)
AND
SMALL BUSINESS TECHNOLOGY TRANSFER (STTR) PROGRAM

- Outreach – through SBA’s SBIR “Bus Tours” and SBIR conferences, and our own Command visits across the US, we look for new entrepreneurs encouraging them to partner with the Navy and seek opportunities to work with the Naval Research Enterprise.
- Leadership -- Secretary Stackley (ASN RDA) and RADM Mathias Winter, Chief of Naval Research, provide continuous advocacy for SBIR/STTR, as well as guidance to our acquisition community about SBIR/STTR engagement. Moreover, the Department of Navy guidance is aligned with the Department of Defense *Better Buying Power 3.0*.

The Navy is working to develop metrics to improve the business of science, increase technology transition and commercialization. Looking at FY2015-FY2016 our SBIR/STTR program can be measured in four critical areas: Phase I awards; awards to new firms; reducing award delays; and Phase III investment.

- Phase I awards – Phase I awards rebounded in FY2014 after sequestration to over 400 awards, and continued in FY2015 with nearly 400 awards.
- Awards made to new firms – despite the intense competition for SBIR/STTR awards the Navy averaged 11% of awards to first-time winners in every solicitation since 2010 – we believe due to improved outreach.
- Attacking award delays - an ONR pilot on focused contracting – funded with the “3% administration” monies afforded in 2011 SBIR reauthorization – reduced Phase II award time from 11.2 months to 4.7 months, and reduced award delay from 7.4 months to 0.9 months. In 2016 we plan to increase the scale of the pilot with expectations that we will be able continue to see improvements in contract award times.
- Phase III investment - \$383 million in non-SBIR/STTR dollars were invested in 142 projects in FY2015, for an average of \$2.7 million per project to mature vitally needed technologies.

Performance, as mentioned above, led former Secretary Jacques Gansler to tell the Senate Armed Services Committee recently that SBIR/STTR should be made a permanent program. The Department of the Navy continues to seek improvements in our program to seek a more diverse vendor base, increase small business integration into Navy business, and leverage small business advances for Navy requirements. I look forward to working with you and your staff regarding the importance of SBIR/STTR authorities.

Chairman VITTER. Great. Thank you both very much.

Now, we will start rounds, five-minute rounds of questions, and I will kick it off.

Mr. Williams, let me turn to you. Your role is to provide programmatic and policy oversight on these programs from the SBA. Given that, I was disappointed, quite frankly, in your testimony that you did not provide the committee with any concrete information about progress or accomplishments in the program since Congress last reauthorized them. And unfortunately, that is consistent with your office having failed to issue annual reports on the program, as required by law. The latest data available seems to be from fiscal year 2012. When will we see an annual report as required by law?

Mr. WILLIAMS. So, we are working on the annual report. When I came over in December of last year, one of the big issues we had was the data that we had was not 100 percent accurate. And, so, what we worked on was developing our sbir.gov site to actually put real-time data on that site and focus on that. So, actually, if you go to that site, you can see data up through 2014 and split it and look at it in a variety of different ways.

What we have been focused on, and as often happens with these systems, we—the data source, we have 152,000 awards. Each award has 79 records. And we have to merge that from 11 agencies, which all have different database systems. We moved from an old system, TechNet, about three years ago, once the reauthorization kicked in, to this newer system that is a more robust data system. We have been having challenges with getting data accuracy, and so we have been spending time and effort on that data that feeds into our report.

Our report has been completed. It has been briefed out through SBA and it should be released to the agencies over the next couple of weeks. Then it will go through OMB review for the agencies, and then we hope to get it out within less than three months.

Chairman VITTER. So, we should see it in less than three months?

Mr. WILLIAMS. Yes.

Chairman VITTER. Okay. And, the data that will be included in it—that is included in it—it is done—will be how current?

Mr. WILLIAMS. So, that will be the 2013 report. We are going to do them annually. What we had done was a 2000—before I got there, there was a 2010, 2011, 2012. So, this is going to be the 2013. Right behind it is going to be the 2014. The 2015, we—we wait until March, when each agency has to submit their information to us from the prior year. So, March 15, that information is due, and then we work on that data for a while and then try to push it out. My goal is to actually try to get these reports out within six months of the time that all the data is submitted to us from the agencies.

Chairman VITTER. And, so, when will we see the 2014 report, which has obviously long ended?

Mr. WILLIAMS. I would like to see that three to four months after the 2013.

Chairman VITTER. Okay. Has each of the 11 agencies required to participate in SBIR met their statutory participation goals in each of the past five years?

Mr. WILLIAMS. So, yes, they have—the challenge with that is in the way the budget is measured, in two years, multi-year programs. So, for all the agencies that have one-year funding, where they have to spend all the money in one year, they have met—they have spent and obligated above the requirement of the, right now, three percent requirement.

The way GAO would like us to start to gather the data is to actually see what they obligated that year. So, Defense has two-year funding. They spend their 2013 money over 2013 and 2014. And, so, they have been measuring their results based on two years of funding, not what happened in a single year. So, as the budget goes up, they are always a little bit behind. And, so, measured in the way GAO has been measuring it recently, they are not, but actually as what they have set aside, they are meeting their requirements.

So, we are working with those agencies to define that so the rules are clearer, and part of that is the terminology of budgets and obligations and things like that that we are trying to clear up.

Chairman VITTER. Okay. How does SBA seek to improve participation in the two programs in states with a significantly lower number of awards per capita?

Mr. WILLIAMS. So, we have focused on two main efforts. One is to improve our website and to do more electronic web-based training, train the trainer—well, a couple ways. The FAST Program that we have that has been supported, and you talked about another bill that you have been working to get boots on the ground, people within individual states who really understand the program to train.

What we have coupled that with is something we started last year called the SBIR Road Tour, where we actually put 15 to 20 program managers on a bus. We do five days at a time. We go state by state and we visit those states. We did 20 states last year. This year, we have a plan to do 20—well, we are actually going to do 17 states and then we are going to do five regional events, including one in New Orleans April 4, 5, and 6. We are going to do another one in the New England area, one in California, and continue to try to do that.

So, we are hitting all the underrepresented states and I have got a plan and a program and time frame for where we are going to hit a lot of the states that are in those underrepresented, under one-third of the awards.

Chairman VITTER. Okay. Thank you.

Senator Shaheen.

Senator SHAHEEN. Thank you, Mr. Chairman.

I would suggest, Mr. Williams, that you talk to Senator Enzi about your budget process issues, because as Chairman of the Budget Committee, I am sure he can fix what is happening at DOD.

[Laughter.]

Just trying to inject a little levity here.

[Laughter.]

What do you think, Mr. Williams, of Mr. Smith's idea of a data summit?

Mr. WILLIAMS. So, it is a great idea. We have been working with the agencies. One of the big challenges we have is we have agencies that are as large as the Navy, which has about a \$300 to \$400 million program, and we have agencies that are a \$5 million EPA program. And, so, what they are able to do and develop and the dollars they have to put towards those resources has been a challenge. So, we have data coming in from an Excel format everywhere to very modern formats and databases and stuff. And we, then, at SBA, have to manipulate all those and get them into one format.

So, I think a value—and I think this is where the administrative funding and things can go towards—is it makes—so, right now, the approach has been each of the 11 agencies develop their own systems that then feed into ours. What we need to look at is can we develop common systems that everyone can use, and especially at those poorer agencies or smaller agencies can leverage off of that and use that same system that they do not have the resources to develop. So, it is a great idea.

Senator SHAHEEN. I think it is a great idea, too.

Mr. Smith also talked about one of the ways in which they have used that three percent administrative funds was for a pilot in the last reauthorization. Can you talk about how some other agencies are using those funds and whether you see those as beneficial for us to continue? Also, can you talk about some of the other changes that we made in the last reauthorization, such as adjusting caps on the size of awards and also the role of venture capital firms in SBIR?

Mr. WILLIAMS. So, I will start with the easy ones. The role of venture capital, it has not really seemed to have any impact. The GAO did a study, I think it was 24 proposals, seven awards, in that range, \$7 to \$8 million over two years between the two organizations, HHS and ARPA-E that run the program. So, really, we never saw a big influx of venture capital companies. So, I see no reason to change anything. It does not seem to have a big impact.

Senator SHAHEEN. Were they able to quantify the funds that were put into majority vc firms?

Mr. WILLIAMS. Yeah. Eight-million dollars was awarded to companies, but that is out of, like, \$2 billion.

Senator SHAHEEN. Okay.

Mr. WILLIAMS. So, it is a very small percent of the funding that HHS and ARPA had funded. So, they are allowed to play. They are allowed to participate. But, they just are not playing because they probably have other resources and funding.

Senator SHAHEEN. So, is there any downside to continuing that provision in the—

Mr. WILLIAMS. I do not—

Senator SHAHEEN [continuing]. New reauthorization?

Mr. WILLIAMS. I do not see a downside, because I do not think it had a—it did not have a negative impact. It allowed those that wanted to to participate, and they won programs and it was a small amount. I would be concerned if it was a higher percentage.

Caps, I think there has been a challenge with caps in that there are programs, especially at the larger agencies—HHS is a perfect example—where it just takes more dollars, and DOD is a great example, and I had a lot of experience there. RIF tried to address that. That is the Rapid Innovation Fund, that would allow additional dollars to kind of do the test and evaluation work. What has now happened, where when I was at Navy, I was allowed to put additional SBIR dollars above the cap limits if I could get matching dollars from a program of record. I can no longer do that.

So, I think there is interest in maybe—is there a program that you could address the 6.4, what we call the 6.4 to 6.7, the test and evaluation, dollars and put almost a separate program that would be a follow-on to SBIR that would allow, instead of separate new research projects, but really take the research projects you developed and provide the test and evaluation or the dollars that basically reduce the risk, prove them out so a program of record can actually accept them.

And, that has always been a problem. As you know, with the Defense, by the time we have a need and the time we get money is usually three to five years. A lot of times, we need money then. So, you kind of need a fund that says, wow, these are my five really important projects. If they each had \$6 million, that could actually go on the JSF, or that could go solve this problem right away.

Senator SHAHEEN. So, can I ask you to comment on that, too, Mr. Smith. What would you like to see with respect to those caps? Is there—

Mr. SMITH. We find on the Phase IIs, flexibility is always helpful. Two cases. One is the amount of money. It is expensive to do research, and to get over that “valley of death,” I either need SBIR dollars to give them another three to six months of development, or I need to have someone else with a checkbook on the other side. Their other checkbooks are two years away unless they change the plan they approved two years previously. So, there is a challenge there when it comes to taking it to the second phase.

RIF, we found exceedingly important to the Navy. We find 70 percent of our RIF awardees have a lineage from the SBIR community. So, it is part of that. They have developed that relationship with the Navy. They understand the Navy requirements. They are ready to answer those Navy demand signals. So, absolutely.

Senator SHAHEEN. Okay. Thank you. Thank you, Mr. Chairman.

Chairman VITTER. Okay. Thank you very much.

Next, we will go to Senator Enzi.

Senator ENZI. Thank you, Mr. Chairman and Ranking Member Shaheen, for holding this hearing. I want to congratulate both of you. As the Chairman of the Budget Committee, I know that I am just appalled at how many reauthorizations have not been done, but we are still spending money on them. You are taking a forward look, getting ready to have this reauthorized in a timely manner so that the program can continue without either violating the budget and knowing where the funding is going to come from.

I have been really pleased with the successes of the SBIR and STTR and how they work together. We have had some good successes in Wyoming. I do an Inventor’s Conference once a year in Wyoming, where we invite people in that have an idea, or are hop-

ing they can learn how to have an idea. We even go through the patent process. But, we go through the SBIR process so that they can take a look, if they need to build prototypes or do something like that.

And then the opposite time of the year, we have a Procurement Conference, and that is where we encourage the federal agencies to come to Wyoming and see what products we have. And, I have been pleased at the number of agencies that come out to do that and we wind up with several million dollars' worth of contracts each year because we have some great products that are at a low price.

One of the first ones that I ran into a few years ago, in fact, 9/11, we had a little problem with some chemical things around the Capitol, and we bought a nice huge truck and any time there was some kind of a chemical spill, whether it was powdered sugar or whatever, around the Capitol, this big van would pull up and guys in space suits would jump out and they would run in, they would get some samples, and they would take it back to the van and analyze it and figure out what to do.

Because of SBIR, we had an innovative group in Wyoming that came up with a thing that looked like a speed gun hooked to a little hand-held computer. And they just point that at the substance, pull the trigger, and ten seconds later, they would know what it was and what to do about it. Unfortunately, that has not developed into mass marketing yet across the world, but I think it should. But, it is just one example of a number of things where a little bit of encouragement helps. Big companies can get some special credits for their research and development, but small companies do not have that. So, I appreciate what you are doing.

My question would be if you could tell me a little bit more about what outreach efforts you have planned for the future to get more businesses into the SBIR and STTR Programs. What have you found to be successful outreach programs?

Mr. WILLIAMS. Sure. So, we will be going to Wyoming on June 27. Hopefully, we will get your support there, I am sure.

So, we tried this Road Tour event and it actually worked really well. We had about 100 individuals at each location we went to. We learned a lot from the first go-around. It has two focuses, basically. One is underrepresented states, so we look at the states that are getting the lower one-third of the awards. And, so, we go to each one of those.

So, this year, what we are trying to do is then also place an emphasis on women and minority. It is challenging—it is obviously easier to go to a location where you know there is underrepresented in the community you are addressing. To bring in the women and minority has been harder, but we have developed relationships with the Society of Women Engineers and the Minority Business Development Agency and things like that to try to get them to help us do the outreach so when we go to events.

What we have expanded to, so, from our 17 individual state Road Tour events, where we will go there for each a day, we are going to add two-day events that there will be five of that we will also do in different regions.

So, as much as possible, my goal is we have set up a program where we will be within 250 miles of every state in the country. We have been to Hawaii earlier this year. So, we are trying to get out there and just put boots on the ground to bring program managers there. That is really important.

But, what is also important is once we leave, do you have people in that state who understand what SBIR is, who can do the training, who can walk them through grants.gov and figure out, how do I put in an application, all those things. So, what we are also trying to invest in with the administrative dollars, that NSF has provided some to us, is train the trainer tools, so instead of them each individually developing training, we develop it for them and then we train them on what SBIR is. When there are changes at DOE or DOD and other places, we provide that information so they are aware of what is current.

So, we are trying to kind of hit it in multiple ways, but it is having people there. It is bringing the program managers. And it is having the material available so that they can train.

Senator ENZI. Thank you. Excellent explanation and my time has expired.

Thank you, Mr. Chairman.

Chairman VITTER. Okay. Thank you.

Senator HIRONO.

Senator HIRONO. Thank you, Mr. Chairman.

I am a very strong supporter of the SBIR and the STTR Programs, and, in fact, I had introduced legislation to provide more funds and permanence for these programs when I was a member of the House. So, I know that both of you would like this program to be made permanent so that we are not facing a reauthorization gap with regard to these programs.

And, I am sure that if we do make these programs permanent, that there is some language that we should consider to make sure that there is enough flexibility within the permanent program, and I would appreciate that kind of—you know, the areas where you would like to see that kind of flexible language as we go forward, because the impression I have is that both the Chair and the Ranking Member very much support—if not all of us—very much support these two programs. So, could you give some thought and provide some guidance as to what kind of flexibility.

So, Mr. Williams, I am glad that you came to Hawaii. Was that because Hawaii is considered one of the underrepresented places?

Mr. WILLIAMS. It is actually—they put on an event every two years, and they have been for probably 25 years. And, so, every two years, the program managers will go out to Hawaii.

Senator HIRONO. Great. So, it is not because we are—

Mr. WILLIAMS. You are not an underrepresented.

Senator HIRONO. Yes.

Mr. WILLIAMS. You actually do reasonably well.

Senator HIRONO. Good. We could always do better. And, I do not know if you have the data as to whether or not we are doing well in Hawaii with regard to minority-owned and women-owned businesses.

Mr. WILLIAMS. I can provide that data to you. I do not have it with me.

Senator HIRONO. That would be great.

So, one thing that is important is that the small businesses in the various states are aware of these two programs, and then the other thing is that, you know, one of you mentioned—I think it was Mr. Smith—the “valley of death.” That is when, I take it, that when our companies are in Phase III, where they have to go on and get their own funding to keep going, that is where things begin to happen that do not allow them to go forward.

So, I think you mentioned—both of you might have mentioned that there could be some way that some of the funds that you have could go into Phase III support. Did you mention that, Mr. Smith?

Mr. SMITH. Senator, what we do at day one, essentially, with our SBIR companies, is start thinking about where is your Phase III money, because there are multiple places where you may or may not find those funds. But, you have got to start working that issue at day one. And, it can be difficult, aligning the technology development with the POM process. In DOD, it is exceedingly difficult because it is locked down. But, we start those conversations. We start those linkages. We put the right folks together early on so there is not that gap, okay.

One of the ways that gap has been filled is with the Rapid Innovation Program the Congress authorizes every year.

Senator HIRONO. Yes.

Mr. SMITH. That has been exceedingly helpful. In fact, the Navy has got a very good transition rate on those SBIR technologies making it into the program of record, because that up to \$3 million makes the difference.

Senator HIRONO. Is the Rapid Innovation Fund, is that a program available to all of the 11 entities that participate?

Mr. SMITH. No. No, it is not, and it is also done once a year. Definitely with the agencies that continue to purchase—there are certain agencies, like NIH—well, no, I take it back. I think all agencies, there is a value of almost funding a stage past Phase II. You have proven it out. You have demonstrated it. But, then, really to commercialize it.

So, we have definitely taken the administrative funds, and one of the challenges with the administrative funds is it was a pilot. So, it was a three-year pilot of a six-year program, and so a lot of agencies were really concerned with actually even using it, and we have really only spent about 25 percent of the funds that were available. They had to come to us at SBA first to get approval for it, and then they had to implement it. They were concerned about hiring people and doing things that would really impact commercialization, because if the program stopped in three years, in the government, it is hard to get rid of people and things like that.

So, I think one of the things in flexibility is to make that program permanent so we could use it, cap the amount, but the—and then, so, like, the Air Force hired six individuals that, like at the Navy, they were more forward thinking in aligning with acquisition, but they did the same thing in the Air Force. They hired people that would help in commercialization. And HHS has done the same. They have hired some of their people to work with the physicians to figure out, okay, now the technology needs to go. Who are your markets? Same with NSF. They have all developed programs.

So, I think everyone could use, whether it is funding or more assistance with people that have expertise on how you find those other markets—it may not be providing money, but just the experience is what most of the firms do not have.

Senator HIRONO. I think that continuity is very important, because if you have already made the investment in these companies in Phase I and Phase II——

Mr. SMITH. Correct.

Senator HIRONO [continuing]. I hate for them to get into Phase III and not be able to find the funding that they—to commercialize——

Mr. SMITH. Correct.

Senator HIRONO [continuing]. What they have come up with.

So, my time is up. Thank you.

Chairman VITTER. Thank you.

And, Senator Fischer.

Senator FISCHER. Thank you, Mr. Chairman, and thank you, Ranking Member, for holding the hearing today. I appreciate you being in the leadership and moving this forward. It is very important.

Thank you for the panel for being here, as well.

Mr. Williams, you mentioned to Senator Enzi that you were going to be headed to Wyoming. I know that Nebraska is underrepresented——

Mr. WILLIAMS. June 28.

[Laughter.]

Senator FISCHER. Can you tell me where? Can you tell me where in Nebraska on June 28 you will be?

Mr. WILLIAMS. Actually, you know, I do not have it in front of me, but we have picked a city——

Senator FISCHER. Let us know.

Mr. WILLIAMS. Is it Omaha? Yes, Omaha.

Senator FISCHER. Great.

Mr. WILLIAMS. Yes, and we are working with people on the ground to make sure they have got——

Senator FISCHER. Okay. Thank you. I have more questions. Do not worry.

Mr. WILLIAMS. Yes.

[Laughter.]

Senator FISCHER. One of the aspects of the SBIR and the STTR Programs that I particularly like is the competition that it spurs between these small firms. I think that is important when they are applying for these awards.

So, my question for both of you would be, do you see any aspects of that application and approval process that could be streamlined so that maybe we could see an increase in the number of firms that are applying?

Mr. WILLIAMS. So, the answer is yes, but it is a real challenge, and it is one that——

Senator FISCHER. And you are going to tell us how on June 28.

Mr. WILLIAMS. Yes. That will be great. The one challenge is with contract authority—so, I work at SBA and you are talking about something that is handled by a contracts authority or a grants shop in each, and they have to follow rules that are FAR, DFAR rules,

and there are not special rules if you are an SBIR company. They cannot, you know, set aside. And, actually, in the last reauthorization, there was a fraud, waste, and abuse element to it, so it actually added more paperwork required by Congress to be put on the small businesses to address—to be proactive in fraud, waste, and abuse.

I would love to tell you we have moved in a better direction, but if anything, we have actually moved in a more conservative direction to protect taxpayer dollars, to make sure that it is being spent in a wise way, which hurts small companies that have never had experience working with the government.

So, what we have tried to do, because—so, I think one of my recommendations to the committee is to actually bring in the folks that manage the contracting shops, the grants shops, to ask them what can they do to streamline. Are there ways that they can treat small businesses differently than large businesses? There have been some rules put in place about accepting outside audits as opposed to having the government audits come in, which usually take six months and a long time. So, there have been things in there, but I have not seen them put to practice and I think maybe asking them.

But, what we have tried to then do is to say, look, I cannot solve that problem, but what I can do is, again, better training. So, I can walk a company through grants.gov. I can tell them how to get their EIN numbers and DUNS Numbers and what they need to do to write a proposal. We could help them evaluate that proposal and say, this is where it really should go.

So, we focused on that side, which we can impact, and again, I am going to plug the three percent administrative funding, but those are the tools that we use to do those things, because this is one of the unique programs where all the money that comes from the Hill has to go and get contracted on the small businesses. The government is not allowed to use any of it to manage the program. And it is probably the worst program to do that with, because it is a program we are purposely trying to get small businesses that have never done work with the government to understand the government system.

And, so, we really need to provide more man hours and bodies to help those companies get through these issues, that we have FAR and DFAR that are not going to change, but we can provide the assistance. So, having that ability to provide those resources is helping us streamline, but—it is making it easier, but we are not really addressing the streamlining issues.

Senator FISCHER. Do you think you would have suggestions for us on maybe what different regulations are needed for smaller companies—

Mr. WILLIAMS. I can come back with some of that kind of thing.

Senator FISCHER. We get to the old quandary there of one-size-fits-all again—

Mr. WILLIAMS. Correct.

Senator FISCHER [continuing]. And it seems like government does that quite a bit. Yes, we want to protect taxpayer dollars, but we want to make sure that the dollars are spent wisely, as well, and

when you look at the costs involved to companies when perhaps it is not needed, I would really be interested in——

Mr. WILLIAMS. Absolutely. No, I would be glad to provide that. And in SBTC, who is talking later, has groups that represent those small businesses that have ideas. But, I, certainly from my perspective, have ideas that I would be glad to forward.

Senator FISCHER. Thank you.

And, Mr. Smith, did you have anything to add on that?

Mr. SMITH. One of the things we are working with our three percent in focus is it is not normally—necessarily the SBIR community that I have got challenges with. It is working with the other restrictions other folks have to live with. My contracts officers have to follow the FAR, but there are ways to have proportionality, okay. There is a difference between a \$1.2 million SBIR award and a \$12 million SBIR, or a \$120 million, so——

Senator FISCHER. So, you could look at the award amount as well as looking at size of companies?

Mr. SMITH. Yes, ma'am.

Senator FISCHER. Would that be a practical way you could handle it, too?

Mr. SMITH. Those are two of the variables we can look at to work those. And, one of the things is we are working best practices within our contracts community. Same thing. They require training. SBIR contacts are usually a small percentage of their workload. But, we found when you put a dedicated team to doing SBIR contracts, it flows much, much smoother.

Senator FISCHER. Thank you very much. Thank you, Mr. Chair.

Chairman VITTER. Thank you.

Senator Ayotte.

Senator AYOTTE. I want to thank the Chair and the Ranking Member for having this important hearing, and I fully support a permanent reauthorization of SBIR and STTR. I know as Senator Shaheen has probably mentioned, these programs have a great New Hampshire tradition when Senator Rudman really was the founder of this because he was concerned about innovation and getting small businesses engaged in new ideas that could come to the fore in research and development and giving those opportunities to have the government have the benefit of that.

You know, Mr. Smith, as I look at the other committee that some of us serve on on this panel, or the Armed Services Committee, and I serve as the Chair of the Readiness Subcommittee, we have had numerous hearings on acquisition reform. And having seen the matrix for what it actually takes to get through to get a defense contract, as a small business, especially as we are trying to really engage on these particular programs, SBIR and STTR, I think it would be daunting for anyone.

And, so, we are trying to undertake that in the Armed Services Committee to really make it a better, more efficient process, because I think we have proven that layers do not necessarily mean more accountability for taxpayers. They can just mean more paperwork as opposed to really focusing on accountability.

So, I would also add that any recommendations that you have in particular in your shop that you think would be helpful, many of us serve on both committees and we could take those up not only

in the Small Business Committee, but also in the Armed Services Committee. We are very focused on acquisition reform. And, this is an area where we want to get things quickly, obviously, because this is opportunities to drive innovation in our security space.

So, if you can get back to us on that, that would be tremendously helpful.

Mr. SMITH. Yes, ma'am. We will work with you.

Senator AYOTTE. Appreciate it.

I also wanted to follow up. Mr. Williams, in the 2014 Interagency Policy Committee's report to Congress on commercialization, it noted that SBA planned to start leveraging and expanding partnerships with high-growth stakeholders like incubators, accelerators, and clusters, trade associations, universities, by taking a lead in a train the trainers model. So, can you give me an update on how that initiative is going, how effective it has been.

Recently, I visited an incubator, for example, in New Hampshire, and we have seen a lot of exciting growth in these incubators and I think it is a great way for us to partner on making sure that those who are engaged in the incubators also know about the availability of SBIR and STTR.

Mr. WILLIAMS. So, we are making progress in that area. One of the other things under my responsibility is the accelerator program within SBA, and so that has been two years. We have gotten a million dollars this year, but we had 2.5, 4.5 in the last two years, and a million this year.

What we do with that is—and it is really small seed dollars that we are just adding to existing accelerators. But, the network of accelerators is well over a thousand across the U.S. and one of our goals is to—so, we provide a prize contest where we award \$50,000 to what was 100, or 88 accelerators last year.

Part of that, then, is to make them aware—so, now they are a partner with SBA and we have these other programs that we want to make sure they are aware of, SBICs, which is a loan program for businesses that are also under the OII portfolio, and then the SBIR and STTR Programs. So, we have been spending a lot of resources developing our sbir.gov, and then that tool, developing the train the trainer materials, and so I have a contract. So, we have put out more materials already.

We have our FAST awardees which we have been funding at about \$2 million a year, which is 20 individual state awards at \$100,000 each, where the state provides a match, and those folks, we have monthly calls with, then we try to share best practices and what materials are out there. So, at first, we have not had as much resources to develop the materials until just recently where we got some of the three percent from—I mean, HHS, NSF gave us some dollars so we could build out the train the trainer stuff.

But, what we have been doing in the short term was to get individuals to share across states so that they would have that material, and accelerators and incubators are a really good sweet spot that, you know, SBA has kind of been focused on our SBDCs, but these are two other sources that really have a great potential, especially in the SBIR world.

Senator AYOTTE. Great.

Just a quick follow-up. Also, as you are creating an interagency unified outreach plan, are you engaging groups like SCORE and the VSOs as we think about some of the, obviously, the veteran-related groups, as well, that are focused on employment?

Mr. WILLIAMS. Yes, and they all work on the same floor as I do—

Senator AYOTTE. Great.

Mr. WILLIAMS [continuing]. So we work closely with them.

Senator AYOTTE. Excellent. Thank you.

Chairman VITTER. Great.

And, Senator Ernst.

Senator ERNST. Thank you. I would like to thank the Chair and the Ranking Member for holding this meeting.

This is really important and I want to echo what Senator Enzi had said about reauthorization of these programs. These programs are phenomenal, and I have heard from a lot of Iowa small companies that have utilized this process to get off the ground. So, thank you, Mr. Chair, Ranking Member. Thank you for doing this very, very important work.

As you can imagine, back in Iowa, we do not have a lot of venture capital to get a lot of these programs started, so it has been an essential tool in Iowa. Sometimes we talk about brain drain, our young college graduates that are moving on to other areas. Well, with these programs, we have found that a number of them have been able to stay in Iowa and develop their own businesses. So, we have a lot of great talent that is now staying in Iowa, a lot of technology companies, and so forth. We are really excited about it, so thank you for that. These are great programs.

You have touched on a number of issues. Mr. Williams, you talked about the underrepresented areas. Rural areas fall into that. Iowa is obviously a very rural area. So, I am glad that you do those types of activities. I actually live just about an hour from Omaha, Nebraska, so that is one that would be important for a lot of folks in Southwest Iowa, Western Iowa, to know about.

We have talked about streamlining the process. Senator Fischer brought that up, as well. And, one thing about streamlining the application process, you said the government puts more emphasis on the paperwork. You would maybe like to see that streamlined. Folks from Iowa have said that the different agencies do things a little bit differently. So, what is your best advice on how do we streamline this, yet allow flexibility for those agencies to work with their population?

Mr. WILLIAMS. First, on August 16—

Senator ERNST. August 16, thank you.

Mr. WILLIAMS. So, the streamlining—the small businesses would love one form for all agencies and just be able to fill it out and push it, and unfortunately, I do not have the power and authority—nothing personal, but I am not even sure you do—I certainly do not—

[Laughter.]

To make that happen.

Senator ERNST. Well, you are right.

[Laughter.]

Mr. WILLIAMS. So, it is something we need to strive towards, but their view, and I fully understand that, is we have a role, the FAR, the DFAR, this is how we do contract. Just because it is a small business and SBIR, we cannot treat them differently.

We have tried to look and we are continuing to look at flexible ways of some of the different contract authorities that you can do. We have gotten pretty good at Phase Is. Grants seem to be a better way to contract quickly with a lot less paperwork. But certain agencies in the DOD have issues with the amount of profits you can allow under a grant that does not allow the flexibility.

So, there is—again, these are issues that kind of are the contracting community. So, most of my peers work on the technical side. We understand the science, we understand where it goes, and then we have to throw it over the wall to the contracting office and say, now, please award this in a timely fashion, and there are a lot of pressures by that community on getting other contracts in place and things like that.

So, as I am sure you are aware, the problem in contracts is widespread across the government. It is a staffing and it is, you know, things that are different, and the big ones get done faster. And, it is a real problem for small businesses.

I think what has helped is that we have—we are actually—I am hosting a meeting when we have our annual event in D.C. in May. We are going to have a one-day event where we are bringing in a bunch of contracting officers and grants officers and we are going to have two different rooms to say best practices and try to learn.

So, those are the things that we can do, but I think pressure from above on asking those questions and measuring.

Senator ERNST. Okay. I think that is great. I think we have been tasked right there with finding some sort of solution along the way.

And for Mr. Smith, I know my time is getting short here, but the federal government spends about \$530 billion in procurement every year and about \$154 billion is on DOD weapons systems. A number of us serve on Armed Services, as well. And, the weapons system acquisition has been on the GAO's High-Risk List since 1990, a very long time, because of the recurring issue of cost overruns and program management.

So, the SBIR does play a huge role in DOD acquisitions. If you could just give me an overview on how you ensure that there is proper oversight and program management for the types of programs that you are working with.

Mr. SMITH. Thank you for that. There are two things recently that have occurred. One is the change to the 5002, which now requires you have plans for small business. One of the great things Secretary Stackley has done was put out his memo, Doing Business with Small Business in a Big Way, which designated the deputy program managers as the small business advocate. So, we have seen from that them reaching out on how we can help them do their job effectively and efficiently, because they are busy folks. So, we have been doing outreach and training within the Navy with our program managers to help them do their job more efficiently.

We have quite the vetting process to get a topic even issued for a company to reply to, and then it does get down to FAR, where we do a source selection competitive selection process for it. And

from that, it is only a five percent selection rate. It is exceedingly difficult, and that is why we do get such great results, because only the best get selected.

Senator ERNST. Very good. Well, I thank you.

My time is up. Thank you, Mr. Chair.

Chairman VITTER. Thank you.

Senator Coons.

Senator COONS. Thank you, Chairman Vitter and Ranking Member Shaheen, for convening this important hearing into a valuable program that is, I think, among the most effective in terms of technology transfer and helping get out of our national labs innovations and to encourage federal resources to be used more broadly for research and development.

Making sure that America continues to lead in the global innovation economy requires sustained and strategic efforts from both public and private sectors in support of both basic science and applied R&D, and I think they are the lifeblood of great American companies, large and small, and we have often seen that small businesses are the ones that are the best at taking risks, at quickly commercializing and taking to scale the most groundbreaking innovations.

So, that is why I, too, support a permanent authorization, reauthorization of SBIR and STTR. I think the need to provide a predictable, stable long-term funding for the small business community in support of innovation is critical to their effective planning. It is also a reason I was glad to work with Senator Enzi and the other Senators on a permanent extension of the vital R&D tax credit and steps to make it accessible to early stage and small businesses.

Just a quick example, if I could, of SBIR's impact in Delaware. A company I am familiar with, Compact Membrane Systems, which is an advanced materials company based in Newport, Delaware. It has over a million in annual revenue from projects that were originally funded through the SBIR Program. Their technologies add value in a range of applications, from power plants, to global transport, to paper mills, saving their clients millions of dollars while reducing waste, risk, and environmental impact.

I just wanted to take a moment and recognize that SBIR has had this kind of meaningful, lasting impact, I suspect in every one of our states. In fact, CMS continues to benefit from SBIR support and is working on new solutions with NIH, Energy, EPA, and Ag. Just a great example of what is possible.

So, I would be interested if both members of the panel might speak to how federal agencies can do a better job of ensuring that potential grantees understand the benefits, the challenges, the application processes for both programs, and what we can do to help our researchers and entrepreneurs to develop the business skills that they need to access the market. And if that question has previously been asked, forgive me and feel free to adjust your answer accordingly.

Mr. Williams, if you might.

Mr. WILLIAMS. Sure. Well, I will answer it again. We have definitely talked about the area, and, so, one of the challenges is it is typically not a normal government activity to help someone com-

mercialize. We fund research, and especially where I came from, the DOD, there really is not a commercialize. We are the customer and things like that. But, even in NIH and things like that, we hire people that are experts in those medical science areas and we do not hire business development people and things like that. So, that is the structure for good reasons, that we are put in place and that is what we live with.

So, with SBIR, we have been lucky to have the administrative dollars where we have started to then hire outside consultants to do that commercialization. When I was at the Navy, I was fortunate to have an administrative budget where none of my other peers at the other agencies did, and one of the things we did, we ran a program for about 15 years where we helped every Phase II company develop that commercialization plan, understand their market, understand how to get into that, understand where their financing is, can they build it, so they license, all those kind of things.

So, I think there has been—well, I know there has been a goal of commercialization within this program since the beginning. The challenge has been it is not a normal government activity and so we have been—and we have not necessarily—the agencies have not been willing to put the extra resources to do that to benefit the private sector. And, so, I think the three percent helps with that.

Senator COONS. You say it is not a normal government activity. Do you have any fundamental objection to it? Do you think it is a—

Mr. WILLIAMS. I do not.

Senator COONS [continuing]. Unwelcome or an abnormal government activity? I do think that is an area that has not been a core competency for the federal government, but in this setting, in the small business setting, in the SBIR transition, to make sure we have got more Phase Is who go to II and III, it is a vital role.

Mr. WILLIAMS. Right. I agree.

Senator COONS. Mr. Smith.

Mr. SMITH. Two things, Senator. Outreach—I really had a great year last year, going out to the SBA Road Tours and seeing these companies and talking to these young companies about how to work with the Navy. They have not had the 20 years of experience of working within the federal government. They are probably a recent graduate from their university who have just a great idea and they are ready to go forward. So, congratulations. You have gotten your first Phase I, \$150,000.

And the first thing the Navy throws at you is, what are you going to do if it is successful? Start thinking about this. The beauty of the program is, from a Phase I to Phase II to Phase III, you have five to seven years to mature that technology, usually to where we see realization of its commercialization. That is time for you and your company to grow. But, you do not know what you do not know. You are an engineer. You did not get your MBA, much less get our Juris Doctorate to understand how to work with the federal government.

That is where we talk about those experts that are not the scientists and engineers helping them in the teamwork concept on how to become a successful company.

Senator COONS. Thank you.

I see my time has expired. Thank you, Mr. Chairman.

Chairman VITTER. Thank you, and thanks to our first two witnesses.

Senator SHAHEEN. Mr. Chairman.

Chairman VITTER. Sure. Senator Shaheen has some follow-up.

Senator SHAHEEN. Thank you.

I just wanted to go at this Phase III issue a little more, because as part of the 2011 authorization, the Department of Defense was required to establish goals related to Phase III to help boost commercialization of technologies developed through SBIR and STTR. The goal there was to promote greater commercialization. I wonder if either of you can tell me if DOD has established those Phase III goals and how they are working and what this committee might do to encourage a greater sense of urgency on the part of the Department of Defense to do that.

So, I do not know, Mr. Smith, if you want to start, and then Mr. Williams.

Mr. SMITH. I can answer that we have not been given goals to achieve within DOD. I know it is important to the Navy that we transition, because we find the value from it. I cannot speak for DOD. I will go back and talk to Mr. Wesley about that to see where it is at. I do know we made the change to 5002, which requires you to have small business goals. We are now looking at acquisition strategy within the Navy as they move forward to make sure it is addressed. But, we have not quantified what that goal should be, ma'am.

Mr. WILLIAMS. So, yes. I have not seen the goals. I think one of the issues that was raised to me was, it was in the legislation, but it requires a FAR and DFAR change since it did not say to do immediately, and so—and as you probably are aware, FAR and DFAR changes take some time. And, so, I have not focused on that, and maybe at SBA we need to try to work to do the FAR and DFAR. But, I think if language talked about implement immediately, that gets around that FAR/DFAR. And, so, yes, they have not implemented it that I have seen.

Senator SHAHEEN. Well, as a number of people have mentioned, there are a number of Armed Services Committee members on this committee, and so perhaps we can take this up before the Armed Services Committee, as well.

Just a final point that I would like to make. I had the opportunity to go out and embark with the USS New Hampshire nuclear-powered Virginia Class submarine last spring, and as I was getting the tour, one of the things that they talked about was the challenge of getting laundry done on a submarine. It sounds really simple, but because of the danger of fires, that is one of the biggest concerns that submarines have.

And, I was able to tell them that I had visited a company in New Hampshire, Create, that was working on technology to address the problem of fires resulting from dryers on submarines. And, so, it was really exciting to be able to talk about that. Even though that is not what most people think of as a national security issue, it is very critical as we think about how the Navy operates.

So, Mr. Smith, can you just sum up why innovation through the SBIR is so important to the work that you do.

Mr. SMITH. It comes back to that culture, Senator. Part of it is, it is we are in there for the long game, because it may take years to finally get that overnight success. And it is working for today's warfighter, fixing the dryers so they work, so the quality of life for that sailor is better, so they can more focus on their job to be a warfighter and not a laundry person. To the long-term, how do I stay in front of the enemy who wants to think faster than I do.

So, these small companies are agile. They can address it right now very quickly. Not only do they cause competition within the small business community, but they also make the big guy look over their shoulder and make them leaner and faster.

Senator SHAHEEN. Thank you. Very well put.

Thank you, Mr. Chairman.

Chairman VITTER. Thank you.

And Senator Cardin, to wrap up our first panel.

Senator CARDIN. Thank you, Mr. Chairman. I apologize for being late. Other committees were in session. This is an extremely important subject.

Mr. Williams, I want to sort of ask you a question here. You are not only in charge of a very important program, but you are also the advocate for small business. And, I appreciate we have a representative of Defense. I find that the set-asides for small business, the requirements to actively engage smaller companies at times becomes more of a burden for our agencies than a commitment to engage the smaller companies.

We all have talked about here today how important small businesses are in regards to technology growth for our national defense or for health or for transportation or for communication. We could go through the list. The set-asides in the SBIR program are critically important. We are coming to a point where Congress is going to have to look at a reauthorization bill. The sooner we get that done, I think, the better for predictability.

But, I would hope that you would share with us your thoughts of how we could improve this program. I see in my State of Maryland so many of the companies that benefit from the partnerships they have on the research funds and what they are able to do with it, but there is a constant friction between the small companies and our academic centers and the larger companies as to how the federal mandate interferes with what they would like to see done.

So, if you are prepared to talk a little bit here, I would appreciate it, as to ways that we could make the program from a statutory point of view, Congressional action, a smoother program, a program that builds on the benefits of the innovation from smaller companies, but in a way that is, I guess, less confrontational. Is there a way that we can get this done in the next authorization level that we should be thinking about now? And, as the advocate for small business, we would hope that you would be pretty aggressive in giving us options to improve the program statutorily.

Mr. SMITH. So, I probably want to get back to you on some of that, but off the top of my head, and we have talked about it a little bit, is there is still a "valley of death" stage after the demonstration Phase II is kind of done to do the further test and eval-

uation, especially in the DOD, but I think in all agencies. There is a challenge in understanding how to commercialize, having the business wherewithal. So, a lot of our small businesses that are extremely strong in the technical sides, but they need assistance in the business side that the government could do more of and mandating more of those activities. But, that requires money put towards those things.

So, with the SBIR, the money is all put, except for this new admin funding with the three percent, it was all put to go towards the company. Anything else, the agency then would have to provide out of hide to provide additional assistance and to get their foot in the door or put more money on them. And, so, that has been a constant challenge, and I think the administrative pilot has started to break that free a little bit, and I think expanding upon that.

But, also potentially—I do not know if it is requiring another program, but there has been a talk about a program that would take things that were proven out of SBIR, developed and prototyped, then into scale-up and things like that. And, so, whether you set kind of a tax aside for that kind of activity or that idea, or how do you encourage that activity.

Unfortunately, my experience, the way, especially my background at DOD, money has to be laid out way in advance. It goes to the big primes and things like that. So, for it to go to small companies in a more rapid program, you have to almost do something like SBIR, which allows ideas to come in and get funding quickly.

Senator CARDIN. I agree with that, and I think moving towards Phase III is much more of a challenge, so it does require some additional attention as to how we can make that easier for the smaller tech companies.

I know Mr. Glover is here from the Maryland Small Business Tech Council, and there are other states that have done some creative things. I would hope that you would reach out to get their ideas. Be prepared to work with members of the Senate who will be looking for ways that we can make this program more effective as we reauthorize, and I hope we do that, again, sooner rather than later.

I was part of the group during the last authorization process, as were members of this committee, and we were very proud we got to the finish line. It was not an easy process. It is never an easy process to get to the finish line on any bill around here. But, I think the more that you have coalesced the needs of the small business tech community, the easier our job will be and the sooner we will be able to get that done. So, I look forward to getting your thoughts and ideas.

Mr. SMITH. I am available at any time.

Senator CARDIN. Thank you.

Chairman VITTER. Great. Well, thanks again to our first two witnesses.

We will now move to our second panel, which reflects stakeholders who have used the SBIR and STTR Programs.

Ranking Member Shaheen, I will first turn to you to introduce your constituent, Dr. Kline-Schoder, and then I will introduce the rest of the panel.

Senator SHAHEEN. Well, thank you very much, Mr. Chair.

Dr. Kline-Schoder, as I said, has been heading Creare and has been very successful both at the work that Creare has done with SBIR and the—being able to get grants awarded, and it has been important not just for Creare, but I think it has been a very important model for other small businesses in New Hampshire to see the success that they have been able to achieve and to have them sort of proselytize on SBIR in a way that is very helpful.

So, it is very nice to have you here and thank you very much for being willing to share the story of Creare and how successful you have been.

Chairman VITTER. Great. And we are also joined by Mr. Jere Glover, Executive Director of the Small Business Technology Council and an attorney representing small businesses on SBIR-related issues.

Mr. Glover has public and private sector experience, having served as a Chief Counsel for Advocacy at the SBA, as well as the CEO and principal of a biotech company and a medical technology company. He is a well-known leader and a strong voice for small innovative firms and the SBIR program.

We were supposed to have Mr. Roy Keller, Director of the Louisiana Technology Transfer Office at Louisiana State University's Innovation Park. Unfortunately, Roy is unable to join us today due to illness. His full testimony will be included in the record. And, in addition, I have an outline of highlights of that testimony, which I think the highlights are particularly significant about the program in general and his specific experience in Louisiana. So, I will also add that outline to the record.

[The prepared statement of Mr. Keller follows:]

Mr. Roy Keller
 Director, LA Technology Transfer Office
 LSU Innovation Park
 Louisiana Business & Technology Center

Chairman Vitter, ranking member Shaheen, and members of the committee, thank you for inviting me to testify today on "Reauthorization of the SBIR/STTR Programs- The Importance of Small Business Innovation to National and Economic Security." I would also like to thank the Committee for having the foresight to start the reauthorization process early to hopefully avoid the long delays that occurred during the last reauthorization.

I am Roy Keller, the Director of the Louisiana Technology Office, located at the Louisiana Business & Technology Center at LSU. I also serve as the Director of the FAST program in Louisiana and as a member of the Board of Directors of the National Small Business Technology Council. My office is funded by the Louisiana Department of Economic Development to help Louisiana businesses and universities tap into the wealth of technology resources available in the Federal Laboratories. We run the SBIR program by working with all of the universities, businesses, and economic development organizations in the state.

After many years of working with technology based small businesses, I have seen the great value of SBIR to help develop companies and create jobs. Louisiana typically does not receive a high number of SBIR awards a year, but we work very hard to commercialize the technology created with these awards. Our state offers a 40% tax credit on qualified Research and Development expenses that includes SBIR/STTR awards. For example, a company with \$1,000,000 in SBIR awards would receive \$400,000 in tax credits that can be used to help commercialize their technology without having to borrow money or giving up equity for outside investment.

We conducted a survey a few years ago to gauge the value of the SBIR program to a group of our award winners. The results were very encouraging. It showed the following:

- 83% of those responding stated that they could link their SBIR funding with the creation of new jobs.
- 60% stated that their SBIR success is a primary reason they now have new collaborative partnerships with Louisiana Universities.
- 75% indicated that their SBIR awards lead to commercialization, generating product sales, new contracts, etc...
- 50% indicated that SBIR awards were critical in leveraging additional sources of capital.
- 67% stated that SBIR opened up new markets for their companies, including three that are now selling internationally.
- 50% stated that the SBIR funding helped their company survive and prosper after the effects of Hurricane Katrina and the recent economic downturn.

The following are some of the comments that we submitted by the companies:

"Because of SBIR we have been able to expand the company from a sole owner to a team of 10. We have also expanded our office space. SBIR funding is directly responsible for growing our company during the recent downturn. I am a woman/veteran entrepreneur and PhD researcher. SBIR has allowed my company to compete on the same level as larger businesses without risks and expenses associated with R&D." -Teaching Research Institute, LLC.

"Securing the \$4 million SBIR awards from NIH gave our private investors the confidence they needed to open their checkbooks even more. And to think we almost closed down right after Katrina"

- Autoimmune

"Though we love our home state, it is not currently known for its high-tech industries. As engineering and science graduates, it was considered common knowledge that employment would likely take us out of Louisiana. However, the SBIR program has provided us with an opportunity to remain in-state and provided the necessary capital to begin the process of establishing a self-sustaining, high-tech research and development company in the Lafayette region. -BMB Gun

Though these numbers are somewhat skewed due to the small survey size, they show the very positive impact the SBIR program has had in helping companies in our state develop and commercialize products, raise capital, and create jobs. I have heard similar stories for other SBIR state directors on the impact of the program in their states.

We have had many SBIR success stories in Louisiana. I will highlight two:

1. Evisive Microwave Non-Destructive Technologies has developed a system to rapidly inspect composite and ceramic materials. This is a spin off from their inspection work in the Nuclear power industry. They have been awarded 10 SBIRs with the Army, Air Force, Marine Corps, and Missile Defense Agency. They hold 11 US and International patents on their SBIR developed technology. Their Hand-Held Inspection Tool for the Stryker vehicle was the only SBIR project selected by the Army for inclusion in the Army Expeditionary Warrior Experiment (AEWE) technology assimilation program. The Army currently has six of these units in field tests. This may lead to a \$30 million sale for the company. They developed under an Air Force SBIR a unique testing system for ATK-Boeing Oxide-Oxide Nozzles used on the F-35 Joint Strike Fighter. The company has also entered into a relationship with Lockheed Martin to integrate SBIR related technology into their Aeronautics, Missions Systems Training, and Missile and Fire Control divisions.

2. Mezzo Technologies in Baton Rouge specializes in small, very efficient heat exchangers used to cool engines and electronics. They have won over 20 SBIRs with multiple agencies including the Air Force, Navy, NASA, SOCOM, and the Missile Defense Agency. They have been able to commercialize a very small radiator developed under a SOCOM SBIR for use in race cars. This radiator that manufactured in Louisiana is now used in every Indy race car worldwide. The heat exchanger they developed under a NASA SBIR to cool electronics is scheduled to for an upcoming demonstration flight on the International Space Station.

Although Louisiana has a number of success stories, we clearly need to get our number of awards up to an acceptable level. That is why I believe it is critical that the upcoming SBIR reauthorization legislation includes the Federal and State Technology (FAST) Program and S.2136- the Regional SBIR State Collaborative Initiative Pilot Program which this committee passed last year. These programs will supply much needed funding to underserved states like ours for outreach and SBIR infrastructure development. A strength of S. 2136 is that the funding would come out of the 3% SBIR funding that agencies can use for outreach. Agencies should send a modest portion of that funding to the SBA for the state initiatives to complement what is being done through the agencies and the SBA. This automatic funding stream would coordinate the national and state initiatives and provide stability to these efforts.

Thank you again for the opportunity to speak today and I look forward to answering any questions you may have.

Roy Keller
Director
Louisiana Technology Transfer Office

Chairman VITTER. And, with that, let us start with Dr. Kline-Schoder.

**STATEMENT OF ROBERT J. KLINE-SCHODER, Ph.D.,
PRESIDENT, CREARE LLC, HANOVER, NH**

Mr. KLINE-SCHODER. Thank you, Chairman Vitter, Ranking Member Shaheen, and other distinguished members of the Committee on Small Business and Entrepreneurship, for inviting me here today to testify in front of you about the reauthorization of the SBIR and STTR Programs.

As you have heard, Creare has had a long relationship with the SBIR program and which we think serves as a very strong example of a successful public and private partnership. Since 1982, the program has played a key role in our business and in the economy in our region of New Hampshire. Our family of companies now employs over 2,200 individuals in high-paying manufacturing and high-tech service jobs, and most of those positions are still actually in New Hampshire.

SBIR has helped Creare to establish some of these spin-off companies to develop new products for important government missions, as well as to license SBIR-funded technologies to product firms.

Through every economic downturn during the past 35 years, Creare has been able to continue to grow, to develop new technologies, and to create high-paying jobs, due in large part to the SBIR Program.

Since the last reauthorization, the programs continue to operate much as they have since the beginning. They are a highly competitive, highly efficient contracting mechanism for the small businesses to meet some of the research and development needs of the federal government while also fostering the capability to develop products that could be used commercially.

The increase in the award sizes and in the set-aside in the last reauthorization has made the program stronger by allowing more work to be done for a given award while maintaining the ability to award a diversity of breadth and number of technologies.

In addition, the funding that has been targeted since the reauthorization for these Phase III type activities that we have just been talking about has also been very effective. These new Transition Assistance Programs, like the Rapid Innovation Fund, have allowed many DOD programs to benefit by increasing the speed at which new technologies, enhanced capabilities, and cost savings can be incorporated into mission critical programs.

As the program moves forward towards the next reauthorization, we make the following recommendations. As you—probably no surprise—reauthorize for an adequate term or make permanent. Frequent reauthorizations over time are very disruptive to both the small businesses as well as the federal agencies that rely on the program. We recommend the program be reauthorized for at least ten years, and hopefully made permanent.

Continue the competitive structure. We believe that the competitive Phase I/Phase II program has been a hallmark from the beginning of the program and has made it very strong, that this focuses the funding only on those programs and those technologies that really deserve to be funded.

Maintain the eligibility requirements. The last time through in the reauthorization, there was a compromise that came about, and we support that compromise and would like to see that continue.

Keep, certainly, and potentially expand the allocation levels. As I mentioned, we endorse the current allocation level and would even advise that we increase that allocation level, similar to the way we have done in the past, increasing it slowly over time to help keep pace with inflation.

Enforce the existing regulations on award size. As you mentioned, or as previous speakers have mentioned, the current law recognizes a good balance, in our mind, between the number of awards and the amount of work that can be done for each given award.

Enforce Phase III requirements. As was also mentioned previously, there is some language that suggests that DOD and other agencies use SBIR technologies to the greatest extent possible. However, we still notice reluctance on behalf of large DOD contractors as well as some government agencies to actually embrace some of the SBIR technologies that have been developed.

And then, finally, standardize the commercialization data and data gathering, as both Mr. Williams and Mr. Smith have talked about earlier. Today, much of that data is gathered agency by agency with very different rules, and it makes it a little complicated to keep up with all the changes and all the requirements.

On behalf of all of the employees of Creare, I would like to thank you for your efforts to reauthorize, hopefully permanently, the SBIR and STTR Programs and for your continuing work to preserve and enhance the participation of small businesses in federal research and development.

Thank you.

[The prepared statement of Mr. Kline-Schoder follows:]

**Testimony of Robert J. Kline-Schoder, Ph.D.****President****Creare LLC****Hanover, New Hampshire**

Chairman Vitter, Ranking Member Shaheen and Members of the Committee on Small Business and Entrepreneurship, thank you for the opportunity to testify today about the importance of reauthorizing the Small Business Innovation Research and Small Business Technology Transfer programs, more commonly known as the SBIR and STTR programs.

Creare has had a long relationship with the SBIR program, which serves as an example of a very successful public-private partnership. In 1982, Creare worked with Senator Warren Rudman on the legislation that originally established the SBIR program. Since then, the program has played a key role in our business and in the economy in our region of New Hampshire – our family of companies now employ over 2200 people in high-paying, manufacturing and high-tech service jobs. SBIR helped Creare establish successful spinoff companies; develop new products for government missions of national importance; and license SBIR-funded technologies to existing product firms. Through every economic downturn of the past 35 years, Creare has remained strong and continued to develop technologies and create high-paying jobs due in large part to the SBIR program.

Since 1982, SBIR and STTR have grown to be critical programs that enable the Federal Government to access the enormous technical talent employed by the nation's small businesses and infuse new technology into critical systems. Through the SBIR/STTR program, the Federal Government has been able to directly promote innovation, sustain the local workforce in many regions of the country, and drive the economy through the growth of small businesses.

Since the last reauthorization, the programs continue much as they have since their beginning—they are a highly-competitive and efficient contracting mechanism for small businesses to meet the research and development needs of the Federal Government and allow the Government to rapidly deploy mission critical technologies while fostering the development of new products for the commercial marketplace. The increased award sizes coupled with the increase in the set-aside in the reauthorization has strengthened the program by expanding the scope of work that can be performed for a given award while maintaining the number and breadth of awards and technologies that can be supported.

In addition, the funding that has been targeted since the last reauthorization to support transition of SBIR-developed technologies has been very effective. Coupled with the efficient contracting mechanism afforded by the SBIR/STTR programs, these new transition assistance funds (such as the Rapid Innovation Fund) have allowed many DoD programs to benefit by increasing the speed



at which new technologies, enhanced capabilities, and cost savings can be incorporated into mission-critical programs.

As the program moves toward its next reauthorization, we make the following recommendations:

Reauthorize for an Adequate Term or Make Permanent. SBIR/STTR is a proven program, and frequent reauthorization with many changes proves tremendously disruptive to vulnerable small businesses and to the Federal agencies that count on these small firms to meet critical program needs. The program should be reauthorized for at least ten years, or, even better, made permanent.

Continue Competitive Structure. We recommend that the competitive Phase I and II structure that has been the hallmark of SBIR/STTR be maintained. It is important that applicant companies compete for Phase I of the process, the stage where scientific validity of a proposal is established, and not bypass Phase I to directly enter Phase II (prototype development). This competitive process ensures that SBIR/STTR focuses its funding only the most promising technologies.

Maintain Eligibility Requirements. We recommend that the compromise on eligibility requirements for small businesses that resulted during the last reauthorization be maintained. We ask you to work to preserve the successful focus of the SBIR/STTR program on small American businesses, by ensuring that large firms or their subsidiaries and academic institutions cannot qualify for this small-business program.

Keep/Expand Allocation Levels. Similarly, we endorse the allocation percentage of extramural funding that each agency is required to achieve. An increase in these allocations, similar to what was done in the last reauthorization, would help small business—a very effective user of the funding—to increase growth and provide good paying jobs.

Enforce Existing Regulations on Award Size. Current law recognizes the balance between award size and number of awards: up to \$150,000 for Phase I and up to \$1,000,000 for Phase II adjusted for inflation with the flexibility to exceed the guidelines by 50%. Special approval by the Small Business Administration is required to exceed these award levels by more than 50%. We urge Congress to keep these protections in place so that these levels are maintained by all agencies. Increases significantly beyond this level will sharply reduce the number of small businesses that receive awards and discourage pursuit of innovative solutions.

Enforce Phase III Requirements. We recommend that the existing requirements that seek to maximize Phase III use of SBIR/STTR technology be enforced across all agencies. The current reauthorization says agencies and prime contractors should utilize Phase III “to the greatest extent practicable”. However, we still experience reluctance on the behalf of large DoD contractors to make use of SBIR/STTR technologies. To help in achieving this goal, additional funding for transition of SBIR technologies into programs, such as commercialization assistance programs and the rapid innovation fund, would be well spent. In addition, requiring large contractors to meet SBIR/STTR subcontracting goals would help meet this goal.



Kline-Schoder testimony
25 Jan 2016

Standardize Commercialization Data. We recommend that the agencies standardize their commercialization data collection around the DoD or new SBA model. The data are now haphazardly collected by each agency in their own form with different requirements, which causes significant effort by the small business to comply.

On behalf of all Creare employees, I would like to thank you for your efforts to reauthorize, hopefully permanently, the SBIR and STTR programs and for your continuing work to preserve and enhance the participation of small businesses in Federal research and development.

Chairman VITTER. Thank you very much.
Now, Mr. Glover.

**STATEMENT OF JERE W. GLOVER, EXECUTIVE DIRECTOR,
SMALL BUSINESS TECHNOLOGY COUNCIL, ANNAPOLIS, MD**

Mr. GLOVER. Good morning. My name is Jere Glover. I am Executive Director of the Small Business Technology Council of the National Small Business Association, the oldest small business organization in America.

I am here to urge you to make a great program better by increasing the allocations and by making the program permanent. This is half of the National Academy of Science's reports on the SBIR Program. Over \$10 million have been spent and there have been 25 GAO reports. I would direct your attention to Appendix 1, which has selected quotes from all of those reports, but let me just give you one.

The SBIR Program has a history of supporting not only the growth of jobs and the overall economy, but also the agency's missions. Every study that has been done comes to more or less that conclusion. After 5,000 pages of National Academy studies, 25 GAO reports, 33 years of success helping thousands of small businesses, it is time to make this program permanent and it is time to make it larger and bigger.

When we look at the chart, we see where innovations come from, and the Keller and Block study looked at key innovations and found that if you look at the red line, large firms in America have been steadily declining in creating key innovations, and this one little SBIR Program, two percent of the whole federal R&D budget and 3.3 percent of the extramural budget, goes to this one little program that creates 25 percent of the key innovations.

Let us go to the next chart. When you look at the Air Force Impact Study, what you find in that study is very interesting in terms of return on investment. The government, the Air Force, for every dollar they spent on SBIR, they get a dollar in military sales and 2.6 dollars in additional commercial sales, and 50 cents of venture capital outside money added to those projects. Ten percent of those companies—this is all the companies that got awards from the Air Force Phase II between 2000 and 2013—10 percent of them had sales in excess of \$10 million. Four of them had sales in excess of \$500 million. Ten percent of those companies license their technology to somebody else. Another 10 percent were acquired. This study, that is the first really comprehensive that got a 96 percent response rate, shows how effective the SBIR Program has been.

Now, there is a lot of discussion about success stories and there are certainly on my website links to all those, but I will simply mention one, IntraLase, which is highlighted in the Air Force study. It is a LASIK, a small business that got a LASIK—an award to improve LASIK surgery so pilots—as we get a little older, sometimes our eyesight is not quite as good and they suddenly get kicked out of the air. They cannot fly and do what they were trained to do. This new surgery allows them to keep doing that. So, not only does it keep pilots in the air, it saves the government thousands of dollars training.

The second thing is the “valley of death,” I want to address briefly. It is really a “Grand Canyon of death” when it comes to technology. When we look at it, there are a number of reasons that small businesses do not commercialize and succeed in taking their technology. Institutional bias against small business, minority, women, veterans, well known, well documented. It is there against high technology companies there, as well.

Banks have been declining in their lending to small business. Home equity loans, a lot of home equity is gone. Venture capital—let us go to the next chart. What you find in venture capital, unfortunately, is seed investing is way down. A hundred-and-eighty-five seed investments made in the entire U.S. in 2015, and quite frankly, many states and many industries did not get a single seed dollar. So, SBIR is the only opportunity. It is a great program.

The Rapid Innovation Fund has been mentioned. It is truly a wonderful program. Eleven-thousand firms applied to the Rapid Innovation. Only 435 got awards. It shows you how much demand there is for follow-on technology that is not being met. Four percent is all of the companies that applied that actually won. So, there needs to be a lot more done.

The law that was passed in the reauthorization bill four years ago has yet to be implemented in many instances. We still do not have reports. We do not know what Phase III contracts, we do not know how many prime contractors are making awards to small business, all specifically required in the law, Section 5122. Section 5108 says that to the greatest extent practicable, federal agencies and prime contractors shall issue Phase III awards to SBIR and STTR award recipients.

Only the Navy has issued a directive requiring—encouraging, not requiring—encouraging folks to do that. Nothing from the civilian agencies, nothing from the rest of DOD. I, quite, frankly, am sort of old school. I kind of believe when Congress passes laws, people should adhere to them. Unfortunately, we have not seen that.

So, we urge you to make a great program better and reauthorize this. Thank you.

[The prepared statement of Mr. Glover follows:]



Testimony of

Jere Glover

Prepared by Jere Glover, Robert Schmidt, and Alec Orban

Small Business Technology Council

**BEFORE THE COMMITTEE ON SMALL BUSINESS
AND ENTREPRENEURSHIP, UNITED STATES SENATE**

Washington, D.C.

Regarding
Reauthorization of the SBIR/STTR Programs – The
Importance of Small Business Innovation to National
and Economic Security

28 January, 2016

*Small Business Technology Council
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(202) 659-9320 Fax: (202) 872-8543
www.sbtic.org*

SBTC, the nation's largest association of small, technology-based companies in diverse fields, is proud to serve as the technology council of the National Small Business Association, the nation's oldest nonprofit advocacy organization for small business, serving more than 150,000 small companies throughout the United States.

Chairman Vitter, Ranking Member Shaheen, members of the Committee, thank you for the opportunity to appear here today to discuss the importance of technological innovation to the United States, and the reauthorization of the SBIR and STTR Programs.

I am Jere W. Glover, Executive Director of the Small Business Technology Council (SBTC) of the National Small Business Association (NSBA), in Washington, DC. I have been involved in federal science and technology innovation programs since 1978, when I staffed joint Senate/House hearings and the resulting report that showed severe under-utilization of small business high-tech companies in the Federal R&D programs.¹ The SBTC is an outgrowth of the White House Conference on Small Business in 1995, and is the nation's largest association of small, high-tech SBIR and STTR companies in diverse fields.

When Arthur Obermayer was inducted into SBIR Hall of Fame at the White House as one of the key founders of the SBIR Program, he stated that next to the GI Bill after WWII, SBIR was one of the most significant pieces of legislation ever passed by Congress. After considering his comments, I'm inclined to agree with him.

The SBIR/STTR Program has been copied by seventeen countries around the world. While the SBIR/STTR program accounts for only 2.6-3.0%² of the Federal extramural R&D budget over the last 4 years, it has created 22% of key innovations. According to a recent Air Force Economic Impact Study, every dollar spent on the SBIR program returns 3.6 dollars in sales, 50 cents of additional outside investment or venture capital, and resulted in over 400 mergers and licenses. Thirteen percent of the Phase II firms had commercial sales of over \$10 million. According to 17 National Academy of Science studies conducted over 17 years, totaling 5,251 pages, the SBIR/STTR programs have met (all but the minority participation which the NRC said was not the fault of the SBIR/STTR) their stated Congressional objectives (See Appendix A. Appendix A also includes references for 25 Government Accountability Office reports.).

In Washington it is extremely difficult to reach a consensus. However, there is consensus that SBIR is a wonderful example of people working together to create new technologies, jobs, and improve the economy in a most cost effective manner. This program was started with the strong support of President Reagan and with the leadership of Senators Kennedy and Rudman.

Despite its strong support and wonderful record of success, reauthorization has, on occasion, been difficult. After 17 National Academies studies and 25 GAO reports and 33 years of positive experience it is time to recognize that 1) increasing the programs is a cost effective investment of Federal R&D dollars, and 2) making SBIR and STTR permanent is long overdue. This Committee voted ten years ago to make these programs permanent, and at the same time Senator Vitter joined with then Senator Bayh to call for a doubling of the SBIR program to five percent. The bill passed 18-0. With Senator Shaheen calling for permanency, and Senator Vitter's legacy on increasing the program, I can't think of two better Senators to lead the committee during this reauthorization.

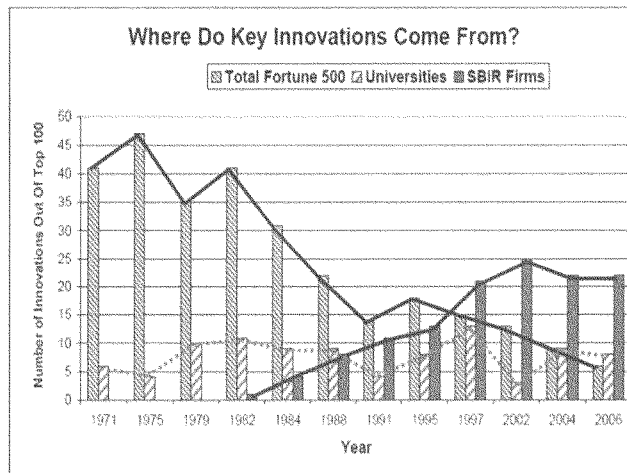
SBIR/STTR Overview

The SBIR/STTR Programs together account for \$2.0-2.5 billion dollars, or about 3.0% of the Federal **extramural** R&D budget. SBIR/STTR represents less than 2% of the **total** Federal R&D budget of 144.4 billion dollars. Each year the 11 Federal agencies³ make almost 5,000 awards with almost one half coming from the Department of Defense. For a description of how the program works see www.SBIR.Gov.

It bears repeating that the National Academy of Sciences and its National Research Council's (NRC) 17 reports have shown that the SBIR/STTR Programs have met the Congressional objectives for the Program: (1) to stimulate technological innovation, (2) use small businesses to meet federal R&D needs, (3) foster and encourage the participation of socially and economically disadvantaged small businesses, and (4) increase the private sector commercialization of innovations derived from federal R&D. While the NRC indicates that (3) has not been met, NRC says it is not SBIR/STTR problem but a STEM problem.

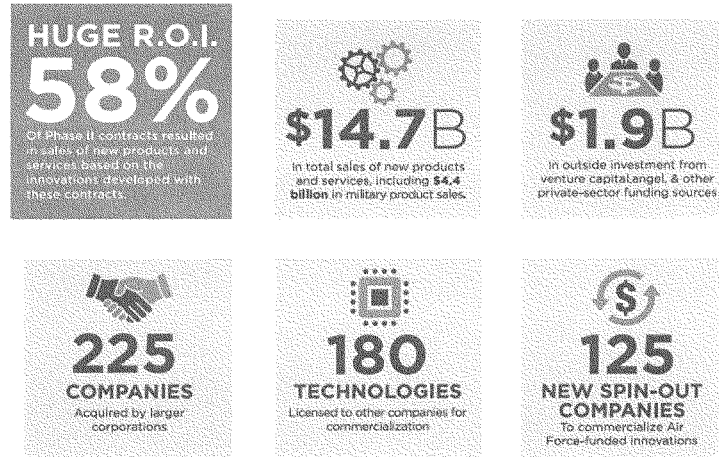
While commercialization is only one of the Congressional Objectives of the Program, I nevertheless want to focus on SBIR commercialization and job creation. In addition to the NRC Reports, studies by the Air Force and the Information Technology & Information Foundation have documented the commercial success of the program. These Reports show that almost 60% of Phase II awards end up with commercial sales exceeding \$1 million, making this the most successful innovation commercialization program in America. Successful alumni of the SBIR program are firms like: Qualcomm (cell phone communications), Symantec (computer security), Genzyme (biotech therapies), Affymetrix (GeneChip), Amgen (biopharmaceuticals), Jarvick Heart (artificial heart), Titan (now Intersection, interactive computer graphics), Chiron (pediatric vaccines), AMTI (advanced materials, radars), Amorworks (military armor), Biogen (Idec, neurological, autoimmune therapies), American Biophysics (mosquito control), Millennium Pharma (gene databases), Geron (telomerase inhibitors for cancer treatment), Neocrine Bioscience (neurological and endocrine pharmaceuticals), ABIOMED (world's smallest heart pump), Aerovironment (unmanned aircraft), A123 Systems (lithium-ion batteries), iRobot (unmanned robotic vehicles, vacuum cleaning, Roomba), JDS Uniphase (fiber optics, lasers, software), Stem Cells Inc. (cell based therapies for CNS and liver disorders), and Nanosys (quantum dot displays), as well as thousands of others.

An analysis of R&D 100 awards show SBIR/STTR Programs have resulted in 22-25% of all key innovations in the United States.⁴



Another analysis of the SBIR program was performed by the Air Force. They found the following in their study.⁵

Well over half of the Air Force Phase II contracts— 58 percent—resulted in sales of new products and services based on the innovations developed with these contracts. Companies reported the following direct commercialization-related outcomes from their Phase II contracts:



The research team used IMPLAN economic-impact assessment software to estimate the total economic impacts related to both the \$4 billion in Air Force SBIR/STTR Phase II contracts and subsequent \$14.7 billion in sales of new technologies. **Results included:**



The study was commissioned by the Air Force SBIR/STTR Program. It is the first-ever comprehensive study of the economic impacts of an entire federal SBIR/STTR program. The study was conducted by TechLink, a federally funded technology transfer center at Montana State University-Bozeman, in collaboration with the Business Research Division (BRD) of the

The Air Force study found after surveying 96% of all Air Force Phase II winners between 2000 and 2013, that 58% of the contracts had sales in excess of \$1 Million. Four contracts resulted in sales of over \$500 million, 23 had sales of over \$100 million, 221 companies had sales of over \$10 million and 1,715 contracts has sales of over \$1 million. I know of no other program with such a remarkable record of commercialization success.

Air Force SBIR/STTR Phase II Contracts	Total Number of Contracts	Percent of Total	Total Sales \$ Billions
Total Contracts	4,524	100	\$14.7
All contracts with sales	2,631	58	\$14.7
Contracts with sales exceeding \$500 million	4	0.1	\$3.1
Contracts with sales exceeding \$100 million	23	0.5	\$6.6
Contracts with sales exceeding \$10 million	221	5	\$11.4
Contracts with sales exceeding \$1 million	1,155	26	\$14.3
Contracts without sales	1,715	38	--
Companies not responding	178	4	--

SBIR/STTR Success Stories:

The SBIR and STTR programs have experienced considerable success in meeting agency needs as reported by National Research Council (NRC). The agencies first provided reports of these successes and later developed web sites listing their successes. In some cases they improve agency research, in others they resulted in new products that could be commercialized, and for DoD, there were new products that provided advanced technology to the warfighters on a quick-reaction basis. Almost all of the SBIR/STTR agencies post their SBIR/STTR success stories on their web sites as follows:

- a. SBIR Success Stories: <https://www.sbir.gov/news/success-stories>
- b. DOD: <http://www.acq.osd.mil/osbp/sbir/about/success-stories.shtml>
- c. NIH: <https://sbir.nih.gov/statistics/success-stories>
- d. DOE: <http://science.energy.gov/sbir/highlights/>
- e. NIST/DOC: <http://www.nist.gov/tpo/sbir/sbir-success-stories.cfm>
- f. USDA: <http://nifa.usda.gov/impacts>

- g. EPA: <http://www.epa.gov/sbir/sbir-success-stories-and-highlights>
- h. Tibbett's Award & SBIR Hall of Fame: <https://www.sbir.gov/about-tibbetts-awards>
- i. Overall, if one performs a web search for "SBIR Success Stories" there are approximately 59,600 responses on Google and 146,000 on Yahoo (of course, some are redundant).

SBIR JOB CREATION

The 2014 Air Force Economic Impact Study shows that the Phase II award winners had \$14.7 billion in sales and added 234,000 jobs in America between 2000 and 2013.

This is more than Google, Apple, Cisco, and Microsoft combined– **JUST FROM AIR FORCE SBIR PROGRAMS.**

	Worldwide	US	Outside US	% Outside US	References
Google	56,300	37,792	18,508	32.9%	http://reviews.greatplacetowork.com/google-inc
Cisco	70,911	35,549	35,362	50%	http://reviews.greatplacetowork.com/cisco
Microsoft	115,905	60,515	55,390	47.8%	http://news.microsoft.com/facts-about-microsoft/#EmploymentInfo
Apple	115,000	76,000	39,000	34%	http://www.apple.com/about/job-creation/
Total	358,116	209,856	148,260	41.4%	
Air Force Study Employment	234,000	234,000			Air Force Economic Impact Study Pg 27

When looking at the entire SBIR program, SBIR involved firm's employ 500,000 graduate-level engineers & scientists across every field of industrial/ technical endeavor is arguably largest single concentration of demonstrated technical talent. - See more at: <http://www.innovation.com/sbir/about-us#sthash.YfqTc7qg.dpuf>

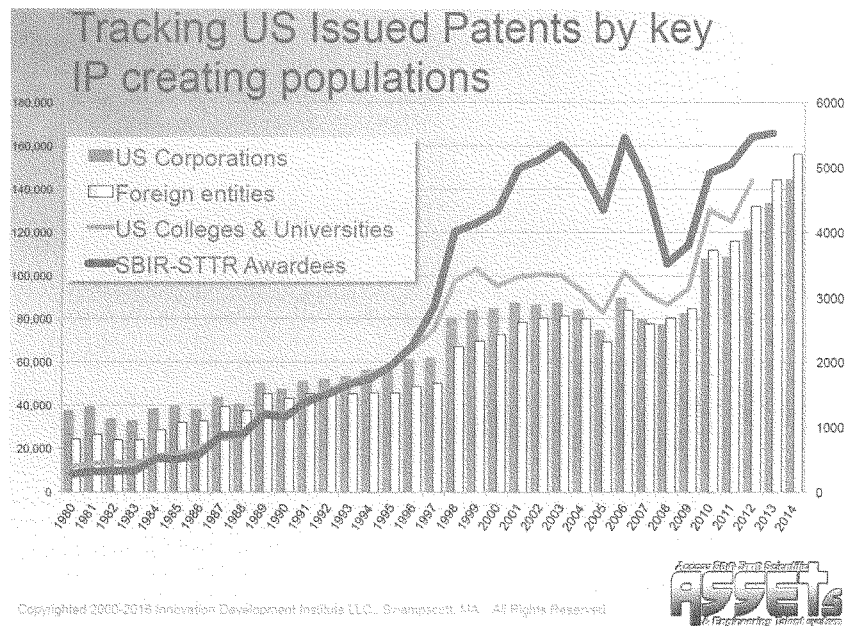
Mergers and Acquisitions

Another indication of success is the number of SBIR/STR firms that are acquired. The Air Force Economic Impact study found that 225 of the Phase II winners had been acquired. This is just the tip of the iceberg. According to Innovation Development Institute of Swampscott, MA (IDI) database 1,975 SBIR/STTR firms have been acquired. This shows that large firms value SBIR/STTR technology. Companies active in acquiring SBIR/STTR firms include L3 Communications with 40 acquisitions, SAIC with 13, General Electric with 12, Raytheon with 11 and BAE and Lockheed Martin with 10.

Unfortunately all small business, the recognized leader in innovation, still receives less than 5% of the total Federal R&D funding, the majority of which comes from the SBIR/STTR programs. Large firms, universities and government laboratories receive the remaining 95% of Federal funding.

Small business gets a tiny amount despite the fact that small businesses make up: 99.7 percent of U.S. employer firms, 63 percent of net new private-sector jobs, 48.5 percent of private-sector employment, 42 percent of private-sector payroll, 46 percent of private-sector output, 37 percent of high-tech employment, 98 percent of firms exporting goods, and 33 percent of exporting value.⁶ Again, despite their small size and limited resources, small and micro entities accounted for almost 30% of all U.S. origin issued U.S. patents in 2015.⁷ And, according to the Federal Reserve, patents are the number one indicator of regional wealth.⁸

The IDI has been tracking SBIR commercialization, mergers and patents by SBIR/STTR involved firms for decades. Their comparison of SBIR firms and patents filed show that SBIR/STTR involved firms receive 12-14 patents each day. SBIR/STTR firms have received 125,631 patents.⁹ As shown on the below chart, each year SBIR/STTR firms receive over 5,000 patents. That is more than all universities combined, on less than 2% of the Federal funding. As noted above patents are very important to commercialization of innovations. IDI analysis of patents show that over one third of all SBIR/STTR firms receive patents.



With this remarkable success of Small Business and the SBIR/STTR programs, it is our view that America has been stifling job creation and economic growth by limiting its support to these small business companies to less than 2% of the total R&D budget, even when they have clearly been the companies that drive new innovation and new jobs.

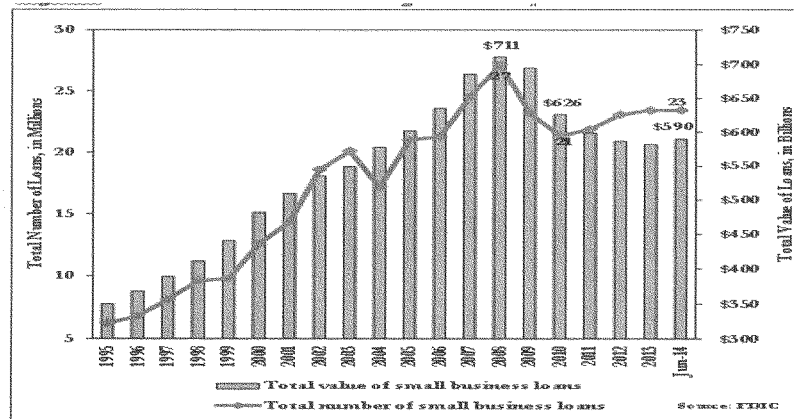
We believe it is time for America to focus on Small Business Innovation, and unleash the creativity, passion, enthusiasm, and zeal of America's greatest job creators by expanding the SBIR/STTR programs, and making them permanent.

Small business has a remarkable history of innovation. Today I will focus on the success of the SBIR/STTR Program.

Financing Innovation is difficult

SBIR/STTR are the only Federal programs designed specifically to help small high technology firms grow and succeed. Unfortunately, bank lending to small business is down, and venture capital is difficult, if not impossible to obtain in most areas of the country. For thousands of inventors and small businesses, SBIR is their only hope of funding their inventions, and America's best opportunity to create American jobs.

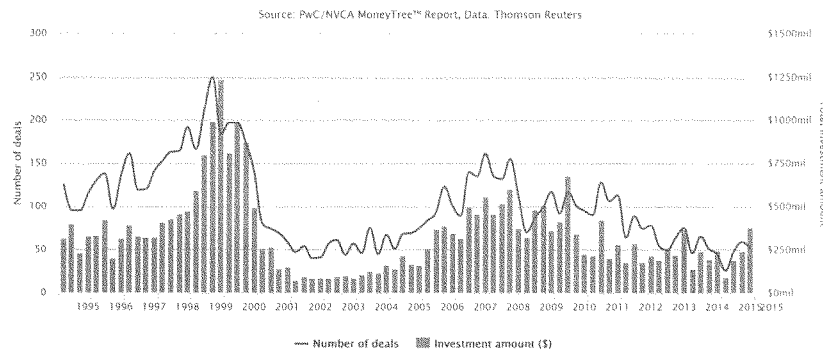
BANKING: Small business options for financing growth and commercialization of their innovations are very limited. Bank lending has declined dramatically since 2007. Bank lending is not available for most innovative small businesses. The amount of lending to small businesses by banks is down over \$120 Billion over the last 7 years. According to Professor Cole at DePaul University, lending to small business is 50% lower than it should be.



VENTURE CAPITAL: Since 2008 venture capital has declined significantly, especially for first round financing and for early stage investment. This decline in venture capital is especially troubling since about 14% of all SBIR firms eventually received venture capital and one of every eight dollars invested by venture capital is to an SBIR/STTR involved firm.¹⁰

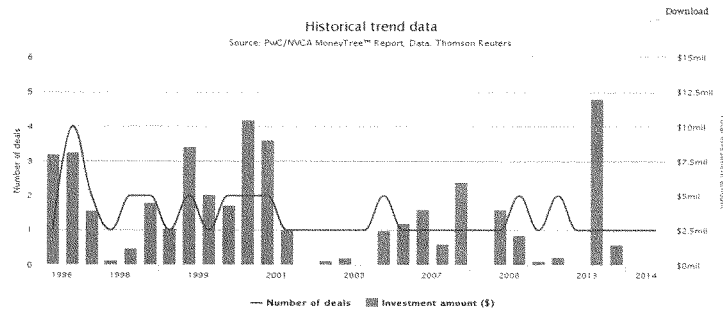
Unfortunately small business cannot rely on venture capital to fund their new innovations. Venture capital only made 185 seed round deals in 2015.¹¹ Compare this with the SBIR/STTR program that makes almost 5,000 awards each year (**about 27 times as many funding opportunities as VCs provide**). Venture capital investments tend to be located in just a couple of states, California and Massachusetts, and in very few industries. (85% of the VC funding is provided to just five states, and 60% of the total funding goes to California.)¹² This means that for most small business in most of the country, venture capital is not a realistic option to grow and commercialize their invention.

Most tech firms (82%) do not raise VC or any other type of institutional capital (VC, Private Equity, Growth Equity, etc.) prior to exit.¹³ This is because VC funding is not an option for them, frequently due to the location or industry of the firm.

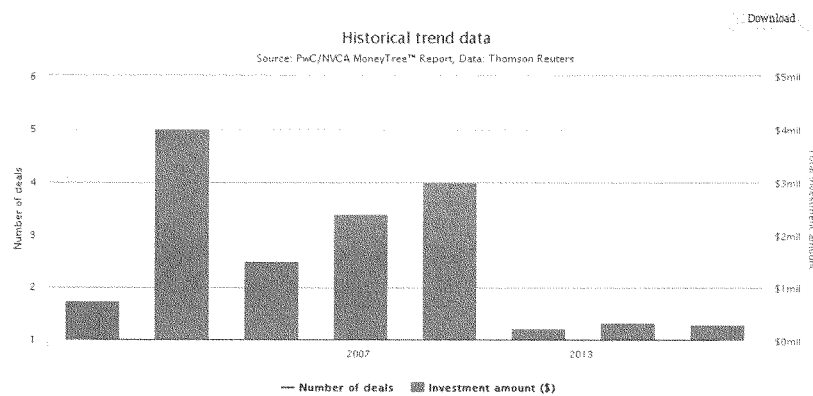


For example if you pick a couple of states selected at random, Louisiana and New Hampshire, the data shows that venture capital had only one or two seed stage financings from per year in New Hampshire, and none or one per year in Louisiana.¹⁴

The chart below shows the aggregated investment dollars and the number of deals from Q1 1995 to Q4 2015. The graph is also being filtered by **State: New Hampshire**, and **SoD: Seed Stage**



The chart below shows the aggregated investment dollars and the number of deals from Q1 1995 to Q4 2015. The graph is also being filtered by **State: Louisiana**, and **SoD: Seed Stage**



Given the circumstances, small businesses seeking to fund their inventions have only one real way. **The SBIR/STTR Program is the only option for most innovative firms. In addition to providing needed funds to innovative small business the SBIR/STR Programs meet the Congressional Objectives of (1) to stimulate technological innovation, (2) use small businesses to meet federal R&D needs, and (4) increase the private sector commercialization of innovations derived from federal R&D.**

U.S. innovation leadership in the World is Challenged

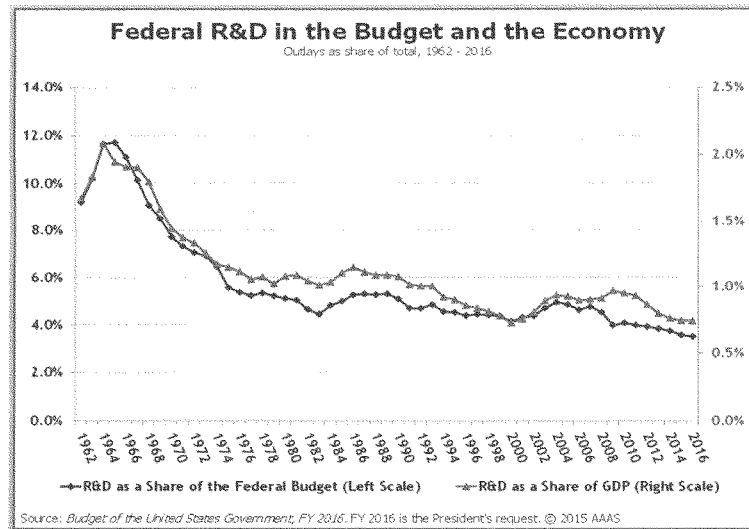
America's leadership in innovation and technology is being challenged. While America leads in the number of scientific articles and journals, we no longer lead in high tech exports and patents filed. The rest of the world is far exceeding America in filing patents and in exporting high technology.

High Tech Exports 2013

Country name	High Tech Exports (millions \$)	Resident patents	Scientific articles
United States	147,833	287,831	208,601
China	560,058	704,936	89,894
Germany	193,088	47,353	46,259
Japan	105,078	271,731	47,106
Korea	130,468	159,978	25,593
Singapore	135,602	1,143	4,543

Source: <http://wdi.worldbank.org/table/5.13>

In addition, the US Federal R&D spending as a percentage of Gross Domestic Product is declining while it is increasing in other countries.



History of SBIR

The SBIR Program History: The original SBIR legislation was started almost 35 years ago by Representative Jerry Lewis (R-CA), when he sponsored H.R. 3091 on April 7, 1981 with 56 cosponsors (28 Republican, 28 Democrat). It was subsequently reintroduced as H.R. 4326 on July 29, 1981 with 189 bipartisan cosponsors. On June 27, 1982 H.R. 4326 was laid on the table in the House, and S.881 (amended) was passed in lieu. S.881 was sponsored by Senator Warren Rudman (R-NH) and cosponsored by Barry Goldwater (R-AZ) on April 7, 1981, with 83 other bipartisan cosponsors. It was strongly supported by the Administration of, and signed into law as PL 97-219 by, the Republican iconic champion of Free Markets, President Ronald Reagan on July 22, 1982, in the midst of the recession lasting from July 1981 to November 1982.

Congressional Findings and Purpose of the SBIR Program: The House and Senate records clearly show that the SBIR program **was not an allocation to help needy small companies.** Rather it was a strong signal to Federal Agencies to make more effective use of the innovative scientists and engineers employed by aggressive small companies that had the potential to convert R&D funds into new products and create new jobs – to optimize return on taxpayers' dollars.

From the PL-97-219 House and Senate Findings and Purpose it was clear that the SBIR program was intended to maximize the return on taxpayers' innovation dollars by forcing the Federal Agencies overseeing this R&D funding to utilize more small businesses because:

“(3) Small businesses are among the most cost-effective performers of research and development and are particularly capable of developing research and development results into new products.”

The House was concerned that small business share of the Federal R&D budget remained at less than 5%. Ironically 33 years of proof that small business innovate better than large companies and universities and thousands of success stories, the **small business share of Federal R&D remains at 5%**. Most of which comes from the SBIR/STTR program.

Despite the SBIR's enduring popularity from both industry and government, reauthorizing the program has proven a challenge in the past. In 2000, the program was reauthorized for eight years, expiring on September 30, 2008. After its expiration, it wasn't reauthorized again for over 3 years, until SBIR reauthorization language was included in the NDAA 2012 bill passed on December 15, 2011. In between those reauthorizations, there were 14 continuing resolutions that kept the program temporarily alive for months at a time, sometimes passed only days before the SBIR program would have been terminated. This process was incredibly stressful for small businesses, as there was a constant atmosphere of uncertainty for over three years over whether or not the program would be around. Small businesses had to gamble with their budgets, employees, and long term plans that the program would eventually be reauthorized. This caused some small businesses to lose key employees who sought a more stable work environment, which subsequently cost the Federal Government more in trying to recreate technology and retrain new employees.

SBTC Concerns

Funding Commercialization

As pointed out above, funding for commercialization of innovation is difficult for all small business. This is true for SBIR/STTR firms. While SBIR/STTR firms have a conversion rate of 58%, there remains significant problem. For decades companies of all sizes have had difficulty getting their technology inserted into DoD. Contractors at DoD prefer to reinvent technology instead of acquiring technology from others. Congress and DoD have tried for years to address this problem. (See Appendix D page 5) SBTC believes that it is time to require DoD and its contractors to create a Program Objective Memorandum (POM) for SBIR technology and to require its contractors to subcontract with SBIR/STTR firms for part of their RDT&E budgets.

Implemented key provisions of the 2011 Reauthorization in 4 years.

SBTC is concerned that after four years SBA, DOD and the Armed Services have not implemented key provisions of the SBIR/STTR Reauthorization Act of 2011. (See SBTC DOD White Paper APPENDIX D). Specifically, there are no goals, or incentives as required by Section 5108, nor any reporting as required by Section 5123. We are also concerned that the civilian agencies have not taken steps to make sure that Section 5123 has been implemented.

Section 5108 provides: **To the greatest extent practicable, Federal agencies and Federal prime contractor shall issue Phase III awards relating to technology, including sole source awards, to the SBIR and STTR award recipients that developed the technology....**

With the exception of the Department of the Navy Phase III Guidebook, no other agency has issued guidance or directives implement this provision. In the four years since Reauthorization became law, DoD has not issued goals and incentives for Program Executive Officers (PEOs) or prime contractors required in Section 5123. In addition Section 5123 requires that the agencies and prime contractors and SBA report on the number and dollar amount of Phase III awards. None of these required reports have been released.

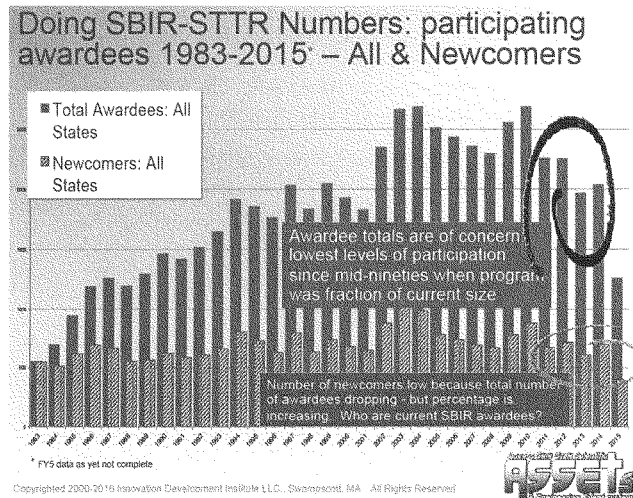
Had DOD and SBA implemented these provisions of the law, DoD would not have been criticized by the National Academy of Science. (See Appendix B for discussion of the key recommendations of the NRC recent report on the DoD. Most of these recommendations are already in the law, but have not been implemented by the DoD or by the other civilian agencies).

SBA Staffing and Budget

SBTC is concerned that the SBIR/STTR staff and budget at SBA are too small. According to the SBA's "Historical Summary, Office of Technology," in 1991, the Office of Technology had a budget of \$907,000 and 10 positions. While I do not have current information, I believe that is in need of more funding and personnel. Running a \$2 billion dollar program with just 4 or 5 people and a very limited budget makes no sense. SBA is years behind in submitting its Annual Reports to Congress and hasn't issued guidance directing the Agencies to comply with the provisions of the last Reauthorization bill. SBA was lucky to convince John Williams to move over from the Navy SBIR program to run its Office of Technology, but it has not given him enough staff to fully leverage all of his talent and follow-through. Lack of personnel and funds are a serious problem at SBA's Office of Innovation.

Declining Number of Awards and Newcomers

One other SBTC concern is the decline in the number of SBIR/STTR awards and especially the number of Phase I awards. The below chart shows the decline in award over the past 5 years.¹⁵ These numbers show a decline of as much as a third of the number of awards since 2009. This decline together with a decline in the age of newcomer as winner of SBIR/STTR and the decline in the number of first time winners of awards is a real concern and another justification for increasing the SBIR/STTR allocation.



Breakout SBIR-STTR Awardees By Type & Percentage;
By-Agency & Year 1983-2015 October 2015

Agency	2014						
	Total Awardees	First Time Awardees	% New/oldcomers	# Agency Returners ²	% Agency Returners	First time in agency ³	% agency first time ⁴
DOD	715	145	20.28%	550	76.92%	20	2.80%
NIH	706	249	35.27%	426	60.34%	31	4.39%
NASA	20	1	5.00%	16	80.00%	3	15.00%
DOE	178	40	22.47%	104	58.43%	34	19.10%
NSF	301	205	68.11%	57	18.94%	39	12.96%
DHS	32	5	15.63%	15	46.88%	12	37.50%
USDA	3	0	0.00%	1	33.33%	2	66.67%
DOT	18	6	33.33%	6	33.33%	6	33.33%
EPA	21	10	47.62%	5	23.81%	6	28.57%
DoEd	4	0	0.00%	4	100.00%	0	0.00%
DOC	21	4	19.05%	8	38.10%	9	42.86%

Dept of Defense: all Agency Data and by Service Breakout							
DOD	715	145	20.28%	550	76.92%	20	2.80%
AF	339	55	16.22%	242	71.39%	42	12.39%
Army	84	12	14.29%	52	61.90%	20	23.81%
Navy	321	53	16.51%	227	70.72%	41	12.77%
MDA	22	1	4.55%	14	63.64%	7	31.82%
DARPA	23	11	47.83%	4	17.39%	8	34.78%
DMEA	2	0	0.00%	0	0.00%	2	####
DTRA	6	0	0.00%	2	33.33%	4	66.67%
CBD	19	6	31.58%	5	26.32%	8	42.11%
OSD	61	13	21.31%	33	54.10%	15	24.59%
SOCOM	9	0	0.00%	3	33.33%	6	66.67%
NGA							
DHP	25	6	24.00%	10	40.00%	9	36.00%

Source: Innovation Development Institute, LLC., Swampscott, MA

2014

The charts in **Appendix E** show that for DoD components newcomers decline by 20% since 2004 and 30% since 1994.

SBTC RECOMMENDATIONS

SBTC has the following recommendations for the SBIR/STTR Program.

1. Complete reauthorization this Congress, preferably before members leave in mid-July.
2. Make the SBIR/STTR program permanent.
3. Increase the allocation significantly.
4. Require the Services to Program Objective Memorandum (POM) for insertion of technology from SBIR/STTR, from Non Traditional Vendors (NTV), or from small businesses using university technology.
5. Require all companies with contracts with a value of \$100 million or more to report on the number and dollar amount of SBIR/STTR, small business NTV and small business using university technology.
6. Each contract or modification to a contract with a value of \$100 million or more shall include a goal of 23% of technology funding to be awarded to SBIR/SBIR, small business NTV or small business using university technology.
7. 2% of 6.4 and above funding at DOD shall be allocated to fund SBIR/STTR Phase III contracts, or technology from small business NTV or small business using university technology.
8. If the 3% administrative fee is to be continued, it should only be for agencies that have reported what they have spent the funds for in the previous year, and what they will spend the funds for in the coming year. They must also report on what they have done to implement fully the provisions in this and prior reauthorization bills. Any reports submitted to SBA by an agency or component there of shall be submitted directly to Congress within 90 days unless SBA has submitted the report to Congress. Agencies shall respond to recommendations in their respective National Academy of Sciences study within 90 days in a report to Congress. Any agency that has not complied with all SBIR reporting requirements shall not be able to use the administrative fees in the following year.
9. The Rapid Innovation Fund (RIF Program) should be expanded at DoD and implemented at DoE and NASA for Phase III SBIR/STTRs at an amount that is at least equal to the amount of the SBIR/STTR programs at the respective agencies.
10. All SBIR/STTR contractors and grantees that have no original contract or grant, or any single modification to a contract or grant that is more than \$7,500,000 shall have the choice to use a Certified Public Accountant to examine financial records and indirect cost rates, in lieu of a review by an Agency's financial services department or the Agencies audit agency. The Agency shall accept the CPA's review and rates without additional audit or review unless directed otherwise by the Agency Director for a specific company.
11. Require that patent costs be allowable as an indirect cost.
12. Require that the provisions in this and all prior reauthorizations bills be implemented immediately and the FAR and DFAR be updated and implemented immediately to include the language in the reauthorization bills.
13. Increase the number of personnel and budget of the SBA Office of Technology

Conclusion

The SBIR/STTR Program has been extremely successful. It has helped create and grow over 22,000 firms. These firms have received over 125,000 patents. Fourteen percent of the firms have received venture capital. One thousand, nine hundred and seventy-five SBIR/STTR firms have been acquired. It has provided high quality for military and other national needs. Twenty-five percent of key innovations come from this program. All of this with less than 2% of the total Federal R&D budget. After 17 NRC favorable reports and 33 years of success, the Small Business Technology Council agrees with the Chairman and Ranking Member of this Committee. It is time to increase the size of the program and make it permanent.

We thank the Senate SBE Committee for the opportunity to make these remarks.

Appendix A

National Academies of Science Studies

(5,251 pages)

1. National Academies of Sciences, Engineering, and Medicine. *STTR: An Assessment of the Small Business Technology Transfer Program*. Washington, DC: The National Academies Press, 2016. (339 pages)
"STTR is meeting its congressional objective of fostering cooperation between small business concerns and research institutions, and does so in some respects to an extent that SBIR does not."
2. National Academies of Sciences, Engineering, and Medicine. *SBIR/STTR at the National Institutes of Health*. Washington, DC: The National Academies Press, 2015. (376 pages)
"The NIH SBIR program is having a positive overall impact. It is meeting three of its four legislative objectives, namely, stimulating technological innovation, using small businesses to meet federal R&D needs, and increasing private sector commercialization of innovations derived from federal R&D."
3. National Academies of Sciences, Engineering, and Medicine. *SBIR at the National Science Foundation*. Washington, DC: The National Academies Press, 2015. (366 pages)
"the Committee finds that with one exception the NSF SBIR program is meeting its overall legislative and mission-related goals."
4. National Research Council. *SBIR at the Department of Defense*. Washington, DC: The National Academies Press, 2014. (444 pages)
"SBIR projects at DoD commercialize at a substantial rate."
5. National Research Council. *Venture Funding and the NIH SBIR Program*. Washington, DC: The National Academies Press, 2009. (140 pages)
"In its recent assessment of SBIR, the Committee found that the concept of the program is sound and recommended that the basic program structure of SBIR be preserved. Accordingly, the Committee recommends that SBA and the agencies should maintain an open competition that is based on scientific quality and commercial potential."
6. National Research Council. *Revisiting the Department of Defense SBIR Fast Track Initiative*. Washington, DC: The National Academies Press, 2009. (212 pages)
"The Fast Track Program should be continued, given its success in encouraging firms with little or no prior SBIR experience to innovate and commercialize their product."
7. National Research Council. *An Assessment of the Small Business Innovation Research Program at the National Aeronautics and Space Administration*. Washington, DC: The National Academies Press, 2009. (344 pages)
"The NASA SBIR program stimulates collaboration, technological innovation, and generates new knowledge"

8. National Research Council. *An Assessment of the Small Business Innovation Research Program at the National Institutes of Health*. Washington, DC: The National Academies Press, 2009. (456 pages)
"The NIH SBIR program is making significant progress in achieving the congressional goals for the program."
9. National Research Council. *An Assessment of the Small Business Innovation Research Program at the Department of Defense*. Washington, DC: The National Academies Press, 2009. (468 pages)
"SBIR is in broad alignment with the needs of the DoD agencies and components."
10. National Research Council. *An Assessment of Small Business Innovation Research Program at the Department of Energy*. Washington, DC: The National Academies Press, 2008. (256 pages)
"SBIR awards from the Department of Energy fund the development of technologies that, otherwise, might have developed more slowly, if at all."
11. National Research Council. *An Assessment of the SBIR Program*. Washington, DC: The National Academies Press, 2008. (402 pages)
"The SBIR program is sound in concept and effective in practice."
12. National Research Council. *An Assessment of the SBIR Program at the National Science Foundation*. Washington, DC: The National Academies Press, 2007. (366 pages)
"The National Science Foundation's (NSF) Small Business Innovation Research (SBIR) program is adding to the storehouse of public scientific and technological knowledge."
13. National Research Council. *SBIR and the Phase III Challenge of Commercialization: Report of a Symposium*. Washington, DC: The National Academies Press, 2007. (200 pages)
"the Small Business Innovation Research (SBIR) program is the nation's premier innovation partnership program."
14. National Research Council. *SBIR Program Diversity and Assessment Challenges: Report of a Symposium*. Washington, DC: The National Academies Press, 2004. (200 pages)
"SBIR facilitates the development and utilization of human capital and technological knowledge."
15. National Research Council. *An Assessment of the Small Business Innovation Research Program: Project Methodology*. Washington, DC: The National Academies Press, 2004. (124 pages)
16. National Research Council. *The Small Business Innovation Research Program: An Assessment of the Department of Defense Fast Track Initiative*. Washington, DC: The National Academies Press, 2000. (372 pages)
"The SBIR Program is contributing to the achievement of Department of Defense mission goals. Valuable innovative projects are being funded by the SBIR."
17. National Research Council. *The Small Business Innovation Research Program: Challenges and Opportunities*. Washington, DC: The National Academies Press, 1999. (186 pages)
"SBIR [has a] history of supporting not only the growth of jobs and the overall economy, but also the missions of participating agencies."

GAO Reports

(1,097) pages

1. US Government Accountability Office. *SMALL BUSINESS RESEARCH PROGRAMS: Challenges Remain in Meeting Spending and Reporting Requirements*. Washington, DC: US GAO, 2015 (49 pages)
2. US Government Accountability Office. *SMALL BUSINESS INNOVATION RESEARCH: Change in Program Eligibility Has Had Little Impact*. Washington, DC: US GAO, 2014 (25 pages)
3. US Government Accountability Office. *SMALL BUSINESS RESEARCH PROGRAMS: More Guidance and Oversight Needed to Comply with Spending and Reporting Requirements*. Washington, DC: US GAO, 2014 (54 pages)
4. US Government Accountability Office. *SMALL BUSINESS INNOVATION RESEARCH: DOD's Program Has Developed Some Technologies that Support Military Users, but Lacks Comprehensive Data on Transition Outcomes*. Washington, DC: US GAO, 2014 (27 pages)
5. US Government Accountability Office. *SMALL BUSINESS INNOVATION RESEARCH: DOD's Program Supports Weapon Systems, but Lacks Comprehensive Data on Technology Transition Outcomes*. Washington, DC: US GAO, 2013 (5 pages)
6. US Government Accountability Office. *SMALL BUSINESS RESEARCH PROGRAMS: Agencies Are Implementing New Fraud, Waste, and Abuse Requirements*. Washington, DC: US GAO, 2012 (21 pages)
7. US Government Accountability Office. *SMALL BUSINESS INNOVATION RESEARCH: SBA Should Work with Agencies to Improve the Data Available for Program Evaluation*. Washington, DC: US GAO, 2011 (44 pages)
8. US Government Accountability Office. *SPACE ACQUISITIONS: Challenges in Commercializing Technologies Developed under the Small Business Innovation Research Program*. Washington, DC: US GAO, 2010 (41 pages)
9. US Government Accountability Office. *SMALL BUSINESS INNOVATION RESEARCH: Observations on Agencies' Data Collection and Eligibility Determination Efforts*. Washington, DC: US GAO, 2009 (15 pages)
10. US Government Accountability Office. *SMALL BUSINESS INNOVATION RESEARCH: Agencies Need to Strengthen Efforts to Improve the Completeness, Consistency, and Accuracy of Awards Data*. Washington, DC: US GAO, 2006 (36 pages)
11. US Government Accountability Office. *SMALL BUSINESS INNOVATION RESEARCH: Information on Awards Made by NIH and DoD in Fiscal Years 2001 through 2004*. Washington, DC: US GAO, 2006 (78 pages)

12. US Government Accountability Office. *FEDERAL RESEARCH: Observations on the Small Business Innovation Research Program*. Washington, DC: US GAO, 2005 (11 pages)
13. US Government Accountability Office. *DEFENSE ACQUISITIONS: Despite Restructuring, SBIR High Program Remains at Risk of Cost and Schedule Overruns*. Washington, DC: US GAO, 2003 (37 pages)
14. US Government Accountability Office. *FEDERAL RESEARCH AND DEVELOPMENT: Contributions to and Results of the Small Business Technology Transfer Program*. Washington, DC: US GAO, 2001 (20 pages)
15. US Government Accountability Office. *FEDERAL RESEARCH: Evaluation of Small Business Innovation Research Can Be Strengthened*. Washington, DC: US GAO, 1999 (94 pages)
16. US Government Accountability Office. *FEDERAL RESEARCH: Observations on the Small Business Innovation Research Program*. Washington, DC: US GAO, 1998 (28 pages)
17. US Government Accountability Office. *FEDERAL RESEARCH: The Small Business Technology Transfer Program*. Washington, DC: US GAO, 1997 (11 pages)
18. US Government Accountability Office. *FEDERAL RESEARCH: Observations on the Small Business Technology Transfer Program*. Washington, DC: US GAO, 1997 (9 pages)
19. US Government Accountability Office. *FEDERAL RESEARCH: DOD's Small Business Innovation Research Program*. Washington, DC: US GAO, 1997 (16 pages)
20. US Government Accountability Office. *FEDERAL RESEARCH: Preliminary Information on the Small Business Technology Transfer Program*. Washington, DC: US GAO, 1996 (38 pages)
21. US Government Accountability Office. *FEDERAL RESEARCH: Interim Report on the Small Business Innovation Research Program*. Washington, DC: US GAO, 1995 (40 pages)
22. US Government Accountability Office. *FEDERAL RESEARCH: Small Business Innovation Research Program Shows Success but Can Be Strengthened*. Washington, DC: US GAO, 1992 (98 pages)
23. US Government Accountability Office. *FEDERAL RESEARCH: Assessment of Small Business Innovation Research Programs*. Washington, DC: US GAO, 1989 (190 pages)
24. US Government Accountability Office. *FEDERAL RESEARCH: Effectiveness of Small Business Innovation Research Program Procedures*. Washington, DC: US GAO, 1987 (50 pages)
25. US Government Accountability Office. *FEDERAL RESEARCH: Small Business Innovation Research Participants Give Program High Marks*. Washington, DC: US GAO, 1987 (60 pages)

Appendix B

KEY NAS RECOMMENDATIONS for DOD on Phase III

The committee's key recommendations by thematic area are highlighted and cross-referenced below.

Encouraging Commercialization

- Encourage Prime Contractors: DoD should consider experimenting with different kinds of incentives to encourage primes to work more effectively—and more often—with SBIR firms to commercialize new technologies. (Recommendations I-A, I-B)
- Brief PEOs: DoD should use new administrative funding in part to develop better briefing materials for PEOs and PCOs. DoD should consider developing a briefing program for all PEOs and PCOs, and should in particular focus for new PEOs and PCOs. (Recommendation I-A)
- Financial Incentives: DoD should encourage its components to experiment with financial incentives for the adoption of SBIR technologies. Even where financial incentives are not available, DoD should consider encouraging components to add explicit targets to prime contracts, in the same way that targets for the participation of small businesses more generally have been added to some contracts. (Recommendation I-C)

Improving Tracking, Data Collection, and Adoption of Best Practices

- Alignment: DoD should address the need for better alignment of data collection, agreed metrics, and utilization of effective evaluation and assessment tools to guide program management. (Recommendation IIIA)
- Annual Report: DoD should provide a single, more comprehensive annual report that could —after appropriate consultations—be used to satisfy the reporting requirements of numerous Congressional sponsors. (Recommendation III-A)
- Data Accuracy: DoD should improve the accuracy of data recorded in the Federal Procurement Data System (FPDS). (Recommendation III-B)

Streamlining Program Management and Agency Mission Objectives

- Streamline Guidance: DoD should revise guidance at the Small Business Administration (SBA), DoD, or component levels that impose unnecessary rigidity on program operations. (Recommendation IV-A)
- Maintain TPOC Continuity: DoD should identify ways to ensure that the knowledge of and enthusiasm of sponsoring Technical Points of Contact (TPOC) is not lost to the project. DoD should consider ways to support ongoing engagement by TPOCs in projects after they have formally handed them on at the end of a rotation. (Recommendation IV-B)
- Protect Data Rights: DoD should work with SBA to explore mechanisms that more effectively protect SBIR data rights. (Recommendation IV-C)
- Disseminating Best Practices: DoD should develop a process for tracking experimentation within the SBIR program. Furthermore, DoD needs to focus attention on the development

of a comprehensive toolset of mechanisms for transferring both formal and informal knowledge about best practices. (Recommendation IV-D)

Improving Contracts and Audits

- Improve Audits: DoD should explore the development of less onerous and more effective auditing procedures for small businesses that can be completed in a timelier manner. (Recommendation V-A)
- Improve Contracting Practices: DoD should provide opportunities for small business concerns (SBC) to raise concerns about contracting practices at the component level. (Recommendation V-B)

APPENDIX C

REAUTHORIZING SBIR: THE CRITICAL IMPORTANCE OF SBIR AND SMALL HIGH TECH FIRMS IN STIMULATING AND STRENGTHENING THE U.S. ECONOMY

Roland Tibbetts
SBIR Program Manager, 1976 -1996
National Science Foundation

The proposed Small Business Innovation Research (SBIR) reauthorizing legislation (H.R. 5819) is of great concern to thousands of small technology-based firms and should be of similar concern to Congress.

The bill would significantly weaken the basic elements of the SBIR program by

- (1) Cutting the number of awards, probably in half. Far larger SBIR awards would be allowed. Companies could receive multiple development awards. Agencies could waive even the higher award caps. Yet the overall size of the program would not be increased. Together, these steps would eliminate funding for a large number of innovative and breakthrough ideas.
- (2) Allowing firms to avoid SBIR's competitive "proof of concept" step and move directly to much larger "development" awards. This is an irresponsible policy for a program that is funding very high-risk ideas. The "proof of concept" requirement, Phase I of SBIR, is necessary to weed out ideas that are not feasible, so that large sums of taxpayer dollars aren't wasted on them.
- (3) Substituting SBIR's R&D funding for private investment capital in the commercialization phase of SBIR (Phase III). Phase III is a market-based reality check. A project that can't attract private-sector funding or mainstream government procurement contracts at that point should not be pushed forward with more R&D funding from SBIR.
- (4) Threatening the integrity of SBIR as a small business program by weakening the safeguards against large business access to SBIR funds.

With each of these changes, the needs of the SBIR Program, and the history of its best practices, call for doing exactly the opposite of what the bill proposes.

What SBIR Is Designed to Do

SBIR was created to address a need that is still critical: to provide funding for some of the best early-stage innovation ideas – ideas that, however promising, are still too high risk for private investors, including venture capital firms. As happened with Microsoft, Apple and hundreds of other firms, technology innovations can mushroom into major products and businesses once private sector investors make a commitment. But they'll only make that commitment once the innovation is well along. In 2005 only 18 percent of all US venture capital invested went to seed and early stage firms while 82 percent went to later stages of development that are lower risk.

The positive role of innovative small technology firms in the economy is evident not only in the dozen or so geographic strongholds of tech entrepreneurship across the nation, but also in the increased productivity of the companies that buy and use the innovations. That is perhaps the most compelling reason to maintain a strong, effective SBIR Program.

SBIR addresses a paradox at the heart of innovation funding: capital is always short until the test results are in. At the idea stage, and even the early development stage, the risks are too great for all but a few investors. But innovations can't get beyond that stage without funding.

There is another paradox, too. The federal government has R&D needs that, for a variety of reasons, will never interest private sector investors. The business models of most investors focus on generating many sales to many customers. When the government is the only buyer, and buys on a one-time or very occasional basis, investors get skittish.

Large government contractors typically aren't interested in such R&D, either. The amounts involved are too small, and most large contractors don't have early-stage R&D capabilities anyway.

So needed innovations in fields like defense, space exploration and homeland security may not occur. The same can be true for innovations in science, especially the health sciences, when the projected patient populations are small or the innovation may only be needed once per person (such as with a vaccine).

SBIR was designed specifically to solve both of these paradoxes:

First, it provides a transparent, competitive and reliable source of early-stage funding for R&D, based entirely on scientific merit. Today, SBIR is the nation's largest source of such funding.

Second, it allows the government itself to obtain needed R&D that the private sector could not otherwise provide.

Why SBIR Has Been Successful

SBIR's success, as recently documented by the major National Research Council / National Academy of Sciences study, is rooted in a number of the program's characteristics.

Drawing on small business scientific talent. SBIR draws on the six million scientists and engineers that are now employed by small firms. That compares to the five million employed by medium-sized and large firms. In fact, small business employs more scientists and engineers than large business, universities, federal labs, or nonprofit organizations. A great many of these small business scientists and engineers are entrepreneurial. To see the entrepreneurial zeal of these technology-based small companies, one has only to look at the extent to which the SBIR Program and the nation's venture capital companies – the only important sources of risk capital for such companies -- are swamped with proposals. Or one can look at patents granted. The SBIR Program accounts for more than 50,000 of them. Currently, it accounts for an average of seven patents a day, which is more than all U.S. universities combined. SBIR has given us Qualcomm, Symantec and dozens of other highly successful technology companies.

Providing the primary source of government R&D funding for small business. Despite their huge numbers of scientists and engineers, and despite their well-documented science and technology successes, small businesses have virtually no access to federal R&D contracts outside of the SBIR Program. According to the National Science Foundation's annual *Science Indicators* report, large firms receive 50.3 percent of federal R&D, universities receive 35.3 percent, non-profits 10 percent, and small businesses just 4.3 percent. SBIR accounts for over half of that 4.3 percent. This is an astonishingly small figure for a nation that expects technological innovation to lead it to new economic heights, but there it is. For small companies, SBIR remains the only game in town, just as it was in 1983, when it began.

Adopting best practices.

In designing the SBIR program, I drew on my own experience as a founder, director and treasurer of Allied Capital here in Washington and as operational VP for two small tech firms, one of which grew to 600 employees before

being sold to TRW. I read about 50 articles on innovation and R&D management. I talked with a few dozen economists and directors of research in large firms and universities. I met with ten or so venture capitalists. I asked them, and others like the DuPont R&D advisory committee, about best practices.

Best practices 1: managing portfolio risk. One thing everyone agreed on was the need to manage R&D portfolio risk through diversification. With the high risk involved in early-stage R&D, there is need to diversify the federal investment by betting on many, rather than fewer, technologies and ideas. (The R&D risk is high not only because of the technical challenges but also because cutting-edge R&D requires expensive equipment. Such R&D is the furthest away in time from the market, and the market may change during that period.)

The size of SBIR awards and thus the dollars at risk per innovation was therefore a major topic. Most of those I worked with in developing SBIR agreed that the technologies involved were such inherently high risks that smaller bets should be made on many projects before making a few larger bets.

Best practices 2: making the largest number of awards possible. Making many smaller awards was not only good risk management practice. Virtually everyone I spoke with argued, and my own 20-year experience as an SBIR Program Manager subsequently confirmed, that the economic payoffs would be higher this way. Many smaller awards mean that more ideas can be evaluated for their potential. More and better choices for further development become available.

Probably a few thousand CEO's of small tech firms have talked with me about SBIR over the years. In general, they liked almost everything about SBIR, except the terrible odds against winning an award. Many no longer submit proposals because of the large investment of time and cost required to prepare a competitive proposal when only one in 15-20 receive the larger Phase II funding. Others still compete because there are almost no alternative sources of such funding.

If there are fewer SBIR awards in the future, not only will fewer technologies get evaluated and funded. Fewer companies will compete, because the odds against winning will get even higher. I believe we have been seeing some of this occur already at the National Institutes of Health, where larger award sizes and fewer awards have been accompanied by a fall off in applicants.

Best practices 3: creating scientific gates and milestones. Another best practice that we adopted for SBIR was the use of science-based gates and milestones before letting projects obtain more funding. Often an idea can be found to be infeasible through the Phase I "proof of concept" process. Other ideas show only a low probability of success. No further expenditures should be made on such technologies.

Unfortunately, some companies always came to us seeking to obtain as much SBIR funding as possible in both Phases I and II. Indeed, during my 20 years as an SBIR program manager, we frequently heard such requests from both the companies and the agency scientists and engineers. However, no proposer was ever allowed to go directly to Phase II. Even if they had done relevant work earlier, we expected Phase I to show further progress. Our strict policy on this point proved to be a good thing. The companies that argued that they had already done the early R&D, and therefore should be able to go directly into Phase II, almost always were unsuccessful when faced with competition. Their requests had been sales ploys. A company's success on earlier projects was no guarantee that its newest idea was competitive.

It is important to always remember that SBIR provides funding for *ideas*, not for *companies*. Competitive, science-based gateways are vital for identifying the best ideas.

Best practices 4: making SBIR a powerful economic development tool.

The past. The roots of SBIR actually go back to Congress' concern over the "Rust-Belt Recession" of the 1970's. Unemployment in Detroit was high, due to the growing sales of new smaller automobiles and machine tools from Japan and Germany. The question was asked whether National Science Foundation research was focused on

economic needs. The result was a new NSF program in applied research called “Research Applied to National Needs” or RANN. For the first time in NSF history, ten percent of a program budget – the RANN program budget -- was set aside for small business. This was the basis for the design and initiation of the Small Business Innovation Program at NSF in 1977. That program grew each year. Its successes led to legislation in 1982 that required all agencies with an extramural R&D budget over \$100 million (today 11 such agencies) to participate. There were some early successes, such as Symantec, that gave us confidence in the basic design of the program.

A little background here: Individuals and small firms are the primary source of category-creating inventions and technical breakthroughs. It is not the successful wagon company that invents the automobile. And it's not the large business that risks upending its business model and its product lines. Small company major economic breakthroughs include the digital computer, microchips, the personal computer, software, the successful cell phone, the internal combustion engine, diesel engine, steam turbines (steamships and railroads), the electric motor, typewriter, telephone, refrigerator, electric transmission, phonograph, incandescent lights, vulcanized rubber, pneumatic tire, photo plate, airplane, motion picture, anesthesia, x-ray MRI; and even earlier the cotton gin, power looms, the sewing machine, the mechanical reaper, and other agricultural machines.

Fast forward a few generations: The great technology-based economic successes of the late 1970's and 1980's -- along the Route 128 corridor near Boston and in Silicon Valley -- as well as the communications and information technology companies that have proliferated since the 1990's, were the result of tens of thousands of scientists and engineers annually opting to start or join small firms. Often this included many of the best and brightest, the most creative, the most entrepreneurial, and the shrewdest risk takers: exactly the qualities that private sector investors, particularly venture capital companies, were looking for.

Think about what happened as Internet-based businesses grew in the 90's. It wasn't all boom and bust. The core of the “dotcom” era was a series of rapid and related breakthroughs in new and emerging technologies. Most of the breakthroughs came from startup companies. Five “dotcom” era startups are now in the “20 Most Widely Held Stocks in the U.S”: Intel (microchips), Microsoft (software), Apple (personal computers), Oracle (relational databases) and Cisco Systems (networks). In 2007 alone, their combined sales were \$166 billion and they employed 221,000. Add to this the thousands of smaller new firms with directly related new products and services, both in the U.S. and worldwide. Overall, the “dotcom” era was probably the largest economic growth breakthrough in history.

The future. Just as we have seen small-business-driven technological breakthroughs throughout our history, we can see them again in the future. There are a whole series of new and emerging technology areas where innovations could have powerful economic impacts. They include:

- global warming and other environmental areas, such as water purity;
- alternative energy and energy conservation;
- all kinds of security -- national, military, commercial, and economic;
- ever-changing communications;
- health care improvements and cost reduction measure;
- disease prevention;
- more effective education;
- improved transportation;
- agricultural challenges addressed;
- nano- and miniaturization technology;
- automated manufacturing; and many more.

All of these needs represent potentially large markets. Today, the technological risks are still too great for most private investors. But the technologies still need funding. SBIR is perfectly situated to explore ideas in these areas.

SBIR funding is necessary because large firms, despite their public relations, do not in fact invest extensively in these areas. Big companies do not take major risks on unproven technologies, except with massive government funding, such as in defense, NASA, and nuclear power. Large firm R&D budgets focus on improving product competitiveness and the processes for fabricating their goods, solving specific problems, and overall growth in sales

and profits. Universities and non-profits also cannot raise high risk money for private sector technological innovations.

The mechanism. Generally only small high-tech firms can raise sufficient amounts of high risk capital to pursue commercially and economically relevant innovations. The key reason for this is that only small companies can realistically offer the promise of their stocks multiplying dozens of times. It's the prospect of that exponential growth in stock value which makes the rewards worth the risks to investors.

When SBIR is guided well, it fosters breakthroughs by such small companies. These breakthroughs get the technologies to the point where they can deliver great economic benefits.

At that point, when the scientific evidence is starting to come in, innovations attract not only additional VC investments, but also investments by individual "angels," mutual funds, insurance companies, endowment funds, and others. Longer-term bank lending becomes possible. All of that financing lays the foundation for stock offerings. Then these stock offerings attract more capital. This business growth, plus the revenues from subsequent product sales and spin-offs, is the money that stimulates the economy.

Successful SBIR-funded technologies can thus generate many multiples of their federal investments, often in a much shorter time frame than traditional investments.

Again, the key steps are: casting the net as widely as possible, attracting entrepreneurial individuals and small companies, insisting on technical feasibility in a competitive and transparent environment, and then moving to a commercialization phase that requires private sector investment equaling or exceeding the federal investment.

What To Avoid in the Future

Avoid needless disruptions to the SBIR Program.

SBIR has proven itself over 25 years. It is known and understood by hundreds of thousands of scientists and engineers, most of them in small firms, but many of them also in the 11 participating federal R&D agencies, in universities, in venture capital companies, in larger firms, in Congress and in other parts of government, including the 50 state governments and a number of foreign countries. SBIR is successful. The National Research Council / National Academy of Sciences comprehensive assessment of the SBIR program last year confirmed the effectiveness of SBIR along the broad general lines that it exists today. Other studies, too, such as those by GAO and by Professor Josh Lerner of Harvard Business School have been highly favorable. No reputable independent study in the past 25 years has called for major changes in SBIR.

Rather than implementing the constructive recommendations offered by the NRC/NAS study, the House-passed bill (H.R. 5819) mandates a vast upheaval in SBIR. Such a re-write of the program would make the NRC/NAS changes far more difficult to execute. How, for example, can the agency Advisory Committees that the study recommends do their work when agencies in the program would be spending the next few years redrafting all their SBIR program rules and retraining all their personnel?

Worse, the extensive reworking of the program would confuse everyone who uses the program – all those people in the small firms, universities, VC firms, large companies, state programs, and Congress that tap into the program. It would lead to lengthy award delays as the program is re-tooled in one agency after another.

Small technology-based companies will suspect, probably correctly, that all these changes will self-destruct and that SBIR will have to be re-tooled again in a few more years. So they'll hold back and shift to other activities. This will intensify the upheaval.

And for what? H.R. 5819 is designed to sharply increase the amount of SBIR funding that goes to maybe half the current number of companies, and to explore perhaps half as many promising ideas. This bill is more like special interest legislation than national interest legislation.

All available evidence suggests the major changes proposed by H.R. 5819 would be highly detrimental to SBIR's mission and effectiveness. Congress has never examined the full implications of these changes and should not embark on them without doing so. Unraveling SBIR now, at a time when the nation urgently needs the economic boost that the program can provide, would be a national tragedy.

Avoid excessive increases in award sizes.

SBIR is not intended to pay for the entire R&D costs required for every project. Some ideas could require tens of millions and even hundreds of millions of dollars ultimately. The purpose of SBIR, as stated earlier, is to lower the R&D risk to the levels that can attract private investment.

H.R. 5819 triples the Phase II award cap, making it \$2.2 million. The bill would also allow agencies to make multiple Phase II awards, and even to waive the \$2.2 million cap. One effect of doing all this will be to divert tremendous amounts of energy to negotiations about how much of an award each project will get. It is difficult, unwise and unfair to most small firms and program officers to have to judge how much to request or award over such a vast range of dollars. Determining the award size will become a time consuming negotiation, complicated by questions of fairness to other participants. Those other applicants often will be equally qualified, and their projects will always be in need of more money. Ultimately, the size of many awards will end up being decided by salesmanship and personal connections, not by science. This will be a very corrosive influence on SBIR.

Just as important, larger awards reduce the number of ideas that can be funded. An \$8 million Phase II award, if cut back to \$1 million, could free up funding for seven other \$1 million Phase II awards. Or, that \$7 million difference could fund 35 "proofs of concept" ideas at \$200,000 each. Similarly, a \$1 million Phase I "proof of concept" award eliminates the possibility of four others at \$200,000 each. We need to remember that research on innovative ideas at the idea stage is often primarily a one person job.

Avoid bypassing Phase I.

The foundation of the SBIR program is competition and openness. Take away the need to prove an innovation against other worthy innovations, in an above-board competition, and SBIR will degenerate into salesmanship and influence-peddling. Its genuine scientific accomplishments will diminish, year by year. If companies are allowed to apply directly for Phase II funding, SBIR will become little more than a traditional procurement program, not an innovation program. Phase I must not be by-passed; it is the seed bed of the entire SBIR Program.

Avoid using SBIR funds for commercialization.

If an SBIR firm cannot obtain a commercialization commitment from private sources, or from federal agencies (using non-SBIR funds), that at least equals the SBIR investment in an innovation, then SBIR's involvement in that innovation should end. The far more pressing public need is to fund additional recommended early-stage innovations, not to keep projects afloat that cannot attract financial support from the government or the private sector.

If SBIR award levels rise moderately to keep pace with inflation, an approach that the NAS/NAS study recommended, and that I agree with, then the SBIR investment in an early-stage technology idea should not exceed \$1.2 million (\$200,000 for Phase I and \$1 million for Phase II). An innovation that cannot match or exceed that \$1.2 million in the commercialization phase (Phase III) of SBIR, using non-SBIR funding, should not be rewarded with more SBIR funding.

In other words, no SBIR funds should be spent for Phase III. SBIR dollars are urgently needed to support additional promising ideas and to keep the high-risk SBIR portfolio diversified. If an agency feels that an innovation deserves financial support beyond a single Phase II award, then it can provide this further investment with non-SBIR funding. An agency that lacks that much faith in an innovation developed under its own guidance should not expect the taxpayers, via the SBIR program, to supply that faith.

Avoid steps that would diminish the small business character of the program.

Large companies view innovation much differently than small companies. A large company wants to protect its product lines and its customer bases. It looks for incremental innovations that make those existing products a little better and a little cheaper to produce. It looks for new products that are familiar and comfortable. For large companies, “re-defining” types of innovations are frightening. They upset settled ways of doing business. The nation needs both incremental innovations and quantum-leap innovations, but right now and for the foreseeable economic future, it needs those out-sized innovations the most. SBIR can deliver sweeping innovations, but to do so it must avoid taking on the coloration and biases of large companies.

Even if there were only a modest national need for “out-of-the-box” innovations, there would still be a powerful need for SBIR, because nothing else in the country, and certainly nothing else in the federal government, supports early-stage innovation by small companies. Despite having more scientists and engineers than large business, universities, nonprofit organizations, or the federal government itself, small business gets only 4.3 percent of federal R&D dollars. And SBIR accounts for over half of that. Those other institutions draw more than 90% of federal R&D dollars. And here’s the rub: there aren’t any other sources of that early-stage innovation funding for small business. Capital for small business innovation research is so short in the United States that SBIR rapidly became, and remains, the largest source of it.

I come from a long and deep background in venture capital and I am a great believer in it. SBIR won’t be nearly as successful unless VC’s can participate in it. But VC’s that directly or indirectly report back to large companies shouldn’t be in Phase I or Phase II of the SBIR program. Nor should VC’s that are big companies themselves.

VC’s that are large firms in fact or spirit will inevitably focus on companies more than innovations. That’s fine in Phase III, but not earlier. If big VC’s get into Phase I and Phase II, they will push for bigger bets on fewer companies. They will want to shift SBIR funding away from high-risk Phase I ideas and toward Phase II development, which is closer to market and therefore less risky for them. Sooner or later, they will back SBIR funding for Phase III, which will also offset some of their risk. And the kind of innovations they ultimately favor will be those that big companies favor – safer and more familiar ones, incremental rather than quantum leap. SBIR can do much more than this. SBIR’s current restrictions on big VC’s are therefore wise. By contrast, H.R. 5819’s approach to this issue is dangerously unwise.

What to Do in the Future

We must meet the competitive challenge.

We are currently the world leader in small high tech firms, in venture capital, and in basic research. These strengths are critical to our future economic growth. But others are catching up.

China, Japan, and Western Europe are rapidly increasing their investment in all three areas.

In a recent Harvard Business School Bulletin article, Jim Breyer, founder of Accel Partners and past chairman of NVCA, stated that there are now 6,000 venture-backed companies in Beijing alone! Accel has recently closed its second Chinese venture fund for \$510 million. “Many of the very best [VC] firms in Europe and in Asia are affiliated with firms here in the United States,” he notes.

The UK has just announced a new innovation program. Dozens of countries, notably including those that came here to study the SBIR program, are now increasing their investment in innovations by small technology firms, venture capital development, business schools, and basic research.

Seeking out technology breakthroughs should be a far more important objective of government R&D than ever before. The single most important initiative we could mount would be to increase the SBIR to 5 percent of extramural federal R&D in a series of steps.

Such an initiative would be opposed by the current recipients of over 90% of federal R&D, like large companies, universities, nonprofits, and the organizations representing them, but these were the same groups that opposed the creation of SBIR in the first place and have opposed every modest increase in the program ever since. The NAS/NAS report clearly shows that SBIR can successfully deploy additional funding.

Think what the Internet and the telecommunications revolution have done for our economy. This was accomplished primarily by small, high-tech firms with major VC support. Now the investment risk is even higher for initial funding. Seed-stage and early-stage VC support has plummeted. If there are only rare investments at the idea stage, there will be no storehouse of proven ideas ready for later development funding. As bad as our economic problems are today, with budget deficits, trade deficits, a shaky dollar, and so on, where would our tax revenues, our productivity, and our technology leadership be today if we had not had that technological revolution?

The SBIR program should be carefully strengthened.

The following are my recommendations to Congress about some specific issues in the SBIR reauthorization:

1. Small firms with 500 or fewer employees should remain eligible for SBIR awards as long as one or more large firms, including large venture capital firms, do not acquire a majority of ownership. Broad eligibility is necessary to identify and accelerate those innovations that can lead to technical and market success and superior economic growth. The nation needs these potentially fast-growing firms far more than those that do not grow. Outside investors can, and often must, obtain more than 50 percent of the stock to protect their investment. That should be acceptable in SBIR as long as these investors are individuals and as long as the companies that they represent are small, as is required today. However, these investors must not be controlled, directly or indirectly, by large businesses. SBIR was created to provide small companies with innovation funding. The program remains too small to allow funds to be siphoned off by large companies, which already receive over half of federal R&D.

2. There should be a set review period for Phase I results, as well as a set period for Phase II proposals, based upon Phase I results. Some firms are obtaining early reviews, before other firms. That is not fair to others and should not be allowed.

3. Agencies should not allow companies to extend the break between Phase I and II except for illness or similar reasons. On the other hand, agencies themselves sometimes need to extend the breaks between Phase I and Phase II due to budgetary issues. This should be allowed when truly necessary, despite justifiable company concerns about cash flow. In the end, SBIR's purpose is to fund ideas, not to support a company's financial picture.

4. SBA is still the proper organization to manage SBIR, not the Department of Commerce.

Criticism of SBA over the years has been due in great part to significant understaffing by SBA management that should not have been allowed. SBA's SBIR staff is less than half the level any evaluator would recommend. When SBIR was a much smaller program, SBA had eleven staff members assigned to it. Today, there are only four. This headquarters staffing crisis is responsible for many complaints. But some agencies, such as DOE, also grossly under-staff SBIR. This leads to reductions in the number of award topics, in order to reduce agency workloads, and to the temptation to use jumbo awards, far in excess of the program's legal guidelines. I suggest some kind of a brake on agency proposal cutbacks and stricter enforcement of the caps.

5. Breakthroughs occur in new and emerging areas that cannot be predicted. I suggest that all agencies should allow innovation proposals in all areas that are relevant to their R&D programs. This openness to innovation proposals should be outlined in agency solicitations. Many agencies think in terms of relatively few topic areas. The original interagency innovation program essentially opened entire agency R&D programs for proposals. Solicitations now have become far more restrictive, which cuts against the national economic interest. Breakthrough ideas that are relevant to an aspect of an agency's R&D should be invited.

6. The commercial results of SBIR need to be strengthened. Awards should not be made by agencies solely on the basis of technical merit and without any consideration being given to downstream commercial potential. Unfortunately, some SBIR firms favor agency approaches that minimize commercial potential, because the firms are

really only interested in having their R&D ideas funded, not in commercializing the results. I suggest that proposers and agencies require a commercialization plan in both phases with a more detailed and specific plan in Phase II. Reviewers should consider both technical and commercial merit in their recommendations. This would include the proposer's plan for obtaining non-SBIR funding for Phase III. I would also support an SBIR funding cutoff for firms that win many Phase I awards without advancing any of them to Phase II, along the lines of what H.R. 5819 proposes. SBIR was specifically designed to force the small firm to focus on innovation, technology breakthroughs, and commercialization for their economic benefits to the nation. Defense and NASA should also seek SBIR projects that have potential Phase III follow-on funding from non-SBIR sources. SBIR funds should not be used for mainstream procurement.

7. Award sizes should be increased in size in this reauthorization, to keep pace with inflation since the last adjustment in 1992. I recommend increasing Phase I awards to a \$200,000 cap and Phase II awards to a \$1 million cap. These are both substantial amounts of risk capital to explore technical feasibility. SBIR is not intended to build up the capabilities of a company, based on considerations like its other projects, but to explore the promise of the specific idea proposed. And SBIR's budget must fund as many ideas as possible.

8. The SBIR set-aside should doubled as soon as possible. SBIR is a major national asset. It accelerates technological innovation and technology breakthroughs. It helps attract private sector investment to the most promising innovations. It increases economic growth. We need to reinvigorate the economy, and we need more technological innovation. Yet despite the history of small company innovations, notably relating to the Internet and to telecom, and despite the fact that there are six million scientists and engineers employed by small firms, over half of the government's external R&D, (50.3 percent) goes to large firms, 35.3 percent to universities, and 10 percent goes to non-profit institutions. Small business firms received only that 4.3 percent. (2005 figures from NSF.) Even a modest increase in the award caps, such as I recommend, will diminish the number of SBIR awards and companies unless Congress takes the sensible step that it took last time award steps were increased – increasing the program size by a large enough amount to offset the larger awards. Shrinking SBIR would be exactly the wrong thing for Congress to do at this point in our economic history.

Finally, I must say that as I review the SBIR recommendations made to Congress by the Biotechnology Industry Organization (BIO) and by my former VC colleagues in the National Venture Capital Association (NVCA), I am deeply troubled. It is mainly these two organizations that are calling for the far-reaching changes in the program. Many of the changes they are proposing would, in my judgment, significantly and perhaps irreparably harm the program. I can understand the desire of any organization to represent its members and prospective members, but this is a case when we must think of the broader national interest.

Without open and competitive early R&D efforts, spread as widely as possible, innovations will never reach the level of maturity that can draw in venture capital or other follow-on funding. BIO and especially NVCA should understand this. The need is to explore as many ideas as possible and lower the risk as much as possible to attract follow-on Phase III investment. There will be no shortage of great new innovations to invest in if we allow SBIR to do its work in supporting truly innovative small companies by objectively assessing which ideas are wheat and which ones chaff.

Congress supported the current SBIR objectives with the first SBIR legislation in 1982. The program is working well, but can be improved, as stated in the comprehensive NRC/NAS report. SBIR can stimulate thousands of high-risk, economically promising ideas like no other program. Given the opportunity to work as designed, and as proven, SBIR can make a major contribution to the national economic welfare.

May 28, 2008

Appendix D

SBTC White Paper

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Small Business Technology Council of the National Small Business Association
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Recommendations for Implementing DOD SBIR Provisions from the National Defense Authorization Act of 2012

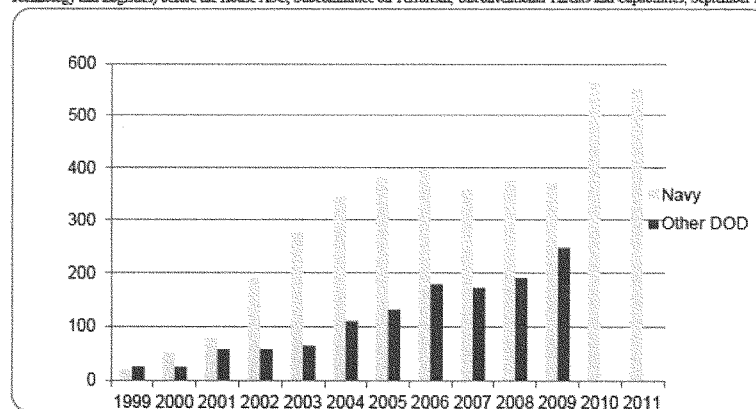
The National Defense Authorization Act of 2012 contains the SBIR/STTR reauthorization provisions [Appendix I] and includes major new language that indicates strong Congressional intent to improve the process of rapidly transitioning SBIR/STTR (hereafter SBIR) innovative technologies for insertion into DOD fielded systems and platforms. The law specifically states:

“Sec. 5108: To the greatest extent practicable, Federal agencies and Federal prime contractors shall issue Phase III awards relating to technology, including sole source awards, to the SBIR and STTR award recipients that developed the technology.” [Emphasis added.] [Phase III is further defined as, see Sec. 5125 – “for work that derives from, extends, or completes efforts made under prior funding agreements under the SBIR program.”]

This provision is the strongest statement to date that Congress is serious that agencies and prime contractors issue Phase III awards to SBIR producers of technology - a mandate, - no longer merely an issue of discretion. Congress had good reason for its action since the DOD SBIR Program has over \$21 billion in cumulative commercialization (i.e., investment in technology maturation) reported by over 7,500 projects since the inception of the Program. In recent years, OSD Office of Small Business Programs has offered various commercialization estimates ranging from 50% to 70%, but the more important insertion metric – which is unknown – may be much lower. This suggests that there is serious undercapitalization of the government’s investment in the technology successes of Phase II and that the government needs to take greater advantage of its SBIR investments. As a rough comparative indicator the direct SBIR investment over the 2000-2009 periods was \$9.6 billion.¹ Regardless of transparency, one participant in Congressional hearings noted that “SBIR transition is horrible”²

In fact, government-issued Phase III contract investments have increased annually since 1999 (2007-2009 excepted), with the Navy alone breaching the \$500M ceiling for the past two years, and the DOD-wide figure climbing close to \$1B in 2011 absent specific “other DOD” totals. Industry figures are unknown but

¹ [Testimony of Ms. Linda Oliver, Acting Director, Office of Small Business Programs, Office of the Under Secretary of Defense (Acquisition, Technology and Logistics) before the House ASC, Subcommittee on Terrorism, Unconventional Threats and Capabilities, September 29, 2010.]



² House Armed Services Committee Report 3-19-2012 Panel on Business Challenges in the Defense Industry, page 86.

may approximate just 10% of government Phase III investments.

Congress ultimately recognized there is more potential and benefit to the government if more SBIR innovations make it into fielded systems or programs of record. Congress recognized that more needed to be done to transition SBIR technology into Federal projects and both the Armed Services Committees and the Small Business Committees dramatically strengthened the SBIR Reauthorization Act to require improved transition of SBIR innovations.

Congress adopted an interesting approach to stimulating Phase III awards by authorizing important incentives, goaling and reporting requirements for DOD departments, DOD Program Managers and PEO's, and for DOD Prime Contractors. The new law builds on and expands Section 252 of the FY 2007 National Defense Authorization Act, PL 109-163. This has been a major goal of the Small Business Technology Council, SBTC,³ for years.⁴

These statutory provisions are provided in bold print and discussed here, followed by the recommendations of the Small Business Technology Council of the National Small Business Association (SBTC) to implement them. Concerning SBIR technology insertion goals, the law states:⁵

Sec. 5122: Commercialization Readiness Program at Department of Defense:

(5) INSERTION INCENTIVES.—For any contract with a value of not less than \$100,000,000 the Secretary of Defense is authorized to—

(A) establish goals for the transition of Phase III technologies in subcontracting plans; and

The Secretary currently provides goals for subcontracting with small business, HubZones and minority owned business. DOD and the Navy have recently strengthened and increased their small business goals. (See recent DOD efforts subsequent) This new provision authorizes the Secretary to establish subcontracting goals for transitioning SBIR innovations for contracts of over \$100 million. (Hereafter "major" primes or "major" contractors) This provision requires the DOD to establish specific subcontracting goals for SBIR transitions for each major contract. These provisions require that in all new contracts or significant modifications of existing contracts that the DOD provide a provision in all major solicitations require subcontracting plans that state clearly how the contractor would include SBIR technology in the project, what specific technology the company planned on using in the project and the dollar amount to be spent on SBIR innovations. The use of SBIR technology should be significant evaluation criteria for the proposals. The provision also provides for setting goals for program managers at DOD.

Recommendation: SBTC believes that the specific SBIR subcontracting goal should be 5% of major contract amounts.

(B) require a prime contractor on such a contract to report the number and dollar amount of contracts entered into by that prime contractor for Phase III SBIR or STTR projects.

Agencies are required in all future contracts or modification of existing contracts that each major prime contractor to report the number of contracts and dollar amounts that result from SBIR.

³ The Small Business Technology Council is the largest small business technology organization representing a diverse range of industries and is the technology council of the National Small Business Association, America's oldest small business organization.

⁴ Prior recommendations for improving the SBIR and Phase III programs at DoD by the SBTC can be found here:

http://www.nsba.biz/docs/sbir_dod_phase_iii_recommendations.pdf http://www.nsba.biz/docs/dod_sbir_recommendations.pdf

⁵ The provisions of the law are bolded. SBTC's comments are in italics.

Recommendation: DOD should develop a matrix for evaluating prime contractors transitioning SBIR technology. DOD should also require qualified major prime contractors to develop amended subcontracting plans to indicate how they will meet the goals for transitioning SBIR innovations.

(6) GOAL FOR SBIR AND STTR TECHNOLOGY INSERTION.—The Secretary of Defense shall—

- (A) set a goal to increase the number of Phase II SBIR contracts and the number of Phase II STTR contracts awarded by the Secretary that lead to technology transition into programs of record or fielded systems;

This provision requires that the Secretary set goals for DOD and its Program Managers and senior acquisition personnel for transitioning SBIR technology.

Recommendation: DOD should set a goal of 5% of all non-SBIR RDT&E funding be spent on SBIR innovations for Phase III follow-ons. This would include funding by primes as well as direct funding by DOD, and its University Affiliated Research Center and FFRDCs. If a component of the DOD does not meet its goal then the funds should be transferred to components that exceed their goal.

II. Concerning technology transition reporting, the law states:

- (C) [The Secretary of Defense shall—] submit to the Administrator for inclusion in the annual report under subsection (b)(7)—
- (i) the number and percentage of Phase II SBIR and STTR contracts awarded by the Secretary that led to technology transition into programs of record or fielded systems;
 - (ii) information on the status of each project that received funding through the Commercialization Readiness Program and efforts to transition those projects into programs of record or fielded systems; and
 - (iii) a description of each incentive that has been used by the Secretary under subparagraph (B) and the effectiveness of that incentive with respect to meeting the goal under subparagraph (A)

These provisions are designed to make sure that the DOD is evaluating, monitoring and improving the CPR and various incentives that DOD is using to improve utilization of SBIR technology. These provisions require that primes, SBIR companies and agency personnel report each SBIR project that has technology transitioned.

This provision also requires DOD to report each specific incentive used and its effectiveness by DOD and its component organizations to meet the goal for transitioning SBIR technology into programs of record.

Recommendation: The Secretary and the agencies should develop a matrix to evaluate each Commercialization Readiness Project (CRP), and report each SBIR technology that is transitioned.

III. Regarding incentives the law also requires the Secretary of Defense to:

- (B) use incentives in effect on the date of enactment of the SBIR/STTR Reauthorization Act of 2011, or create new incentives, to encourage agency program managers and prime contractors to meet the goal

We recognize the importance of these statutory incentives. Only if proper incentives are provided to encourage senior acquisition personnel and prime contractors, will the Congressional mandated goal of transitioning SBIR innovations be met. The law requires that DOD create or designate incentives and

report on how successful the particular incentive is working to achieve the goal of SBIR technology insertion. As far back as 2005, the DOD Manager's Guide to Technology Transition presented a comprehensive list and description of incentives to entities and individuals including cash and non-cash incentives and cost-based incentives.

Recommendation: We believe that the goal of delivering to the war fighter new technology faster and more efficiently is critical. These incentives for transitioning SBIR innovations should be bold and significant.

These provisions require that for all new major solicitations, that there be a provision requiring that all proposals include a requirement that the company submitting the proposal submit a subcontracting plan that states clearly how the contractor would include SBIR technology in the project and what specific technology the company planned on using in the project.

Recommendation: DOD should set goals for each new prime contract. We believe the goal should be 5% of the contract value. The use of SBIR innovations should be significant evaluation criteria for all proposals and contracts.

In order for the law to be successful it requires that the Program Managers and PEOs implement the new provisions. The law specifically provides for incentives to encourage the program managers to meet the goals.

Recommendation: These incentives should be at least \$5,000 for each Program Manager or PEO that meets the Secretary's goal for SBIR technology insertion (these funds could come from the 3% administrative fees provided in the law.) In addition, incentives should include step-grade or band promotions available to persons of SBIR insertion achievement other than PMs or acquisition executives. The use of SBIR innovations by the program managers and senior acquisition personnel should also be evaluated on their use of SBIR innovations in their programs.

The Assistant Secretary for the Navy (Research, Development and Acquisition) issued a memorandum dated July 19, 2011 that provided that: "Accountability: Senior leadership at the Flag, General Officer and SES level that influence acquisitions will have performance standards established to demonstrate support for Department of the Navy small business mission"

Recommendations: 1) This memorandum should be amended to include specifically SBIR technology transition. 2) Other components of the DOD should issue similar directives to its Senior Acquisition personnel. 3) There should also be a provision for the PM to report on cost savings that result from the use of SBIR technology. 4) Incentives should be provided for PM who use SBIR technology that results in cost saving. 5) DOD should set goals for each PM and PM should be evaluated on the amount and number of SBIR innovations that are inserted in the PM projects.

IV. The law also requires commercialization reporting at SEC. 5138:

(kk) PHASE III REPORTING.—The annual SBIR or STTR report to Congress by the Administration under subsection (b)(7) shall include, for each Phase III award—

(1) the name of the agency or component of the agency or the non-Federal source of capital making the Phase III award;

- (2) the name of the small business concern or individual receiving the Phase III award; and
- (3) the dollar amount of the Phase III award.

These provisions require DOD to monitor which CRP project, the number of Phase III awards and which incentives are effective in transitioning SBIR technology. This requires that each agency, SBIR company and prime contractor report on all Phase III activities.

Recommendation: SBTC believes that DOD and each contractor should report when each new phase III subcontract is issued.

These statutory provisions are the strongest Congressional language requiring the DOD and its major Prime Contractors to take significant and meaningful steps to transition SBIR technology into fielded systems and programs of records. This new law builds on prior efforts of Congress and DOD to transition technology into fielded systems.

HISTORY

The strong language that emerged in the 2012 SBIR Reauthorization Act evolved, it can be argued, from various prior efforts by Congress and Federal agencies to work with and develop a viable SBIR program. While there have been some false starts, there has always been a forward thrust. A review of that history of congressional and agency initiatives is valuable background for understanding the significance of this most recent congressional enactment.

Past Congressional efforts on DOD technology transition

Since 1996, there has been a continuous pattern of hearings, proposals and programs before Congress concerning transitioning technology at DOD, especially SBIR technology. DOD has launched a number of Congressionally-sanctioned technology transition programs not focusing on SBIR such as Defense Acquisition Challenge, Technology Transition Initiative, Quick Reaction Fund and Rapid Technology Transition. DOD has almost 50 external funding programs with 20 of those programs designed to rapidly transition technology. Unfortunately, none of these programs have been as successful as Congress or DOD would have hoped. None of these 20 programs have focused on SBIR technology.

Congress has also enacted a number of SBIR specific programs: Over the past decade Congress recognized the value of rapid transition of SBIR innovations to the war fighters and provided specific SBIR-related programs supporting such efforts. These include:

- ☐ The Commercialization Pilot Program (Section 252 of the National Defense Authorization Act of 2006, PL 109-163), which was a successful SBIR-related pilot program and resulted in the language in the new law requiring commercialization programs at other agencies [Sec. 5123].
- ☐ PL 111-84, the FY2010 National Defense Authorization Act, extended the DOD SBIR Program in the absence of Congressional reauthorization of SBIR for all agencies.
- ☐ Public Law 111-383, The "Ike Skelton National Defense Authorization Act for Fiscal Year 2011" provided the Defense Research and Development Rapid Innovation Program [Sec. 1073] "to accelerate the fielding of technologies developed pursuant to Phase II SBIR projects ... to rapidly insert such products directly in support of primarily major defense acquisition programs."
- ☐ [House Report 112-331 House Defense Appropriations Subcommittee creates 200 million to transition technology to be spent on SBIR and other technology transition. http://thomas.loc.gov/cgi-bin/cpquery/?&dbname=cp112&sid=cp1126p9Uf&refer=&r_n=hr331.112&item=&&set=TOC_46776&]
- ☐ In addition to these laws, the House Armed Services Committee has created a special panel on Challenges to Doing Business with the Department of Defense. This panel has held a number of

hearings around the country. This Panel issued its report on March 19, 2012. Much of this report deals with SBIR. The Panels hearings began with testimony on the importance of the SBIR Program to DOD. In a hearing before this Panel on September 29, 2010 DOD reported its SBIR commercialization rate:

“the DOD SBIR Program has over \$21 billion in cumulative commercialization reported by over 7,500 projects since the inception of the Program. As a rough comparative indicator the direct SBIR investment over the 2000-2009 period was \$9.6 billion.”⁶

Congress recognized that not enough had been done to transition SBIR technology. The Armed Services Committees and the Small Business Committees dramatically strengthened the SBIR Reauthorization ACT to require better transitioning of SBIR technology.

THE PROVISIONS IN THE 2012 DEFENSE AUTHORIZATION ACT ON SBIR ARE THE STRONGEST PROVISIONS PASSED BY CONGRESS ON TECHNOLOGY TRANSITION AND SHOULD BE IMPLEMENTED BY DOD QUICKLY AND EFFECTIVELY.

Congress has taken many steps in the past to strengthen Federal agency utilization of innovations emerging from the SBIR program. The government's investment in R&D needs to be transformed into products of value that advance agency objectives. With the enactment of the 2012 Defense Authorization Act on SBIR Congress has made its intentions very clear that agencies need to issue more Phase III SBIR awards. It has proposed several innovative steps it wants agencies to adopt, steps which agencies cannot ignore.

Past DOD Efforts

Top DOD leadership and many agency leaders have understood the value of the SBIR programs in providing advanced technology to the war fighters faster than many traditional acquisition strategies. Yet, more can be done to improve the process.

Examples of past DOD top leadership initiatives towards improved SBIR transition and insertion include:

- ☐ Jacques Gansler, USD (A&T) wrote in his 24 February 1998 memo, *SBIR Program*, “I am requesting that you ... Establish quantifiable, performance-based metrics of SBIR program outcomes in phase III ...”
- ☐ Dr. James Finley, DUSD-Acq. & Tech., in late 2006 declared his intention to lead improvement of DOD technology transition overall. “My duties,” he said, “are to support the Secretary ... with matters relating to acquisition and the integration of technology. I have three major goals: One to reduce cycle time; two, to increase competitiveness; and three to broaden communications.”⁴ [Dr. Finley received the Tibbitt's award in 2007 for his leadership.]
- ☐ DOD component SBIR programs – led by the Navy – have pushed down the technology transition path, securing over \$21 billion in cumulative commercialization reported by over 7,500 projects since the inception of the Program. As a rough comparative indicator the direct SBIR investment over the 2000-2009 periods was \$9.6 billion.”⁷ In 2008 the Navy issued a report on their successes, entitled, *A Report on the Navy SBIR Program: Best Practices, Roadblocks and Recommendations for Technology Transition*,⁵ in which they reported:
 “As a whole, the Navy SBIR program has the highest transition success across the DOD and has that honor because of the dedication of the people that are involved. Nevertheless, we must continually study our processes and techniques in our desire to increase Phase III transitions and value to the

⁶ [Testimony of Ms. Linda Oliver, Acting Director, Office of Small Business Programs, Office of the Under Secretary of Defense (Acquisition, Technology and Logistics) before the House ASC, Subcommittee on Terrorism, Unconventional Threats and Capabilities, September 29, 2010.]

Fleet.” [Page IV.]

- ☐ DOD has issued guidelines to agency program managers to improve the process of incorporation of SBIR innovations into fielded programs such as:
 - ☐ *Small Business Innovation Research, Small Business Technology Transfer, Program Manager Checklist*, v02-04/29/11
 - ☐ *DOD Program Manager Tools, Using SBIR for Risk mitigation*, which states:

“SBIR can be employed during the Technology Development Phase for technology risk reduction, competitive prototyping and the identification of the appropriate set of technologies to be integrated into a full system. One way to derive maximum value from SBIR is to include specific award fee clauses in contract language to target and reward incorporation of SBIR technologies by prime contractors. This following is an example of appropriate language to encourage use of SBIR technology:

“Two percent of the total award fee pool shall be dedicated to an evaluation of success in applying technology from SBIR projects.”DOD component SBIR programs – led by the Navy – have pushed down the technology transition path, securing \$2.8B in Phase III contracts since 2005².”

Recent DOD Efforts

Within the past year DOD has issued a number of Memorandums and efforts supporting increased use of small business.

1. July 19, 2011 Assistant Secretary of Navy, Sean J. Stackley
Subject: Increased Use of Small Business Concerns includes specific SBIR provisions
[\[https://acquisition.navy.mil/rda/content/view/full/8550\]](https://acquisition.navy.mil/rda/content/view/full/8550)
2. August 5, 2011 Under Secretary of the Navy, Robert O. Work Subject: Maximizing Department of the Navy (DON) Opportunities for Small Business
[\[https://acquisition.navy.mil/rda/content/view/full/8545\]](https://acquisition.navy.mil/rda/content/view/full/8545)
3. February 10, 2012 Deputy Secretary of Defense, Ashton B. Carter, Memorandum Subject: Advancing Small Business Contracting Goals in FY 2012
[\[http://contractingacademy.gatech.edu/wp-content/uploads/2012/02/Advancing-Small-Business-Contracting-Goals-in-FY12-Ashton-Carter-02.10.2012.pdf\]](http://contractingacademy.gatech.edu/wp-content/uploads/2012/02/Advancing-Small-Business-Contracting-Goals-in-FY12-Ashton-Carter-02.10.2012.pdf)
4. March 13, 2012 USD (AT&L) Under Secretary of Defense for Acquisition, Technology and Logistics, Frank Kendall, Subject: 10 point increase in prime contract and dollars going to small business
5. April 10, 2012 Assistant Secretary of Navy (Acquisition, Technology & Logistics, Principal Civilian Deputy, and James E. Thomsen Subject: Improving Small Business and Competition Opportunities in Services Acquisitions includes specific SBIR provisions.
[\[http://www.nsba.biz/docs/small_business_memo_4-10-12.pdf\]](http://www.nsba.biz/docs/small_business_memo_4-10-12.pdf)
6. The Air Force recently held a conference with its major primes that focused on SBIR transition best practices.

The thrust of these efforts is to put Small Business First. The thrust of the new SBIR provisions in the law is to make small business and SBIR technology a critical component of DOD decision making. These new Small Business memorandums provide guidance and direction impacting all small business procurement. These memos will certainly help many small businesses. The SBIR provisions in the 2012 National Defense Authorization Act require new initiatives on transitioning SBIR technology that should build on these recent efforts.

SBTC Recommendations

With the approval of the Congressional Senate and House Armed Services Committees, Small Business and Entrepreneurship Committees and House Science Committee the 2012 National Defense Authorization Act provides important incentives, goaling and reporting requirements for DOD departments, DOD Program Managers and PEO's, and for DOD Prime Contractors. SBTC believes that DOD should take this opportunity to dramatically improve technology transition and technology insertion. Specifically SBTC recommends:

1. SBTC believes that the Secretary should set a goal of 5% of all non-SBIR RDT&E funding for SBIR innovations for Phase III follow-ons. These goals should flow down to the PEO and PM levels. This would include funding by primes as well as direct funding by DOD, and its University Affiliated Research Center and FFRDCs. If a component of the DOD does not meet its goal then the funds should be transferred to components that exceed their goal.
2. SBTC believes that DOD should establish significant incentives to encourage Program Managers and PEO to meet the SBIR transitioning goals and to reward senior acquisition personnel for transiting SBIR innovations into programs of record. These incentives should be at least \$5,000 for each Program Manager or PEO that meets the Secretary's goal for SBIR/STTR technology insertion.
3. Cash and non-cash incentives (including promotions and other professional recognitions of merit) for utilizing SBIR innovations should be created for DOD senior leadership personnel at Flag, General Officer and SES level that influence acquisitions (See Navy July 19, 2011 memorandum), and separately for lower-level acquisition personnel.
4. DOD senior leadership personnel at Flag, General Officer and SES level that influence acquisitions should include meeting SBIR transition goals in their performance evaluations. (See Navy July 19, 2011 memorandum that provides "Accountability: Senior leadership at the Flag, General Officer and SES level that influence acquisitions will have performance standards established to demonstrate support for Department of the Navy small business mission"). The Navy memorandum should be amended to include SBIR transition goals and other components should issue similar memorandums.
5. The law requires the DOD establish specific subcontracting goals for SBIR transitions for each major contract. SBTC believes that the Secretary should set the goal of at least 5% of all contracts in excess of 100 million dollars should be used to transition SBIR innovations.
6. There should be a specific requirement in all major solicitations that companies submitting a proposal include a specific subcontracting plan that state clearly how the contractor would include SBIR technology in the project, what specific technology the company planned on using in the project and the dollar amount to be spent on SBIR innovations.
7. Solicitations should include contract award criteria that incorporates the use of SBIR innovations in major DOD prime contracts. "Subcontracting: Acquisition strategies for all ACAT I and ACAT II programs must address Small Business and SBIR/STTR engagement through the next milestone decision or during program sustainment, as applicable. The Technology Insertion Plan should identify specific SBIR technologies to be transitioned to meet program capability gaps and a schedule to deploy these capabilities"
8. A small business subcontracting plan, specifying SBIR inclusion not less than 20% of the overall subcontracting level of effort, should be a mandatory evaluation element for DOD program proposals. (see related recommendation #12, below)

9. All major contracts should contain provisions requiring the contractor to adhere to and implement their SBIR subcontracting plans and require that the contractor meets its SBIR subcontracting goal.
10. Program managers and contracting officers should include a Small Business Innovation Incentive Fee for major contractors who meet subcontracting levels where incentive fees are used. The *Manager's Guide to Technology Transition* already provides for profit incentives are another form of cost-based incentive. The DFARS now include a provision to increase the negotiated fee according to the contractor's use of innovative technology. This incentive is based on a Congressional desire to encourage innovation and is completely consistent with DOD's objectives.⁸ The Navy also provides incentive fees for SBIR innovations. *"Program manager and contracting officers should include a Small Business SBIR transitioning Incentive Fee for meeting specific small business and SBIR subcontracting levels in contracts where incentives are used."*⁹ Share-in savings (SIS) provisions are cost-based incentives, now referred to by DOD as 'efficiency savings.' An SIS contract encourages contractors to use their ingenuity and innovation to get the work done quickly and efficiently to share in the savings attributed to their planning and execution. Savings can be shared.
11. Where SBIR subcontracting goals are set by the DOD program office in the RFP as an explicit percentage of the total contracted effort, penalties such as fee reduction (or incentives such as award fee increases) should be employed to encourage prime contractor fulfillment of those goals. SBIR transition Incentives have worked *"Two percent of the total award fee pool shall be dedicated to an evaluation of success in applying technology from SBIR projects."* *"DOD component SBIR programs – led by the Navy – have pushed down the technology transition path, securing \$2.8B in Phase III contracts since 2005."*¹⁰
12. Another incentive involves IR&D. Some adjustment to the companies IR&D could make for meeting the SBIR innovation goals. For every prime RDT&E contract in excess of \$100M, the prime contractor shall subcontract not less than five per cent (5%) of the contract value to small businesses that have completed relevant Phase II SBIR or STTR programs and can meet or exceed the technical requirements of the prime contract. The determination of the ability of a technology to meet these requirements shall be made jointly by the Agency SBIR innovations transition manager and prime contract project manager. For example for every one per cent (1%) of the prime contract subcontracted to small businesses to meet or exceed this goal, the prime contractor shall be entitled to a credit of ten per cent (10%) of its audited Independent Research and Development (IR&D) expenses by the Department of Defense. For example, meeting the goal of 5% subcontracted to SBIR companies will entitle the prime contractor to recover 50% of its IR&D expenses up to the amount allowable.
13. Reporting is critical to the success of the SBIR transitioning efforts. SBTC believes that SBIR companies should report each Phase III follow on contract within 90 days and that prime contractors should also report all Phase III contracts within 90 days. Further, since the SBIR reauthorization statute stipulates that industry shall report its contributions to SBIR commercialization but does not specify a mechanism or process, OSD Office of Small Business

⁸ *Manager's Guide to Technology Transition in an Evolutionary Acquisition Environment* – Version 1.0; Office of the Under Secretary of Defense (Acquisition, Technology and Logistics); January 31, 2003; pp. 2-27 – 2-28.

⁹ Navy July 19, 2011 Memorandum Assistant Secretary, Sean Stackley, Subject: Increased Use of Small Business Concerns

¹⁰ A STRATEGY FOR EXPANDING SBIR/STTR OPPORTUNITY in ACAT PROGRAMS: CONTRACTING INCENTIVES and PROGRAM REQUIREMENTS; 5 March 2011; Navy SBIR Program Office

Programs should work with SBA to develop a mechanism or process for inclusion in the SBIR and STTR Policy Directives.

Incentivization Case Study: NAVSEA PEO Submarine

A practical and successful approach to cash incentives used for enhancement of SBIR Phase III activity in DOD programs has been in place since 1988 in Program Executive Office – Submarine, a Naval Sea Systems Command (NAVSEA) office. Under the leadership of Richard McNamara, Executive Director of PEO SUB, over \$1B in Phase III work in key submarine programs has been generated since 1988, from an SBIR investment of ~\$150M. PEO SUB's Phase III total is 82% of total NAVSEA Phase III awards between 1988–2004. McNamara, in his June, 2005 address at The National Academies of Science symposium on SBIR Phase III issues, credited PEO SUB's open competition and incentives policies for helping achieve this notable success.¹¹

PEO Submarine is an example of where the proper use of incentives resulted in the transitioning of SBIR technology with significant cost and delivery time savings to the government. McNamara estimated that the use of SBIR innovations reduces the cost to the Navy by 25% and the delivery time was also reduced by 25%.

¹¹ For an independent look at PEO SUB's unique technology transition strategy, see: Johnson, William; "Delivering Combat Power to the Fleet, Now! A Case Study in Rapid Acquisition"; *Naval Engineers Journal*; Fall, 2004

These next two pages are Appendix I to Appendix D.



Small Business Technology Council of the National Small Business Association
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APPENDIX I

Summary of Information Pertinent To Defense Prime Contractors And To SBIR/STTR Awardees By SBTC From The

NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEAR 2012, Public Law No: 112-81

SECTION 1. SHORT TITLE.

This Act may be cited as the "National Defense Authorization Act for Fiscal Year 2012".

SEC. 2. ORGANIZATION OF ACT INTO DIVISIONS; TABLE OF CONTENTS.

(a) DIVISIONS.—This Act is organized into five divisions as follows:

- (1) Division A—Department of Defense Authorizations.
- (2) Division B—Military Construction Authorizations.
- (3) Division C—Department of Energy National Security Authorizations and Other Authorizations.
- (4) Division D—Funding Tables.
- (5) Division E—SBIR and STTR Reauthorization

Selected Sections of:

DIVISION E—SBIR AND STTR REAUTHORIZATION ACT OF 2011

SEC. 5108. SBIR AND STTR SPECIAL ACQUISITION PREFERENCE.

Section 9(r) of the Small Business Act (15 U.S.C. 6 638(r)) is amended by adding at the end the following:

(4) PHASE III AWARDS.—To the greatest extent practicable, Federal agencies and Federal prime contractors shall issue Phase III awards relating to technology, including sole source awards, to the SBIR and STTR award recipients that developed the technology.

SEC. 5122. COMMERCIALIZATION READINESS PROGRAM AT DEPARTMENT OF DEFENSE. [For both SBIR and STTR Programs:]

(5) INSERTION INCENTIVES.—For any contract with a value of not less than \$100,000,000, the Secretary of Defense is authorized to—

- (A) establish goals for the transition of Phase III technologies in subcontracting plans; and
- (B) require a prime contractor on such a contract to report the number and dollar amount of contracts entered into by that prime contractor for Phase III SBIR or STTR projects.

(6) GOAL FOR SBIR AND STTR TECHNOLOGY INSERTION.—The Secretary of Defense shall—

(A) set a goal to increase the number of Phase II SBIR contracts and the number of Phase II STTR contracts awarded by the Secretary that lead to technology transition into programs of record or fielded systems;

(B) use incentives in effect on the date of enactment of the SBIR/STTR Reauthorization Act of 2011, or create new incentives, to encourage agency program managers and prime contractors to meet the goal under subparagraph (A); and

(C) submit to the Administrator for inclusion in the annual report under subsection (b)(7)—

(i) the number and percentage of Phase II SBIR and STTR contracts awarded by the Secretary that led to technology transition into programs of record or fielded systems;

(ii) information on the status of each project that received funding through the Commercialization Readiness Program and efforts to transition those projects into programs of record or fielded systems; and

(iii) a description of each incentive that has been used by the Secretary under subparagraph (B) and the effectiveness of that incentive with respect to meeting the goal under subparagraph (A).

SEC. 5124. INTERAGENCY POLICY COMMITTEE.

(a) ESTABLISHMENT.—The Director of the Office of Science and Technology Policy shall establish an Inter-agency SBIR/STTR Policy Committee.

(b) MEMBERSHIP.—The Interagency SBIR/STTR Policy Committee shall include representatives from Federal agencies with an SBIR or an STTR program and the Small Business Administration.

SEC. 5138. TECHNOLOGY INSERTION REPORTING REQUIREMENTS.

Section 9 of the Small Business Act (15 U.S.C. 638), as amended by this title, is further amended by adding at the end the following:

(kk) PHASE III REPORTING.—The annual SBIR or STTR report to Congress by the Administration under subsection (b)(7) shall include, for each Phase III award—

(1) the name of the agency or component of the agency or the non-Federal source of capital making the Phase III award;

(2) the name of the small business concern or individual receiving the Phase III award; and

(3) the dollar amount of the Phase III award.

Appendix E

Data has shown that the percentage of newcomers to the SBIR program has declined noticeably over the past twenty years. DoD components have declined by 20% in the last 10 year and 30% in the last 20 years.

Agency	1994						
	Total Awardees	First Time Awardees ¹	% New/oldcomers	# Agency Returners ²	% Agency Returners	First time in agency ³	% agency first time ⁴
DOD	888	298	33.56%	506	56.98%	84	9.46%
NIH	510	220	43.14%	250	49.02%	40	7.84%
NASA	319	97	30.41%	172	53.92%	50	15.67%
DOE	189	55	29.10%	95	50.26%	39	20.63%
NSF	241	87	36.10%	106	43.98%	48	19.92%
DHS							
USDA	60	37	61.67%	11	18.33%	12	20.00%
DOT	32	11	34.38%	8	25.00%	13	40.63%
EPA	29	8	27.59%	14	48.28%	7	24.14%
DoEd	18	6	33.33%	7	38.89%	5	27.78%
DOC	40	14	35.00%	4	10.00%	22	55.00%
<i>Minimal SBIR participation agencies</i>							
NRC	11	3	27.27%	4	36.36%	4	36.36%
Dept of Defense: all Agency Data and by Service Breakout							
DOD	888	298	33.56%	506	56.98%	84	9.46%
AF	336	101	30.06%	174	51.79%	61	18.15%
Army	164	41	25.00%	70	42.68%	53	32.32%
Navy	252	57	22.62%	128	50.79%	67	26.59%
MDA	107	29	27.10%	56	52.34%	22	20.56%
DARPA	263	82	31.18%	98	37.26%	83	31.56%
DMEA							
DTRA	13	1	7.69%	8	61.54%	4	30.77%
CBD							
OSD							
SOCOM	18	8	44.44%	0	0.00%	10	55.56%
NGA							
DHP							
Source: Innovation Development Institute, LLC., Swampscott, MA							1994

Agency	2004						
	Total Awardees	First Time Awardees ¹	% New/oldcomers	# Agency Returners ²	% Agency Returners	First time in agency ³	% agency first time ⁴
DOD	1224	340	27.78%	799	65.28%	85	6.94%
NIH	947	364	38.44%	527	55.65%	56	5.91%
NASA	249	60	24.10%	159	63.86%	30	12.05%
DOE	226	62	27.43%	121	53.54%	43	19.03%
NSF	165	63	38.18%	70	42.42%	32	19.39%
DHS	88	36	40.91%	0	0.00%	52	59.09%
USDA	97	51	52.58%	27	27.84%	19	19.59%
DOT	13	8	61.54%	2	15.38%	3	23.08%
EPA	40	8	20.00%	17	42.50%	15	37.50%
DoEd	43	20	46.51%	14	32.56%	9	20.93%
DOC	48	13	27.08%	15	31.25%	20	41.67%

Dept of Defense: all Agency Data and by Service Breakout							
DOD	1224	340	27.78%	799	65.28%	85	6.94%
AF	439	88	20.05%	261	59.45%	90	20.50%
Army	317	75	23.66%	165	52.05%	77	24.29%
Navv	445	93	20.90%	253	56.85%	99	22.25%
MDA	252	41	16.27%	163	64.68%	48	19.05%
DARPA	158	39	24.68%	55	34.81%	64	40.51%
DMEA							
DTRA	0	0	0.00%	0	0.00%	0	0.00%
CBD	23	3	13.04%	9	39.13%	11	47.83%
OSD	82	20	24.39%	31	37.80%	31	37.80%
SOCOM	26	6	23.08%	6	23.08%	14	53.85%
NGA	2	0	0.00%	0	0.00%	2	###
DHP							

Source: Innovation Development Institute, LLC., Swampscott, MA

2004

Breakout SBIR-STTR Awardees By Type & Percentage;
By-Agency & Year 1983-2015 October 2015

Agency	2014						
	Total Awardees	First Time Awardees ¹	% New/oldcomers	# Agency Returners ²	% Agency Returners	First time in agency ³	% agency first time ⁴
DOD	715	145	20.28%	550	76.92%	20	2.80%
NIH	706	249	35.27%	426	60.34%	31	4.39%
NASA	20	1	5.00%	16	80.00%	3	15.00%
DOE	178	40	22.47%	104	58.43%	34	19.10%
NSF	301	205	68.11%	57	18.94%	39	12.96%
DHS	32	5	15.63%	15	46.88%	12	37.50%
USDA	3	0	0.00%	1	33.33%	2	66.67%
DOT	18	6	33.33%	6	33.33%	6	33.33%
EPA	21	10	47.62%	5	23.81%	6	28.57%
DoEd	4	0	0.00%	4	100.00%	0	0.00%
DOC	21	4	19.05%	8	38.10%	9	42.86%

Dept of Defense: all Agency Data and by Service Breakout

DOD	715	145	20.28%	550	76.92%	20	2.80%
AF	339	55	16.22%	242	71.39%	42	12.39%
Army	84	12	14.29%	52	61.90%	20	23.81%
Navy	321	53	16.51%	227	70.72%	41	12.77%
MDA	22	1	4.55%	14	63.64%	7	31.82%
DARPA	23	11	47.83%	4	17.39%	8	34.78%
DMEA	2	0	0.00%	0	0.00%	2	####
DTRA	6	0	0.00%	2	33.33%	4	66.67%
CBD	19	6	31.58%	5	26.32%	8	42.11%
OSD	61	13	21.31%	33	54.10%	15	24.59%
SOCOM	9	0	0.00%	3	33.33%	6	66.67%
NGA							
DHP	25	6	24.00%	10	40.00%	9	36.00%

Source: Innovation Development Institute, LLC., Swampscott, MA

2014

References/Endnotes:

¹ As Counsel to the House Small Business Committee, I helped convene the first joint House-Senate Small Business Committee hearings on the subject in 1978. These hearings and report showed that, despite their demonstrated superior efficiencies at innovating, small companies received only 3.5% of federal R&D contract dollars. Today, with far more science and engineering talent at their disposal, and a far more widely acknowledged record of innovations, small companies still receive only 5% of those R&D contract dollars. And SBIR/STTR accounts for more than half of that. I subsequently testified before Congress regarding small business and innovation on numerous occasions, as Deputy Chief Counsel for Advocacy at SBA during the Carter Administration, as Chief Counsel during the Clinton Administration, and as Executive Director of SBTC during the George W. Bush and the Barack Obama Administrations. SBTC represents more companies that are active in the federal Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Program than any other organization. SBTC also serves as the Technology Council of the National Small Business Association, the nation's oldest nonprofit advocacy organization for small business, which represents over 150,000 small companies across the United States. I appear here today on behalf of both organizations.

² From the SBIR/STTR Reauthorization Act of 2011, Section 9(f) of the Small Business Act (15 U.S.C. 638(f)) amended SBIR allocations to:

- (1) not less than 2.5 percent of the Agency's extramural research budget in each of fiscal years 1997 through 2011;
- (2) not less than 2.6 percent of such budget in fiscal year 2012;
- (3) not less than 2.7 percent of such budget in fiscal year 2013;
- (4) not less than 2.8 percent of such budget in fiscal year 2014;
- (5) not less than 2.9 percent of such budget in fiscal year 2015;
- (6) not less than 3.0 percent of such budget in fiscal year 2016; and
- (7) not less than 3.2 percent of such budget in fiscal year 2017 and each fiscal year thereafter

³ [Department of Agriculture](#)(link is external)

[Department of Commerce - National Institute of Standards and Technology](#)(link is external)

[Department of Commerce - National Oceanic and Atmospheric Administration](#)(link is external)

[Department of Defense](#)(link is external)

[Department of Education](#)(link is external)

[Department of Energy](#)(link is external)

[Department of Health and Human Services](#)(link is external)

[Department of Homeland Security](#)(link is external)

[Department of Transportation](#)(link is external)

[Environmental Protection Agency](#)(link is external)

[National Aeronautics and Space Administration](#)(link is external)

[National Science Foundation](#)

⁴ In part derived from: Fred Block and Matthew R. Keller, "Where Do Innovations Come From? Transformations in the U.S. National Innovation System, 1970-2006", THE INFORMATION TECHNOLOGY & INNOVATION FOUNDATION, July 2008,

http://www.itif.org/files/Where_do_innovations_come_from.pdf?_ga=1.133125959.897409575.1453668309

⁵ The Air Force Impact to the Economy via SBIR/STTR, 2014 Economic Impact Study,

<https://www.sbir.gov/sites/default/files/USAF%20SBIR-STTR%20Economic%20Impact%20Study%20FY2015.pdf>

⁶ https://www.sba.gov/sites/default/files/advocacy/FAQ_March_2014_0.pdf

⁷ Performance and Accountability Report FY 2015, United States Patent and Trademark Office, Table 11,

<http://www.uspto.gov/sites/default/files/documents/USPTOFY15PAR.pdf>. Calculation of % = $3.26 + 25.79 = 29.05\%$.

⁸ See Federal Reserve Bank of Cleveland, "Altered States: A Perspective on 75 Years of State Income Growth,"

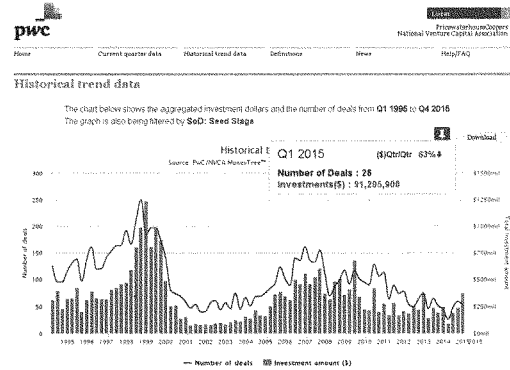
Annual Report 2005. For more detail, see Paul Bauer, Mark Schweitzer, Scott Shane, *State Growth Empirics: The Long-Term Determinants of State Income Growth*, Working Paper 06-06, Federal Reserve Bank of Cleveland, May 2006,

<https://www.clevelandfed.org/en/Newsroom%20and%20Events/Publications/Working%20Papers/2006%20Working%20Papers.aspx> and then Click on the PDF for WP-06-06 by Bauer *et. al.*

⁹ Innovation Development Institute, Swampscott, MA, www.inknowvation.com

¹⁰ Innovation Development Institute, Swampscott, MA, which has for decades compiled list of mergers and venture capital investments. See: www.inknowvation.com.

¹¹ See: <https://www.pwcmoneytree.com/HistoricTrends/CustomQueryHistoricTrend>, and then filter data by Sage, and then f Stage. Move the cursor to the quarter you desire data for. 1Q 2015 26 deals, 2Q 48 deals, 3Q 59 deals, 4Q 52 deals for a total of 185 Seed Stage VC deals in 2015.



10,11,14 See: <https://www.pwcmoneytree.com/HistoricTrends/CustomQueryHistoricTrend>, and then filter data by State. Once you have your state of interest, filter by Sage, and then Seed Stage.

¹² Venture Capital Update: Software and Expansion Dominate, Midwest Struggles

August 6, 2015, David J. Robinson, http://montrosegroupllc.com/venture-capital-update-software-and-expansion-dominate-midwest-struggles/?utm_source=rss&utm_medium=rss&utm_campaign=venture-capital-update-software-and-expansion-dominate-midwest-struggles&utm_source=Aug+2015+Montrose+Way-No+Greeting&utm_campaign=July2015+Montrose+Way&utm_medium=email

Top Five States for Venture Capital Investment, 1st Quarter, 2015, MoneyTree Report

State	Venture Capital	National percentage
California	\$8.0B	60%
Massachusetts	\$1.3B	10%
New York	\$1.3B	10%
Texas	\$426M	3%
Washington	\$299M	2%

¹³ THE Q3'15 GLOBAL TECH EXITS REPORT, Global tech exits including M&A, IPO trends, and much more, www.cbinsights.com.

¹⁴ See: <https://www.pwcmoneytree.com/HistoricTrends/CustomQueryHistoricTrend>, and then filter data by State. Once you have your state of interest, filter by Sage, and then Seed Stage.

¹⁵ Chart courtesy of Ann Eskesen, Innovation Development Institute, Swampscott, MA, www.inknowvation.com.

Chairman VITTER. Thank you very much, Mr. Glover.

Let me kick off questions. Again, we will have a five-minute round.

Mr. Glover, as we reauthorize, what are the top three or so tweaks or reforms or improvements that you would suggest we make?

Mr. GLOVER. Well, my first recommendation is make people comply with the law. Find out why the civilian agencies have not to the greatest extent practicable opened the rest of their 97 percent of their federal R&D dollars open to small business and giving SBIR the preference the law required.

Also, make sure that the reporting requirements and that are done quickly. There is no excuse for these reports not to be—to be years and years behind. If SBA cannot get them filed, then they ought to send them directly to the committee and get that information in. There is no accountability in the system and it needs to be done.

In terms of the top three priorities for new legislation, one, make it permanent. This uncertainty for businesses knowing what is going on is just driving you crazy. We have people lose good scientists and engineers because the 14 Continuing Resolutions, why work for this company when you can go work for somebody else that has a long-term plan.

Two, increase the program significantly. This is a great program. It is working well. There is no other R&D program that even comes close to this program. So, why is it still down three, four, five, six percent? It ought to be double that or more. The STTR Program, likewise, needs to be increased substantially. So, that is number two.

And, one of the questions that came up earlier, I would like to address, and that is the simplification of the process. There are all kinds of rules and regulations for government contractors, rooms and rooms of regulations. There is no reason that Congress cannot direct the government to come up with simple, clear rules that just apply to SBIR. You may want to cap it at some number of dollars, but there is no reason we cannot have a simple program like it was when it started. That is the whole idea. The money that people spend complying with government regulations when it is this small amount means that they are not spending the money on doing the innovation and they are not doing the money on commercialization.

So, we do need a simplified, streamlined process. There is no reason to wait around for years for a DCAA audit. They are, on average, three or four years behind anyhow. Let CPAs do it. It is not that much money. We could certainly streamline the process.

So, those three would be three recommendations. I have a number more in my testimony.

Chairman VITTER. Okay. Thank you.

To both of you, we have talked a lot about the challenge of commercialization, either within these programs or outside of these programs. What can we do to help smaller firms meet that commercialization challenge?

Mr. GLOVER. Well, one of the things that I think that John Williams mentioned earlier is that we need to have specific allocations of the testing and evaluation, the 6.4 and above kind of money,

going specifically to not only SBIR, but other challenging companies. There are some university technology that have small businesses license it. There are some other non-traditional vendors that need to get into the process. So, there needs to be a way to open all that up, but there needs to be a significant pot of money.

And I think the Rapid Innovation Fund is a great program, but it only helps 100 companies a year—only 100 a year. We can do better than that, because every time we create a need—we meet a need for the military, what we are finding is 2.5 times that much in commercial sales on the outside. So, this is a huge job creation and economy program. It really does great things, and the multiplier effect of a dollar spent on this program, 3.6—58 percent of those Phase IIs at the Air Force ended up with sales in excess of a million dollars.

Mr. KLINE-SCHODER. So, one of the things we have seen is that some of the large Defense contractors, when they have a very large program, are reluctant to hire a small business because we do not seem stable. We are not going to be around for a long time, and so they do not want to invest their program funds in taking technology from a small company and inserting it into a program that might have a 30-year lifetime.

So, one of the things that might be helpful would be to reduce that risk for the large contractors, and I think it is also partly some of the folks in the federal government, as well. They see we are going to have this long program. You know, I have been asked, “Is Creare going to be around in 10 years?” Well, I usually say, I know I am going to be around. Are you going to be around in 10 years?

And, so, what—if you could come up with a way of potentially—as for instance, we have worked on some very expensive refrigerators that go into space, and we compete against the Lockheeds, the Boeings, the Raytheons, and Ball Aerospace and Northrup Grumman, and then they have cryocoolers and we have a cryocooler. And when a large program looks at which one should we take, you know, it is a little hard for us to compete against these multi-billion-dollar companies.

And, so, if there were a way to help either develop technologies in parallel in a situation like that, to provide funding so that it could give reassurance to the program managers and also the contractors, the Defense contractors, that we are behind Creare. We are really going to help them make sure that they make it and they are going to be there for the rest of the time. But, if they are not, in parallel, we are going to allow you to fund a little bit extra work over here to come up with an alternative in case your primary selection does not pan out for the long term.

So, reducing that risk, I think, in people’s minds and providing some reassurance is something that could be helpful.

Chairman VITTER. Okay. Thank you very much.

Senator Shaheen.

Senator SHAHEEN. Thank you, Mr. Chairman, and thank you both for that really helpful and informative testimony.

I was interested, there was a lot of discussion on the first panel about simplifying the regulations, the paperwork around SBIR and STTR awards. Mr. Glover, you talked about that in your testimony. But, I was interested, Mr. Kline-Schoder, that you did not talk

about that. If the program were going to simplify the paperwork, the regulations, where would you like to see that simplification first occur?

Mr. KLINE-SCHODER. Right. So, I am not an attorney. I am an engineer, one of those guys. And, so, I am told the Uniform Commercial Code is 30 pages long and it has been in existence for about 50 years. As I think all of you know, the FAR, I think, is 30,000 pages and keeps changing every single year. And, so, to the extent that one could look at trying to simplify some of those 30,000 worth of pages that do get imposed upon small businesses, that would probably be quite helpful.

The other thing that I think is actually quite helpful that we have been trying to do a little bit more is actually to do more firm fixed price contracts. I know there has been a push, I think, in the Senate Armed Services Committee to try to encourage that, and those contracts actually are not audited in the end, so it gets around the problem that Jere was talking about, having the DCAA come in three or four or five or six, or in our case seven or eight, years later to look at sort of what has happened and then make changes after the fact. And, so, that would be something that I would consider, as well.

Most Phase I projects actually are firm fixed price contracts. There is a reluctance for some reason for the contracting officers to use firm fixed price contracts for Phase II awards, and I am not exactly sure why that is, but if we could encourage that a little bit more. NASA does that, and so I guess I am not sure—I do not see why other contracting agencies can do that, anyway.

There is, as you all know, a difference between the contracting agencies and the granting agencies. As it turns out, I think what John Williams said earlier is actually true. The contracting agencies actually have a much simpler application process than the granting agencies do. But when it comes to contracting, they are totally opposite. Once you are awarded a contract, then you enter into the world of talking to contracting officers and doing all those things.

On the grant side, one day a notice shows up in your e-mail and says your grant started, and you do not have to sign anything, you do not have to do anything. It just happens.

And, so, although on this side it usually takes nine months to have that happen, things are happening, I guess behind the scenes on this side. So, in the end, it sort of winds up being the same amount of time, but it does seem like we could gather something from either side, to take the best from both worlds and try to combine those.

Senator SHAHEEN. That is a good thought.

Did you want to add anything to that?

Mr. GLOVER. I am mindful of Irwin Jacobs, head of Qualcomm, who testified here and also at the White House that the SBIR Program let Qualcomm get started and provided the early money that let them survive. He said there has been significant requirement creep. When the program first started, \$25,000 was Phase I. He said, you just got the \$25,000. You did your work. You sent a report in. They liked it. They funded another round. And you sent

that report in and you got paid. And it has been a lot of difference now. So, they have added more and more regulations.

By the way, the FAR, they have not updated the FAR for the 2000 reauthorization and 2001 STTR reauthorization, much less the 2011 one. So, do it immediately, but let us get serious. We are so low on their list, you know, 2000, it has not been done. No FAR regulation updates. None of that is in there.

Senator SHAHEEN. So, you both talked about the allocation amounts and increasing those as a way to get more small businesses involved and to make the program more effective. Now, you have both been affiliated or associated with this program longer than I have. So, is the—I remember the last reauthorization debate and some of the concerns that Congress expressed about increasing the allocation amounts. Are there other concerns that you have heard over the years? Are there agency concerns about increasing those allocation amounts that you think we ought to take a look at, or what is the problem with increasing those amounts, since there seems to be agreement from all of you working with the program that we should do that.

Mr. KLINE-SCHODER. I think what I have heard on the government side is they kind of view the SBIR as a tax on their programs, and for those organizations or those groups that do not actually participate actively, I could see how that would be a tax that you are just paying and you are not getting any return for.

But, those groups that actually look at it as an opportunity rather than a tax are the ones that really benefit the most, because they are the ones who are most motivated to actually have something come out of the program, as well, and it allows them to do rapid innovations and insert new technologies much quicker than they can otherwise.

Senator SHAHEEN. Mr. Glover.

Mr. GLOVER. There is virtually no risk for somebody in the government making a decision to give Lockheed or Boeing or one of the giant companies a contract. If they fail, if they overrun, nobody gets punished. If they give an award to a small business, that is why the previous reauthorization, I believe Congress put in there, you will have goals, you will have incentives, you will do reports. Four years later, you heard the testimony, no goals. The incentives, they reauthorized to create any incentive they wanted to to insert this and they have not done it. And reports, no reports exist.

So, you are going to have to get tough and you are going to have to be serious about it, because if not, they are going to continue to ignore it. Business as usual is always the easiest thing to do. Disruptive technology, there is disruptive government. If we do not disrupt the status quo, we will be sitting here in another 10 years saying, you know, we could have created a lot of jobs in America if we had made this program bigger and better.

The Air Force study just to me nails it clear. Every dollar that is spent by the Air Force got 2.6 dollars in follow-on sales. I defy anybody in the government to find a better result on investment. It is just phenomenal and it has got—it needs to be done, for America, for job creation. How many innovative companies did not get started, did not grow because they did not have a chance?

Senator SHAHEEN. Well, thank you both very much for your testimony, and shame on us if we do not require the provisions that were passed in the reauthorization to be implemented by all of the government agencies involved.

Chairman VITTER. Okay, thank you.

And, Senator Ayotte.

Senator AYOTTE. Thank you, and it is great to see you again, Doctor, and appreciate all the important work being done at Creare.

I am very curious, Mr. Glover, and also just to hear, Dr. Kline-Schoder, your feedback on the regulations. I think your analogy of the Uniform Commercial Code versus the contracting regulations and what you are dealing with, and even the grant regulations, it almost seems like we need to do—you know, I visit manufacturers and they are always talking about lean process. It seems like we need to do a lean process on how this whole thing—how do you—how does a small business go through this process, and whether it is a grant or whether it is a contract award, let us face it, it takes too long. Even when you are awarded the contract, the nine months that it takes is too long, especially for small businesses, especially if we are focusing on innovation.

And, so, I guess I would ask both of you, especially you, Mr. Glover, you say they have not yet even done what we asked to do four years ago. So, you are in our shoes. What would you do? How do we get to the bottom of this so they actually make this easier, streamline it, do it in a logical way? We would love to see people like you at the table as they do that so that they are not just doing it in some vacuum.

Mr. GLOVER. The three percent administrative money, we took three percent out. We were told by the government, we will streamline the process. We will make awards faster. We will compress it. The Navy has done it and they are to be commended. The rest of the government has not done it. If they want their three percent, make sure they comply with the law that is here and make certain that they streamline the process—

Senator AYOTTE. I like it.

Mr. GLOVER [continuing]. Come up with a new set of regulations that are quick, short, simplified, and easy. Make this a model in government to show how you can eliminate government regulations. Every dollar a small business spends on accounting and paperwork, regulatory compliance, is a dollar they are not spending on innovation and technology.

Senator AYOTTE. I like it. So, basically, you know, you want the three percent, then you make this happen, and we want to see accountability for it. I like it.

I wanted to get your thoughts, Doctor.

Mr. KLINE-SCHODER. Yeah. An analogy could be—and I know you are on the Senate Armed Services Committee—recently, the ITAR regulations were looked at—

Senator AYOTTE. Yes.

Mr. KLINE-SCHODER [continuing]. And there has been a process to go through and kind of streamline those and try to get them modernized. It seems like the same thing could happen to the FAR—

Senator AYOTTE. Yes.

Mr. KLINE-SCHODER [continuing]. Spending a little time looking at that and asking the questions, you know, do we still need this, and is it—

Senator AYOTTE. And what are we accomplishing with it?

Mr. KLINE-SCHODER [continuing]. With it, right, and for each of the—

Senator AYOTTE. That is a great idea. We should think about that as a way to—because there needs to be a forcing mechanism to have them look at all this, because as a small business, you know, you think about what it takes, all the regulations. A lot of people with great ideas are going to be discouraged and are not going to go forward just because of the paperwork. So, I think that would be a worthy undertaking as we, hopefully, permanently re-authorize these programs.

And, Dr. Kline-Schoder, when we had the hearing, Senator Shaheen and I, in 2013 that you participated in, in Manchester, one of the things that you raised to us then is the need for uniformity in the administration of the SBIR, and that has sort of been, I think, a theme we have heard today at the hearing. So, have you seen—since we had this hearing in 2013, here we are in 2016—any change, any progress, or are we pretty much in the same situation?

Mr. KLINE-SCHODER. It has probably gotten a little worse.

Senator AYOTTE. It has gotten worse?

Mr. KLINE-SCHODER. Yeah.

Senator AYOTTE. Okay.

Mr. KLINE-SCHODER. I think, although it may be one of those things where it needs to get worse before it gets better, and the benefit, actually, is going to go to John Williams, I think, because he had set up—and this is mostly related to the commercialization reporting that I was talking about as an example—

Senator AYOTTE. Right, uniformity.

Mr. KLINE-SCHODER. Yeah. The current—you know, since we spoke, NASA came up with a different model of commercialization reporting than they had, or they had one and they added some things to it, and DOD changed theirs a little bit, and DOE changed theirs a little bit. And then SBA came in and they set up their own. And, I think the reason SBA set up their own is, hopefully, in the end, they are going to be the central—

Senator AYOTTE. The standard—

Mr. KLINE-SCHODER [continuing]. Repository for everybody. And, so, since then, we have had a few more changes, plus we had a new one that we have to deal with. But, John has been great about setting that up and making sure that it was as smooth as possible, and I am hoping that he is successful in getting all of the other agencies to kind of just standardize on that SBA database.

Senator AYOTTE. What can we do to make sure that happens, so when we already look at where we are sort of behind on implementation, but if we can help this process and, obviously, make sure that it does become more uniform, that there is one central repository and you are not trying to meet all these different—

Mr. KLINE-SCHODER. Right. Yeah, I mean, I think what Jere said before in terms of having some incentive for the different agencies. I also liked what Mr. Smith said about maybe having a summit

where you get together with a number of the agencies so that they can talk about, you know, best practices and try to figure out how to get more streamlined-type things, that would probably be quite helpful, too.

Senator AYOTTE. Great idea.

Mr. GLOVER. The SBIR community is excited that John Williams is at SBA. He did a magnificent job at the Navy and we are excited he is there.

The sad thing is he has got virtually no budget and virtually no people. To try to run a \$2.5 billion a year program with four people is just a joke. Years ago, when it was less than half this size, they had 11 people in the office. And, to try to run it—it has just been lower and lower priority at SBA. It has just been bumped down and bumped down. It is a \$2.5 billion program.

It should be—somebody should be making sure that the Paperwork Reduction Act, which is a joke, is real. There is no reason.

And, OMB should have allowed every agency to come up with anything they wanted to on commercialization. They should have said, SBA is going to be it. Everybody else, stop. And, quite frankly, we told SBA, use the Defense Department's Commercial Achievement Index. It is working. It is great. We all understand it. Half the companies know how to use it. For whatever reason, they did not choose to do that.

But, they are not thinking about paperwork reduction. They are not thinking about the burden they are putting on these companies. They do not understand, when they put burdens on the companies, they take away money that they could be using to innovate and create new jobs.

Senator AYOTTE. Oh, absolutely. I mean, the people it takes to comply with this stuff is unbelievable, and a small business does not have an army of lawyers and accountants and every other person.

Mr. GLOVER. We have been meeting with DCAA. We tried to do it the right way, and Senator Shaheen wanted to—but DCAA was coming along, helping out. The head of DCAA left and it is dead now. And, there are some—Armed Services did something—I am not sure it was good enough or far enough—in the last bill—

Senator AYOTTE. Right.

Mr. GLOVER [continuing]. But that needs to be made tougher. And, quite frankly, there is no reason—for the kinds of awards they are making, you need to have auditors go in and hold up for years these accounting procedures. It drives the CEO of the company crazy—

Senator AYOTTE. Right.

Mr. GLOVER [continuing]. When a DCAA auditor comes in on a million-dollar contract and stays there for weeks.

Senator AYOTTE. Well, I was really struck when Dr. Kline-Schoder talked about eight years later. That is absurd for any business. Eight years later? How do you possibly deal with that?

So, I really appreciate both of you being here and the important feedback, and hopefully, as we take up a permanent reauthorization, we will also address these concerns to make it a more efficient program.

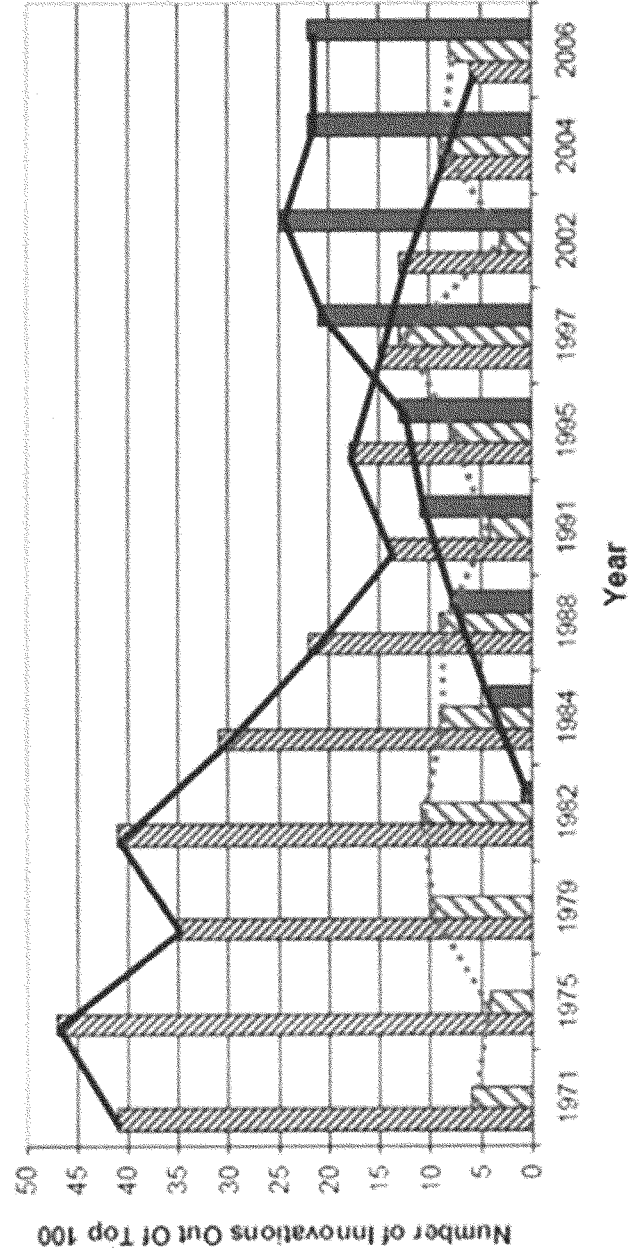
Chairman VITTER. Thank you very much, and thanks to both of you and our previous two witnesses again. I think this was a very informative and productive hearing, and we will absolutely take away these key thoughts and, hopefully, produce a good, strong bipartisan reauthorization which reauthorizes and improves the two programs. So, that is our very determined goal which we are actively working on.

Thanks very much, and with that, the hearing is adjourned.
[Whereupon, at 11:54 a.m., the committee was adjourned.]

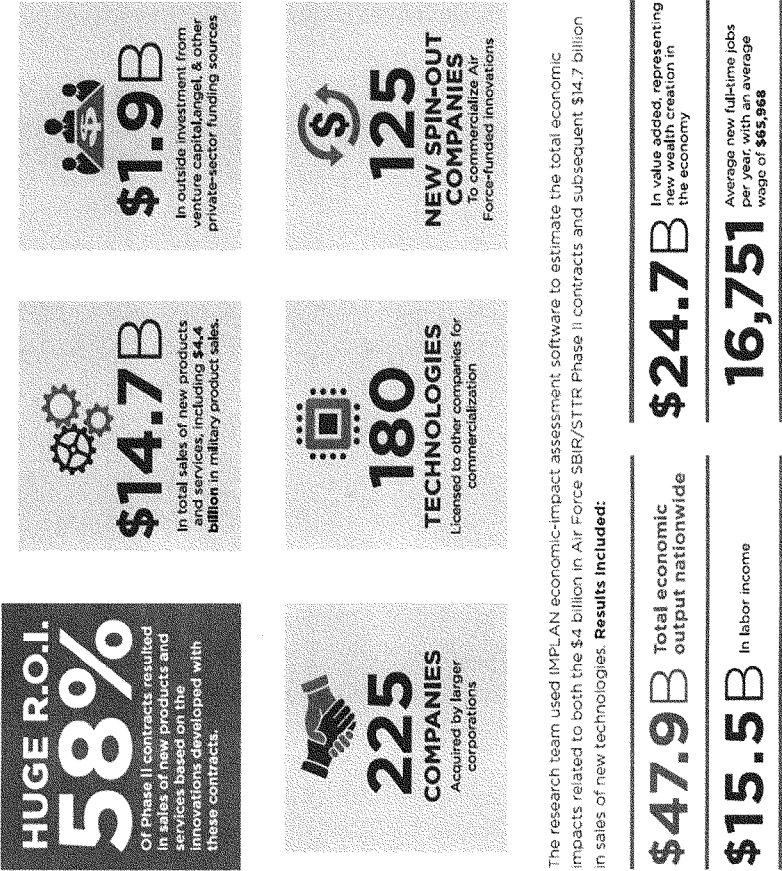
APPENDIX MATERIAL SUBMITTED

Where Do Key Innovations Come From?

 Total Fortune 500
  Universities
  SBIR Firms

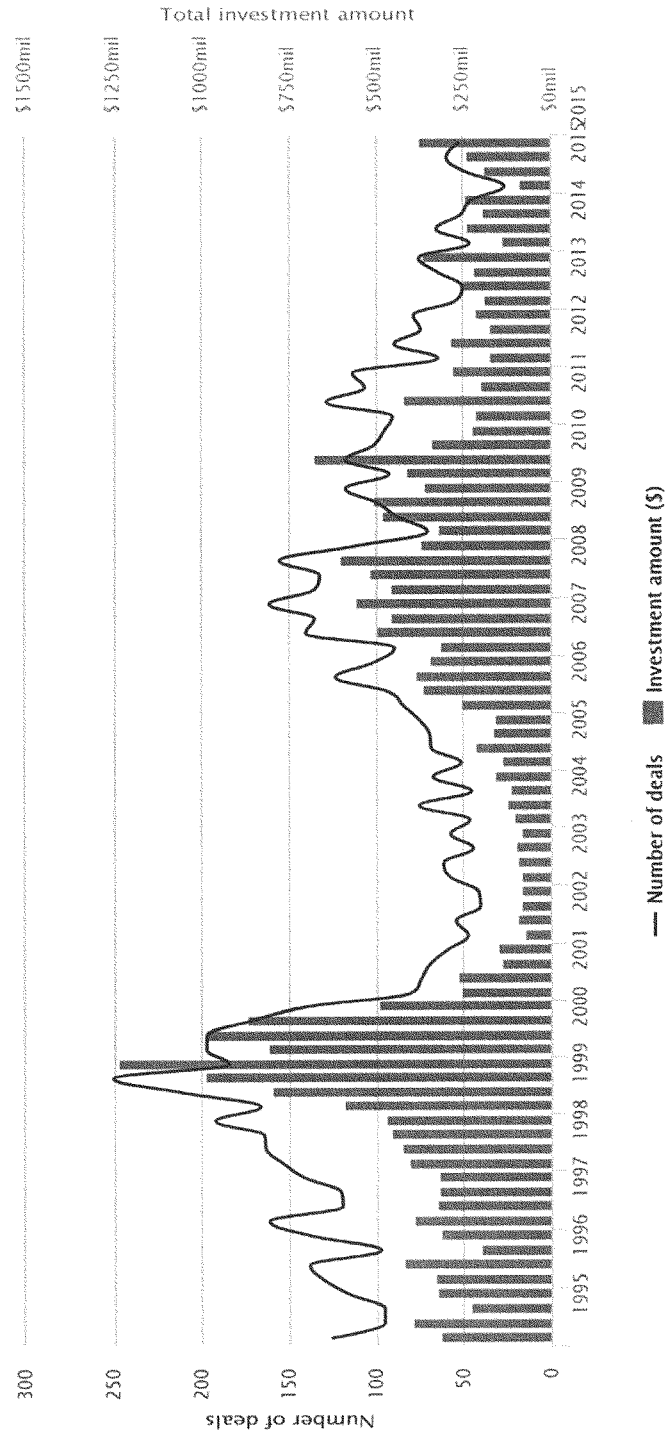


Well over half of the Air Force Phase II contracts—58 percent—resulted in sales of new products and services based on the innovations developed with these contracts. Companies reported the following direct commercialization-related outcomes from their Phase II contracts:



Historical trend data

Source: PwC/NVCA MoneyTree™ Report, Data: Thomson Reuters



**Senator Cantwell Statement and Questions for SBIR/STTR Small Business Hearing –
Jan. 28, 2016**

I want to thank Chairman Vitter and Ranking Member Shaheen for holding this hearing and for making promoting small business innovation a priority. Throughout my time on the Senate Small Business Committee, I have made it a goal to ensure that federal agencies work effectively with small businesses to do cutting-edge research and drive job growth. When I served as Chair of this committee, I held a field hearing on this issue in Seattle in April 2014.

Innovation has long been at the heart of economic growth in my home state of Washington. Seattle is internationally known as a hub of innovation. We need to work to ensure that innovation is driving economic growth and job creation across our country especially in underserved and rural areas.

While large companies have research and development budgets, it is often difficult for thousands of small businesses to find the resources they need to fully capitalize on bold new ideas. At the same time, small businesses have great talent, flexibility to take the risks, and are often best positioned to move quickly to develop new solutions and technology.

I support the permanent reauthorization of the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs because they give the federal government the ability to partner with small businesses on innovation. These programs give federal agencies the certainty they need to establish long-term strategies for research and development and to include small businesses in this planning. They also give small businesses certainty to make the investments required to move ahead on research and development.

Reauthorization of SBIR and STTR is win – win for both the government and small businesses. The government gets the advanced technology and solutions it needs while small businesses get the funding they need to pursue innovation. Congress should reauthorize SBIR and STTR as soon as possible so more and more U.S. small businesses can innovate keeping our country competitive in the 21st century global economy.

Question 1: John Williams, Director of Innovation and Technology, SBA Office of Investment and Innovation

- Mr. Williams – I understand your office at the Small Business Administration manages the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs. You also coordinate the participation of 11 federal government agencies and 100s of private research institutions and universities that take part in these programs.
- Like many federal programs, Congress has extended SBIR and STTR many times as opposed to being reauthorizing them for a long period. They are currently authorized until September 2017.
- Can you discuss why it would be important for Congress to reauthorize the SBIR and STTR programs for the longest period possible?
- What do small businesses and universities engaged in commercialization of research gain from being able to rely on the uninterrupted operation of SBIR and STTR?
- Alternatively, what do they lose from uncertainty about whether these programs will be extended or reauthorized?
- What difference does long term reauthorization make to the federal agencies taking part in these programs?

Question 2: Robert Smith, Director of Department of Navy SBIR/STTR Program, Office of Naval Research

- Mr. Smith – Could you explain what difference it would make to the U.S. Navy for these programs to be reauthorized for a long term versus a shorter period?

- How would a long term reauthorization impact the U.S. Navy's planning and goals?

Question 3: Jere W. Glover: Executive Director of the Small Business Technology Council

- Mr. Glover – As Executive Director of the Small Business Technology Council, what do small businesses tell you they need to continue to innovate and to compete in the 21st Century global marketplace?
- What more should the U.S. Government be doing to incentivize small business innovation and work to commercialize cutting edge scientific breakthroughs?
- How can we make sure small businesses across our country focus on competing in the innovation economy of today and the future?



Written testimony of the

Biotechnology Innovation Organization

Submitted to the United States Senate Committee on Small Business & Entrepreneurship

*Reauthorization of the SBIR/STTR Programs –
The Importance of Small Business Innovation to National and Economic Security*

January 28, 2016

Chairman Vitter, Ranking Member Shaheen, and Members of the Committee, the Biotechnology Innovation Organization (BIO) applauds you for convening this hearing and for your dedication to supporting the Small Business Innovation Research (SBIR) program, a vital component of the innovation funding ecosystem.

BIO represents more than 1,100 innovative biotechnology companies, the vast majority of which are growth-stage innovators. A typical biotech company has fewer than 50 employees (most of whom are scientists) and is dedicating vast sums of investment capital to the decades-long, billion-dollar R&D pathway intrinsic to groundbreaking medical advancement. These small businesses operate without the benefit of product revenue to fund their work, so every dollar must come from an external source, ranging from start-up grants and angel investors to venture capitalists and the public market. SBIR has historically been an important funding option for the earliest stages of biotech research.

SBIR Reauthorization

As you know, Congress created the SBIR program in the early 1980s because it recognized that promising, early-stage scientific research all too often failed to be funded through the markets because it was viewed as too high-risk. This failure of the markets is often referred to as the "valley of death." SBIR grants serve to bridge the valley of death, providing financing for encouraging therapeutic candidates and signaling to the markets that a small company is viable and promising. SBIR funds often allow companies to advance potentially life-saving innovations out of the lab and into clinical trials, supporting groundbreaking science at a vulnerable stage and bringing exciting potential therapeutics closer to patients.

The SBIR program is extraordinarily important given the current financing environment faced by growth-stage biotech companies. Venture funding of biotechnology innovation has grown steadily since the financial crisis, and 2014 was the strongest year since before the crash. However, venture financing still has not recovered to its pre-recession heights – total biotech venture funding declined from \$20.5 billion from 2005-2009 to \$17.9 billion from 2010-2014, a 13% drop.

Overall, venture funding of early-stage R&D is making a comeback, but the progress has not been felt across all therapeutic categories. Specific disease areas that represent significant public health challenges to the U.S. have seen sharp declines. Venture funding for therapies for cardiovascular diseases, the leading cause of death in America, fell by 32% from 2005-2009 to 2010-2014. Neurology financing, including research into Alzheimer's disease,



decreased by 32%. Infectious disease research, which holds the potential to treat and cure deadly diseases ranging from HIV to Ebola, declined 29%.

Funding for early-stage biomedical research, when a product candidate has not been through as many stages of rigorous testing, is often viewed as a risky investment strategy compared to investing in later-stage products or other industries. The number of companies receiving Series A financing, the earliest stage of venture capital investment, declined from 89 in 2006 to just 62 in 2014. Total Series A funding fell by 20% from 2005-2009 to 2010-2014. The importance of the SBIR program cannot be understated when viewed against the backdrop of the early-stage biotech financing environment – SBIR is integral to building a pipeline of medical innovation, from start-up financing all the way to commercialization. It also gives later-stage investors the confidence that a company's science has been vetted by peers and experts in the field.

Despite financing hurdles, growth-stage biotechs represent the heart of 21st century R&D, and their progress provides the foundation for a healthy innovative therapeutic pipeline. Funding from the SBIR program provides much-needed early-stage funding for these small companies to test concepts and advance the research and development of the next generation of medical advances. Currently there are nearly 5,000 product candidates in development across the biotech industry – and 69% of them are being developed by small companies. That's nearly 3,500 potential medicines being developed by over 1,200 small businesses across the U.S. From 2000 to 2010, 61% of all new drugs approved by the FDA originated in small companies. These growing businesses support American innovation and high-quality jobs, and SBIR supports them.

BIO strongly supports the reauthorization of the SBIR program. In 2014, the National Institutes of Health (NIH) disbursed over \$600 million in awards to fund more than 1,400 innovative medical research projects. Over the last decade, NIH SBIR awards have totaled more than \$5.7 billion. SBIR awards provide funding for the earliest stages of biotech research – research that has the potential to combat disease, reduce suffering, and save lives. Reauthorizing the SBIR program would build on its successes and spur next generation research at emerging American biotechs.

Majority Venture-Backed Companies and SBIR

As the Committee works toward reauthorizing the SBIR program, BIO believes that it is important to maintain the vital reforms enacted in the 2011 reauthorization. Specifically, BIO strongly supports the clarification made in 2011 that restored SBIR eligibility to majority venture-backed companies.

Emerging biotechs depend on millions of dollars in outside investment to fund their research – a key portion of which is invested by venture capital firms, which often provide the first significant capital to a young company. From the outset of the SBIR program in 1982, venture-backed biotechs competed for SBIR awards. These growth-stage innovators are the very definition of a small business (few employees, no revenue, early-stage research), and those with the most promising science were supported by SBIR funds like any other growing company.

Congress, in the 2011 SBIR reauthorization, clarified that all small biotechnology companies could compete for SBIR funds, allowing growth-stage innovators with the most promising biomedical breakthroughs to use this critical early-stage capital to advance their research and attract private sector funding. Specifically, since 2012 majority venture-backed companies have been eligible to compete for up to 25% of SBIR funds at NIH, the National



Science Foundation, and the Department of Energy, and for up to 15% of funds at all other participating agencies. Since having their eligibility restored, growing biotech companies have once again been able to compete for SBIR awards, with the dollars they receive going toward life-saving medical advancement. SBIR funding can bridge the valley of death for these growth-stage innovators, and restoring their eligibility was a significant boon for the biotech R&D ecosystem.

BIO strongly supported this reform in 2011, and we emphatically believe that venture-backed small businesses are deserving of the chance to compete for SBIR awards. BIO urges the Committee to continue to support this and other reforms that were enacted in 2011 as it considers the upcoming reauthorization.

Conclusion

The SBIR program plays a critical role in financing promising early-stage innovation. By reauthorizing the program and maintaining eligibility for majority venture-backed small businesses, Congress has the opportunity to continue to support groundbreaking R&D and spur small business growth across the U.S. BIO strongly supports reauthorization, and we encourage the Committee to maintain the progress it has made by preserving improvements made to the program in the 2011 reauthorization. SBIR provides critical support for promising science at innovative small businesses, and BIO believes that a strong reauthorization mandate from Congress will allow the program to continue to be a keystone in the funding ecosystem for the search for the generation of medicines that will bring solutions to our nation's most critical public health needs.