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A REVIEW OF THE SBIR–STTR PROGRAM

HEARING

BEFORE THE

COMMITTEE ON SMALL BUSINESS AND ENTREPRENEURSHIP

OF THE

UNITED STATES SENATE

ONE HUNDRED SEVENTEENTH CONGRESS

FIRST SESSION

SEPTEMBER 22, 2021

Printed for the Committee on Small Business and Entrepreneurship

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

U.S. GOVERNMENT PUBLISHING OFFICE
47–001 PDF WASHINGTON : 2022

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A REVIEW OF THE SBIR–STTR PROGRAM

WEDNESDAY, SEPTEMBER 22, 2021

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

The Committee met, pursuant to notice, at 2:15 p.m. in Room 301, Russell Senate Office Building, Hon. Ben Cardin, Chairman of the Committee, presiding.

Present: Senators Cardin, Shaheen, Markey, Coons, Hirono, Rosen, Hickenlooper, Paul, Young, and Hawley.

OPENING STATEMENT OF HON. BENJAMIN L. CARDIN, CHAIRMAN, A U.S. SENATOR FROM MARYLAND

Chairman CARDIN. The Senate Small Business and Entrepreneurship Committee will come to order.

Today we are holding a hearing on the review of the SBIR-STTR program. I want to thank Senator Paul and our witnesses for agreeing to start this hearing 15 minutes earlier than the previously advertised starting time, because of the adjustment of a Senate schedule and voting. It gives us a little bit more leeway. So I just want to thank everyone for their cooperation. I know Senator Paul will be joining us, and he encouraged us to get started.

So thank you all for joining us today for this important hearing, examining two of the Federal Government's most important innovation programs, the Small Business Innovation Research Program, also known as the SBIR, and the Small Business Technology Transfer Program, or the STTR for short.

The SBIR and STTR represent the best of government and industry's partnerships. They harness the creativity and ingenuity of America's small businesses to solve the most pressing public health and national security challenges of our time. They also support the growth of small, high-tech companies that create high-paying, local jobs and keep the American economy on the cutting edge of the technology industry.

Congress created the SBIR in 1982, to increase the participation of small businesses and federally funded research and development opportunities. Under the program, Federal agencies that budget at least $100 million annually for outside research must allocate a portion, 3.2 percent since fiscal year 2017, to support research and development in small businesses.

There are currently 11 Federal agencies and departments participating in the program, including the Departments of Defense, Energy, Education, and Health and Human Services.

The program awards funds in three phases. Phase I, awards are up to $225,000 and may be used to conduct a feasibility study to determine if the idea's scientific and commercial promise. Phase II awards are worth up to $1.5 million, and may be used to conduct further research and development on the feasibility of turning an idea into a commercial product. And Phase III does not award funds but denotes that an idea is ready to move from the laboratory to enter the marketplace. During the commercialization phase, small businesses are expected to raise funds from private sector or non-SBIR Federal funding.

Congress created the STTR program in 1992. While the program is similar to the SBIR in structure, utilizing a similar three-phase progression, STTR awards are made to small businesses engaging in collaborative research and development with Federal labs as well as nonprofit, educational, and scientific institutions.

The program requires Federal agencies and departments that spend at least $1 billion on outside research to allocate at least 0.45 percent of those funds to STTR opportunities.

The American people may not be familiar with SBIR and STTR, but they definitely recognize the products and companies that were created through the program. The Sonicare electric toothbrush, the iRobot, Lasik eye surgery, and Qualcomm, the company that makes the technology that powers our smartphones, were all made possible through SBIR and STTR grants.

The programs also help prepare our Nation's public health infrastructure for the COVID–19 pandemic. In 2013, the National Institutes of Health, which is headquartered in my home State of Maryland, awarded $2.53 million SBIR grant to the Seattle-based Adaptive Biotechnologies to support the company's development of adaptive immune system testing technology. On March 5th of this year, the Food and Drug Administration granted the company an emergency use for its T-Detect COVID test, which is able to detect a recent or prior COVID–19 infection. The development of this test was a direct result of the research and development the company was able to conduct through an SBIR.

While the test cannot be used to detect a current infection, the FDA is confident that the test will be especially useful for people who may have exhibited symptoms previously or believe they have been exposed but have not tested positive for COVID–19. The test will deepen our knowledge of the virus and help keep our communities safe.

Simply put, SBIR and STTR have been invaluable to our national economy, and they continue to help us keep safe.

I have had many discussions with State government officials and leading scientists in Maryland who have told me that one of the most sensible steps we could take to improve the SBIR and STTR programs would be to make them permanent. Right now, SBIR and STTR are only authorized through September 30 of next year. The high-risk research that grant awardees are engaged in requires more certainty.

Instead of leading the researchers who will create the technology that will power the economy of tomorrow wondering about funding for SBIR or STTR, we in Congress have an opportunity and an ob-

ligation to make these programs permanent, which both the Pentagon and NASA have urged us to do.

Acknowledging the importance of these programs is not meant to imply that they are perfect, by any means. Today we must also discuss how to best improve the speed of grant reviews, how to assist and target potential applicants in underserved communities, the disbursement of award funds, and whether to increase the percentage of funds that agencies and departments are required to set aside for these grants.

I look forward to hearing more from our witnesses about how we can improve the SBIR and STTR programs to ensure that American technology and research industries remain the standard-bearer for the global economy.

As I pointed out earlier, these programs have enjoyed strong bipartisan support in the United States Senate, and for good reason. They have really resulted in a very fine investment for America's economy and America's future.

With that let me recognize the distinguished Ranking Member, Senator Paul.

OPENING STATEMENT OF HON. RAND PAUL, A U.S. SENATOR FROM KENTUCKY

Senator PAUL. Thank you, Mr. Chairman.

When the Federal Government spends other people's money it has little incentive to spend it wisely. Unsurprisingly, when taxpayers are compelled to support research proposals without any expectation of a return on investment, the results often have been bad science and wasted dollars.

The Small Business Innovation Research and Small Business Technology Transfer programs are no different. We should look at the history of SBIR and ask ourselves whether the taxpayers should be compelled to continue funding the folly of this program. For instance, the National Science Foundation spent nearly $1 million to genetically engineer an alternative hops-flavored beer. Now why would the government, which is trillions of dollars in debt, offer this almost million-dollar donation when the $100 billion beer industry would likely finance such a project?

The SBIR not only funds projects that would be taken on by private actors but it also is duplicative and funds projects that no one in their right mind would spend their money on. SBIR funded studies for a phone app that measures your gratitude. Yes, that is right, a phone app that measures your gratitude, whatever that means. The SBIR also funded an app to promote virtual clothing fittings. Really? I wonder what cretin thought that was a legitimate function of government.

SBIR even provided seed funding to test a new show that teaches children to eat their fruits and vegetables first. Well, one would think the proposal would call to mind something we already do through Sesame Street, the pro-veggie kids' show that the Federal Government already spends millions of dollars annually on. Maybe we should not be surprised that the bureaucrats at the SBIR program offices have never heard of Sesame Street. If they had they might be able to count all the way up to $28 trillion, which is our national debt at the moment.

A country approaching $30 trillion in debt cannot afford such frivolous spending. Now is the time to put a stop to such waste. A century of economic history proves, beyond a doubt, that the free enterprise system is best suited to provide capital to help small businesses grow and succeed. When private investors have skin in the game they will prudently invest their own dollars rather than roll the dice with taxpayer subsidies.

Milton Friedman got this right. He explained succinctly when he said, "Nobody spends somebody else's money as wisely as their own." When those investments pay off, everyone in the market wins. But only a select few win and have figured out how the SBIR program worked for them, and them alone.

Some companies have been so successful in creating an entire business model and revenue stream that solely for these grants they are known as SBIR mills. An analysis by the State Science and Technology Institute showed that from 2009 to 2019, 21 percent of the awards were made to the mills, which the institute defined as firms who received more than 40 Phase I awards. Forty grants to just one company may raise a few eyebrows as unnecessary and excessive and somebody abusing the system. According to SBA's public data, 196 businesses received more than 100 awards each. Some businesses received more than 900 awards. It sounds like somebody has figured out the system here.

Various studies show minimal or no program benefits for firms that receive multiple awards. They typically do not commercialize their products or move on from the program. Instead, they crowd out new small businesses from participating.

The question is, why do these firms receive so many awards without any limitations from Congress? The SBIR program is typical of government programs that pick winners and losers. The SBIR mills, the winners, will always ask to continue the flow of free money. It is somebody else's money anyway. It is the small businesses that are crowded out of this program that are not heard from, and the taxpayers, the people who pay all the costs while others get the benefits. These people are the losers in this game.

We need to question whether this program should continue to exist. We need to hold agencies accountable, and at the very least, we need to stop the abuse of the SBIR mills.

Thank you.

Chairman CARDIN. We will now go to our witnesses. Our first witness will be Mr. Jere Glover, who is the Executive Director of the Small Business Technology Council, a group of small, high-tech companies, most of which are involved in the SBIR and STTR programs. Mr. Glover's experience with the SBIR is extensive, as he is one of the fathers of the program. As counsel to the House Small Business Committee, he directed an extensive set of hearings on small business innovation that laid the groundwork for the SBIR in 1978. He was also the lead witness before Congress in 1982, when the SBIR program was first proposed.

Our second witness will be Mr. Robert Kavetsky, who is the Chief Executive Officer and President of Energetics Technology Center, a research and development organization headquartered in the great State of Maryland. ETC executes technology development

and tech transfer programs for the Department of Defense and other agencies.

We will start with Mr. Glover. And for the information of our witnesses, your entire statements will be made part of the record. You may proceed as you wish.

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

Mr. GLOVER. Thank you. Good afternoon, Chairman Cardin, members of the Committee. I am Jere Glover, Executive Director of the Small Business Technology Council of the National Small Business Association.

We know America's small business, which employs 35 percent of our scientists and engineers, are the primary innovators and job creators led by entrepreneurs developing new products and services and focusing on building their businesses. Yet Federal R&D is still done primarily by large businesses, government labs, and universities. Congress realized this disconnect, and with President Reagan passed the SBIR in 1992, to make sure that at least a small portion of the Federal R&D dollars was done by small business.

The resulting SBIR has become a primary driver for American innovation and jobs. Seventeen countries have copied the SBIR program around the world, and China is even going further, making investments in businesses, even American businesses. The European Union invests over 20 percent of its R&D dollars on small businesses, more than twice what the United States does.

The genius of the SBIR program is it enlists our Nation's small businesses to competitively convert American science into scientific breakthroughs, useful technologies that meet the Federal needs while engaging entrepreneurs to build their businesses and create jobs.

SBIR does not cost anything. It redirects a portion of the Federal R&D dollars to small business, the most innovative sector of the economy. These small firms must be based in and owned by Americans, and the work must be done in America.

Why does SBIR work? One, it gets Federal R&D done by small business, the most innovative sector of the economy. Two, there is a merit selection based on technology. Three, it is highly competitive. Four, it focuses on agency needs and there is a commercialization focus.

Attached to my testimony is a list of links to hundreds of SBIR success stories, but let me just mention two in particular that are on everybody's cellphones these days. One is the GPS and Bluetooth, and the second is CMOS, which is the camera technology used for almost all cellphones.

Let me talk about the DoD. Two agencies, DoD and the National Cancer Institute, have both had detailed studies showing over 95 percent of all Phase II SBIR awards. Looked at it. Out of an investment of $16 billion by those agencies, it attracted additional $30 billion in additional assets and R&D, and returned $130 million in sales, $56 billion for acquisition of SBIR technologies by those two agencies.

The market really loves SBIR. Fifteen of the leading 20 biotech companies have SBIR awards, 15 of 2000. Two thousand SBIR firms have been acquired, DoD firms, have been acquired. Most major prime contractors recognize the importance of SBIR technology and actually acquire them. Most of them have acquired at least 10 SBIR firms.

Over 4,000 SBIR firms have received $170 billion worth of venture capital. The SBIR rate of return at the DoD is 22-to–1, and 33-to–1 at National Cancer Institute. The SBIR returns in tax money, State and Federal tax income, over $3 for every dollar invested in the National Cancer Institute of Health and just slightly under $3 at DoD.

The best program at DoD is the Navy. Its SBIR program will reach $1 billion per year in follow-on contracts. That is $2 for every dollar invested.

In conclusion, the SBIR program works.

I am sorry. One other thing.

In many sectors, SBIR funding is the primary source of R&D funding. SBIR and STTR invest in the innovation stage, well before venture capital and banks will provide risk capital. VCs focus on sectors such as software, internet, telecommunications, and health care. These get 83 percent of VC investment deals. SBIR, on the other hand, invests in a broad spectrum of technologies in all sectors and regions of the country.

In conclusion, after 19 National Academy of Sciences studies, 4 economic impact studies that have found the SBIR program meets the congressional goals with over 50 percent commercialization. The SBIR program works and should be reauthorized as soon as possible and should be grown.

Thank you.

[The prepared statement of Mr. Glover follows:]



Testimony of

Jere W. Glover
Executive Director
Small Business Technology Council
Washington, DC
Prepared by Jere Glover, Kevin Burns, Robert Schmidt and Alec Orban

BEFORE THE COMMITTEE ON SMALL BUSINESS & ENTREPRENEURSHIP

UNITED STATES SENATE

40 Years of Success:
SBIR drives America's High Tech Economy
Technology Innovation, Competitiveness and High Quality Jobs

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September 22, 2021
On behalf of
The Small Business Technology Council
www.sbtc.org

SBTC is the nation's largest association of small, technology-based companies in diverse fields, and represents more companies that are active in the federal Small Business Innovation Research (SBIR) Program than any other organization. SBTC is proud to serve as the technology council of the National Small Business Association.

SBIR drives America's High Tech Economy
Technology Innovation, Competitiveness and High Quality Jobs

We know America's small businesses (which employ ~35% of our scientists and engineers) are our primary innovators and job creators, led by entrepreneurs developing new products and services for our economy, and capable of and focused on building their businesses.

Yet Federal R&D is still done primarily by large businesses, national labs and universities. Congress realized this disconnect: Federal R&D is not being done by America's primary innovators and job creators best able to carry the result forward into U.S.-based products and services and jobs to strengthen the American economy. Consequently, Congress in 1980 piloted the Small Business Innovation Research (SBIR) program and expanded the program in 1982 to make sure that at least a small fraction of Federal R&D is done by small businesses. The result has become a primary driver of American innovation, economic advantage and good jobs.

The genius of the SBIR program is it enlists our nation's small businesses to competitively convert American science into new scientific breakthroughs and useful technology innovations that meet Federal R&D needs while enabling entrepreneurs to build businesses and American jobs. SBIR, and its sister program STTR, draw small businesses into Federal R&D, resulting in substantially more technology innovation and American-based products, services and jobs growth.

SBIR firms must be American-based/owned small businesses, with work done in the U.S. Topics are set by the agencies, which competitively select among small business proposals based on merit to meet agency objectives. The R&D offers to meet agency-defined market and societal needs, and create new sustainable high quality, high paying manufacturing and service jobs in the U.S. while raising living standards and making American industry more competitive.

This highly competitive program is successful in creating both innovations and resulting products and services for both commercial and Federal requirements.

- Competitive merit selection: Only ~1 in 20 Phase I proposals for exploratory proof of concept work advances to substantial agency R&D support in Phase II.
- High quality R&D: The result is high quality R&D in Phase II directed to agency objectives and transforming American technology for the future.
- Commercialization: A primary objective is Phase III transition and commercialization of the R&D, funded outside the SBIR program. This has driven business and jobs growth in the small businesses and in larger businesses who acquire or license the new high tech.
- Broad participation: SBIR has helped women and minorities and underserved states to boost their participation in Federal R&D. SBIR has broadened national access to America's tech economy across all 50 states while also boosting participation by women-owned firms, minority-owned firms, and others to build new businesses, all based on selecting the best proposed technological for the agency topics.

SBIR remains a very small program: only ~2% of total Federal R&D expenditures (3.2% of extramural R&D). Many studies have recommended growing it, based on its outsized performance (e.g. the EU is investing over 20% of its R&D in small businesses). For manufacturing and for many other sectors, it is virtually the only source of early stage funding),

generating innovation and job creation better than any other innovation program in America. Internationally, many countries are investing their R&D heavily in small business, with 17 copying the SBIR program.

The result: over 40 years of a clear success story. SBIR has become a primary driver of American innovation, economic advantage and good jobs. It has brought small business ingenuity and entrepreneurial drive into Federal R&D, disrupting old approaches and creating myriad new technologies. The result has been new American industries, new businesses and high quality jobs while growing America's technology competitiveness across a more diverse population and all 50 states.

The SBIR program is currently set to expire on **September 30, 2022**. The sooner it is reauthorized, the sooner both small businesses and agencies can begin to plan for the future. Uncertainty is the enemy of long-term investment. The closer the SBIR program its expiration, the more all parties think short term and defensively, rather than the strong sustained drive for future innovations that should be the focus on the program. SBTC urges Congress to reauthorize SBIR this year, don't wait until the last minute and leave small businesses guessing whether or not the program will exist in 2023.

SBIR Works

SBIR R&D projects are technology seed corn, planted in small businesses committed to grow them into new products. **Despite only ~2% of overall Federal R&D funding, SBIR/STTR's outsized results are a primary driver of American economic strength.** SBIR/STTR firms have created over 20% of the world's major innovations[1], and as many patents as all universities combined (which receive 10X the R&D funding). SBIR firms significantly outperform larger firms on patent productivity. High quality R&D tackles Federal challenges and creates new innovations, while seeding new startups and driving the growth of small businesses with their new technology products and services. Global giants such as Qualcomm, Broadcom, Symantic, Biogen, iRobot, Genzyme, Illumina, and Genentech all emerged from SBIR funding. Other SBIR businesses and technologies were sold or licensed, revitalizing older industries while cutting costs and growing competitive strength, and generating new divisions and new jobs located here in America. Follow-on new product investment and sales have totaled many hundreds of billions of dollars.

SBIR firms have produced life-changing breakthroughs in defense, energy, communications, information and bioscience - new tech building blocks for American manufacturing. Agency mission objectives were accomplished. DOD strengthened capabilities while cutting costs. The National Cancer Institute has produced $33 in economic output for every SBIR R&D dollar, creating $26 billion in economic impact from $787 million in SBIR awards. An NIH program for home sleep testing saves health care payers over $34 million per year. The Air Force's SBIR program saved the F-35 JSF program over $500 million, while Navy SBIR projects have boosted performance and saved substantially across the submarine fleet.

The data supports SBIR success, and suggests doing more can increase its success. The SBIR/STTR program clearly provides a big bang for the federal R&D dollar, an unmatched economic growth engine.

- 19 National Academy of Sciences studies have been conducted on the programs, and have concluded that SBIR has met its goals, and showed SBIR/STTR Phase II awards commercializing at rates from 45-70 percent.
- Economic impact studies at the Navy, Air Force, DOD and the National Cancer Institute show remarkable impact on America, e.g. in excess of $15 to $23 for every SBIR dollar over a 14 year period.[2] Results included improved military strength and capability, significant cost-savings, new industries with new products and services, and new life saving medical techniques and products. Job quality was high, with high average incomes, e.g. $68,535 in the Navy study.
- The studies understate the impact, not capturing the impact of SBIR licenses or business acquisitions on the licensing or acquiring business's sales and competitiveness.
- Tax income in the period more than repaid the SBIR R&D funding: up to over $3 in increased Federal, state and local taxes for every dollar spent on SBIR.

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[1] Fred Block and Matthew Keller, *Where Do Innovations Come From? Transformations in the U.S. National Innovation System 1970-2006*, Information Technology and Innovation Foundation, July 2008.

[2] Swearingen, Will and Jeffrey Peterson, *"National Economic Impacts from Air Force and Navy SBIR/STTR Programs, 2000-2013"; "1998-2018 National Economic Impacts from the National Cancer Institute SBIR/STTR Programs"; and "National Economic Impacts from the DOD SBIR/STTR Programs 1995-2018"* Techlink



- Depending on agency, 45-70% of SBIR small business awardees include university faculty. 70% of all university licenses are issued to SBIR and other small/startup firms.[3]

SBIR supports and drives American technology transformation: Further American economic infrastructure revitalization offers further opportunity for improved performance via SBIR/STTR innovation and new STEM impacts further transforming the defense, energy, bioscience, communication, and information industries. SBIR/STTR infusion offers the potential for simultaneous performance improvements and dramatic cost reductions throughout our economy as we reinvigorate and grow our economy, export base and competitive strength, building a stronger American internationally competitive base. Further, small businesses have a far greater tendency to locate their resulting new jobs in the United States, compared to large businesses.

In many sectors, SBIR/STTR funding is the primary source of external R&D funding: SBIR/STTR invests at the innovation R&D stage – well before Venture Capital (VC) and banks will provide risk capital. Successful SBIR technologies advance to use VC and bank lending as they mature towards products as well as to advance to larger non-SBIR Federal agency support where this is appropriate (e.g. for larger, more advanced agency needs using regular program support). Also SBIR innovation is directed across America's innovation opportunities, well beyond the VC-focused sectors such as software, internet, telecommunication and healthcare (which receive 83% of VC deals). The broader sectors SBIR primarily supports include manufacturing, defense, energy, and the environment, all key to growing America's economy. This is increasingly important as VC funding and VC-created jobs increasing move out of the United States. Over 90% of VC money used to be invested in the US, that is now halved to 44.9%; $156B worldwide, of which $70B invested in the US.[4] And small businesses have a great record on keeping their jobs in the U.S., being much less likely to outsource their jobs after product development.

Those who can't find funding in the U.S. are turning overseas for help commercializing their research. One Chinese organization, BICI, has developed 158 U.S. research projects and has funded over $616 million for commercialization of U.S. funded research, moving the commercial jobs from U.S. research to China. So far BICI has commercialized 108 such projects.[1]

SBIR/STTR is a force for diversification and broadening of America's technology base. SBIR reaches out to underserved states and groups, broadening the impact and strengthening national STEM results. This is the result of merit-based selections and openness to new entrants. In making award decisions based upon supporting the best technologies, helps open broader competition and break down geographic, ownership and existing market power restrictions in America's technology's sector. VC funding is concentrated in just a few areas of the US; SBIR reaches all the states and far outstrips VC investment in terms of women and disadvantaged minority participation. The SBIR program is critical to providing startup capital to all parts of the nation.[5]

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[3] Association of University Technology Managers (AUTM), *FY2016 AUTM US Licensing Activity Survey*, 2018

[4] "State of Venture Report, Global Q2 2021, CB Insights

[5] Of $70B VC funding in the US, $23.7B was in Silicon Valley, $11.2B in New York, $7.8B in Boston, and $6.0B in LA (State of Venture Report, Global Q2, 2021 CB Insights). These four regions used $48.7B, leaving only $21.2B (30%) for the rest of the country. $13.5B went to the next 10 metro areas. So, the top 14 metro areas received $62.2B, which leaves $7.8B for the other 378 metro areas; 11.2% of the VC investments for 96.4% of U.S. metro areas.

In addition, the SBIR program works to actively boost opportunities among geographically disenfranchised regions and disadvantaged businesses, as well as women-owned small businesses, such as by leveraging the nation's dramatic spread of "innovation hubs" in geographically disenfranchised regions, led by regional industry/academic/ government partnerships, and redefining STEM. In one example, GSA's new transition support for Phase III transitions has led to 45% women-owned small business participation in Phase III awards.

New products meeting important American STEM challenges are energizing new generations looking for better and more sustainable jobs. Increased heartland investment in SBIR/STTR can become a keystone of America's manufacturing revival. This said, more should be done to support outreach to underserved areas and underrepresented groups.

The SBIR program works well. But it works not simply because the results have been good, but also because the program is structured to work well.

SBIR is Designed for Success

It is important to realize why SBIR works – it is not just accident or the tapping into the small business capabilities, but also in the structure of the program that ensures technology relevance, keeps the focus on the quality of the R&D, and provides checks and balances.

- Taps small business entrepreneurship, innovation, drive and competitive flexibility
  - Small businesses themselves are creative, flexible, innovative, entrepreneurial, and employ 35% of America's scientists.
  - Small businesses are inherently capable of growing and driven to grow
  - Small businesses almost exclusively create their new jobs here in the US, whereas larger businesses and VC-driven firms tend to create most of their jobs worldwide.
- Earliest stage innovation funding while performing R&D for Federal purposes. SBIR/STTR is a unique seed fund for American technological innovation, investing in innovations before Venture Capital or banks are interested while doing R&D wanted by the agencies.
- 3 stage program: Phase 1 is proof of concept. Phase 2 focuses on R&D. Phase 3 is follow-on R&D and commercialization. SBIR funding is for Phases 1 and 2. Phase 3 is not done with SBIR funding.
- Agencies control the R&D: Directed to agency challenges supporting agency missions
  - Agencies select topics, select winners, make awards to meet their needs
  - Topics are selected by the agencies to focus the competition among the small businesses, so that specific agency challenges can be addressed.
  - As best run, e.g. at Navy, SBIR is aligned with programs of records' interests and the programs needs drive R&D selection.
- Merit selection based on science and technology and performance
  - Highly competitive: Only 5% of Ph 1 proposals advance to main Phase 2 R&D work.
  - The unwavering use of merit, "pick the best solution", ensures that Federal R&D is always directed to the best potential solution for the best potential outcome.



- Leverages university research: some 50-70% of SBIR work is done either with direct or former university faculty involvement either in the business or at the university. STTR is focused on encouraging company-university partnership.

Small business innovation will grow high quality manufacturing and service jobs, reduce our dependence on imports, reduce debt, improve American competitiveness, and better spread good American jobs throughout all 50 states. *See state by state data in Appendix B.*

The Market loves SBIR

It is well established that the Federal government benefits tremendously from SBIR technology, but the commercial market also values SBIR technology. Some facts that show that SBIR makes a difference include:

- Over 50% of Phase II projects have advanced to commercialization.
- Of the 15 leading Biotech Firms then identified in a Forbes article, 11 were SBIR Awardees (*see Appendix F)*
- 829 SBIR related firms have gone public
- 2,120 SBIR firms have been acquired, invigorating the acquiring businesses
- Many SBIR companies have licensed their technologies, with the licenses reinvigorating the technologies of the larger and older-technology firms that are granted licenses.
- Large Prime contractors have acquired over 100 SBIR firms for $35 billion. L3 Com, GE, SAIC, BAE, Lockheed Martin, Raytheon, Gen Dynamics, Philips, Teledyne have each acquired 10 or more SBIR Firms. L3 Com alone has acquired 43 SBIR Firms
- Universities license 70% of all their technology to small business and are using SBIR and STTR to help get their technology into the market.
- VC have invested twice as much as the Government in SBIR firms. 10% of all VC investments go to SBIR firms
- For every dollar invested the Navy gets two dollars of follow-on Phase III contracts in addition to subcontracts, licenses and additional investments for a 22:1 ROI.
- There have been 137,443 patents issued to SBIR firms. In most years SBIR firms receive more patents than all colleges and universities combined.
- The SBIR/STTR Programs have been copied by seventeen countries around the world, with other small business R&D investment by many. Including China. The European Union is investing over 20% of its R&D in small businesses.[6]

[6] https://ec.europa.eu/programmes/horizon2020/en/area/smes



National Academy of Sciences: Repeated Stamps of Approval for SBIR

While the Government Accountability National Academy of Sciences have scrutinized and reported on SBIR/STTR Program mechanics more than 25 times since 2000, NRC made a definitive SBIR assessment in a series of reports from 2004 to 2009, comprising thousands of pages, on the SBIR programs at the Department of Defense (DoD), National Institutes of Health (NIH), National Aeronautics and Space Administration (NASA), Department of Energy (DoE), and National Science Foundation (NSF)—the five agencies responsible for 96 percent of SBIR operations. **The Rate of technology commercialization across these agencies were found to be from 45 to 70 percent**, and direct university collaboration in between 33 and 63 percent of SBIR awards.

National Cancer Institute

One agency's remarkable success story

The SBIR/STTR economic impact study for the National Cancer Institute showed a return of $3.68 in taxes for every dollar invested. Unleashing small businesses in the health care field has proven successful, like printing money without the inflationary effect. New innovations, good jobs, and we get back more in taxes than we invested. The study looked at 12 years and 690 NCI Phase II SBIR/STTR awards totaling $787 million dollars to develop new medical devices, drugs, research tools and in-vitro diagnostics for treating cancer. The results were $9.1 billion in sales, $2.9 billion in tax revenues, and 107,918 new jobs, as well as 45 spinouts, 103 licenses, $4.26 billion in added outside investment, and 103 of the companies being sold to invigorate the larger companies looking for new technologies. SBIR is a GDP and jobs engine producing high leverage economic power. SBIR success stories were for Breast, Lung, Prostate and multiple other cancers. There are literally thousands of success stories here. All of our lives are better for them.

dollar amounts in millions	NCI ('98-'10)	
Total Awards	690	
Total SBIR/STTR Award Investment	$787	
Rate of Commercialization	53%	
Cumulative Sales	$9,144	$11:1
Follow-on R&D	$957	$1.2:1
Total Value of Acquired Firms	$21,630	$27:1
Total Outside Investment Funding	$4,260	$5:1
Total Economic Output	$26,100	$33:1



Areas for Improvement

Congress has driven improvements to the SBIR program: Congress created the SBIR program and has been a primary force driving its evolution and improvement. Congress has made a number of improvements to the program in recent years, such as pilot programs to streamline and simplify the award and contracting processes, allowing GSA to do Phase III contracting, meeting competition in contracting requirements and sole source contracts, and increasing the allocation amount. More can be done to continue to improve and strengthen SBIR/STTR, keeping what has been successful about the programs while working to improve overall effectiveness.

- Greater focus on simplifying and streamlining the proposal and contracting processes
- Better alignment of topics with the longer-term R&D interests of the agency. Greater alignment with the agency primary programs of record.
- Broader outreach to better attract high quality minority, women and rural technology companies and to improve their ability to submit proposals that win based on merit.
- Greater focus on improved and speedier commercial transition of SBIR technologies into commercial market entry or regular Agency R&D programs and purchase programs.
- Look for best practices across programs to help improve the SBIR program. E.g. the Navy SBIR Program is a model of excellence with a proven record of success involving its Program Managers, trained contracting personnel, purposefully making advanced regular program transition investments to rapidly convert the best SBIR projects into products for the warfighter. Other programs have also developed good best practices that could be shared among agencies.
- Even now, with all of the program's successes, many say the program is too small.[7] It still only uses 3.5% of Federal external R&D $, whereas small businesses employ some 35% of American scientists and engineers.
- The DOD Section 809 Panel recommends doubling SBIR and RIF for DOD[8]

[7] For example, see 809 Report, *Supra.*

[8] DOD Section 809 Panel, Jan. 2018: "Report of the Advisory Panel on Streamlining and Codifying Acquisition Regulations", Sub recommendation 21b.

Areas for Concern

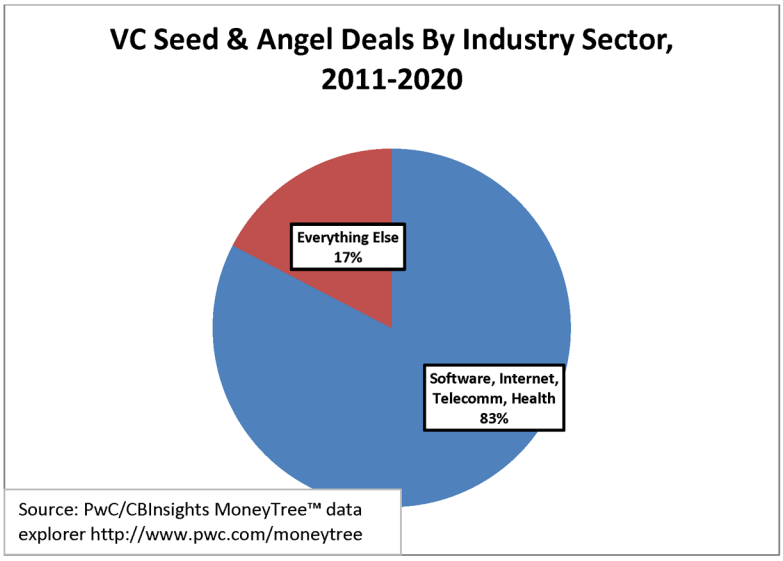
Congress should ensure that new changes do not weaken the drivers that have supported high SBIR performance and potential. We have some concern that changes may be introduced into the program that could harm the high effectiveness of the program. Some see SBIR as a pool of money that their special interest would like to use, some look to tap the funding for use in non-small business R&D, and in other cases some agencies haven't worked their SBIR program to get the most out of them. We suggest that potential changes be evaluated to ensure they are not weakening the reasons that make SBIR work, that are the cores of its success.

- **Make sure the focus stays on merit-selection and the technical R&D**: SBIR success has been the result of sustained investment into merit-selected R&D projects in a two-Phase structure that encourages high quality selection in support of agency objectives and that encourages proof of performance prior to substantial investment.
- **The focus should stay on innovations rather than already-commercialized technologies**: Some groups have looked to invest R&D in already-commercial technologies – we'd argue that SBIR funding isn't for commercialization and is best spent to create the commercial technologies of tomorrow, not to help advance existing commercial technologies. It's the Small Business Innovation Research fund – make sure to use the program to fund small business innovation research, not other things. If an agency wants to advance an already-commercial technology without focus on innovation, this might be considered the role for regular agency program funding for highly advanced technologies where innovation is no longer a key R&D focus.
- **We believe jumbo awards should be funded by regular agency program funding for advanced programs, not SBIR funds**: The system currently supports many high quality R&D investments in Phase II. We are concerned that jumbo Phase II awards (beyond the current limits in the SBIR Policy Directive) sap money away from many other potential awards to over-invest in just a few projects. If an agency considers a project deserving of an unusually large follow-on award, this is better drawn from regular program funds rather than overconcentrating the agency's SBIR program investment into fewer projects. Remember that every SBIR dollar spent on something big means less is spent on multiple potential solutions to agency challenges.
- **Open topics weaken competition**: Some groups have looked to heavily use so-called open topics where there really is no topic but instead a scrum where all ideas compete with all others rather than seeking competition towards specific topics. This misses the opportunity to use the SBIR Phase I process to have companies compete with each other in proposing specific solutions to specific problems, and so have to in Phase I actually prove their proposed solutions. The result is weakened competition and, combined with jumbo awards, increased return on agency lobbying.

SBIR is often the only source of funding for innovation research

SBIR innovations reflect the needs of America across the nation. In many cases there is no other source of funds for developing early stage technology in America, and this holds true even for advanced stage technologies outside of the favored venture capital/angel industry sectors of software, internet, telecommunications, and healthcare that comprise 83% of the VC deals. All other industry sectors combine for only 17% of the total funds VC invests in seed and angel stage deals. VCs are also focused on only a few states, with most flowing to California and Massachusetts. SBIR funded **7000** deals last year with **$3,700,000,000** dollars across a wide spectrum of technology, industries and regions.

SBIR/STTR invests at the innovation stage – well before VC and banks will provide risk capital. Successful SBIR technologies do advance to use VC and bank lending as they mature towards products. Also SBIR innovation is directed across America's innovation opportunities, not just in VC-investing sectors such as software, internet, telecommunication and healthcare (receiving 83% of VC deals) but also in higher jobs-producing areas such as manufacturing, defense, energy, and the environment, that are key to building America's good job economy. And small businesses have a great record on keeping their jobs in the U.S.

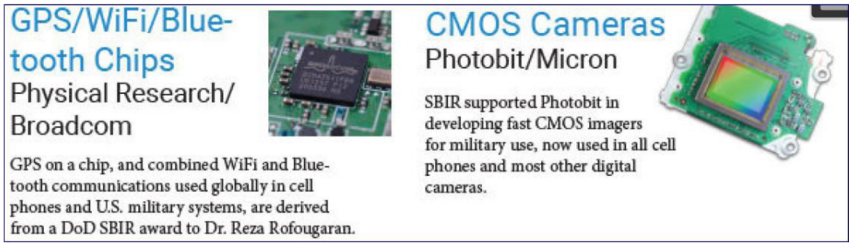


Many universities and government labs have had difficulty translating their research into inventions. A recent Association of University Technology Managers study shows that less than 1% of their licenses generate more than $1 million, and that 70% of university licenses are with SBIR firms.[2] Small business and SBIR/STTR are now a huge part of how universities and their professors advance their technologies out of the lab.

But those who can't find funding in the U.S. are turning overseas for help commercializing their research. One Chinese organization, BICI has developed 158 U.S. research projects and has funded over $616 million for commercialization of U.S. funded research, moving the commercial jobs from U.S. research to China. So far BICI has commercialized 108 such projects.[3]

Success stories

You probably use technologies initially funded by the SBIR/STTR Program on a daily basis, and probably have at least two of these in your pocket or purse right now. The technology that allows your cell phone to use GPS on a chip was developed by Dr. Reza Rofougaran under an SBIR award. And the fast CMOS camera technology used by most cell phones and digital cameras was developed for military use under an SBIR award as well.



Successful alumni of the SBIR program include: Qualcomm (cell phone communications), Symantec (computer security), Genzyme (biotech therapies), Affymatix (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), 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. (For more success stories see Appendix D).

Phase III is another area of success. In recent years, the Navy has entered to $2.5 billion dollars of Phase III contracts, the Air Force over $1.5 billion contracts and the GSA has entered into contracts that could be worth $4 billion. All three agencies have shorten the time it takes to get some Phase III contracts awarded.

SBTC
Small Business Technology Council

Appendix A

SBIR Impact on Job Creation & STEM Employment

- SBIR involved firms – current or previous - collectively have been factor in some 9.26% of US STEM jobs
- …yet as firms, SBIR Awardees in almost every state consistently factor to significantly less than One-Quarter of ONE percent of establishments.

Analysis of extent to which SBIR-STTR Awardees by State (and overall) are factor in US STEM employment

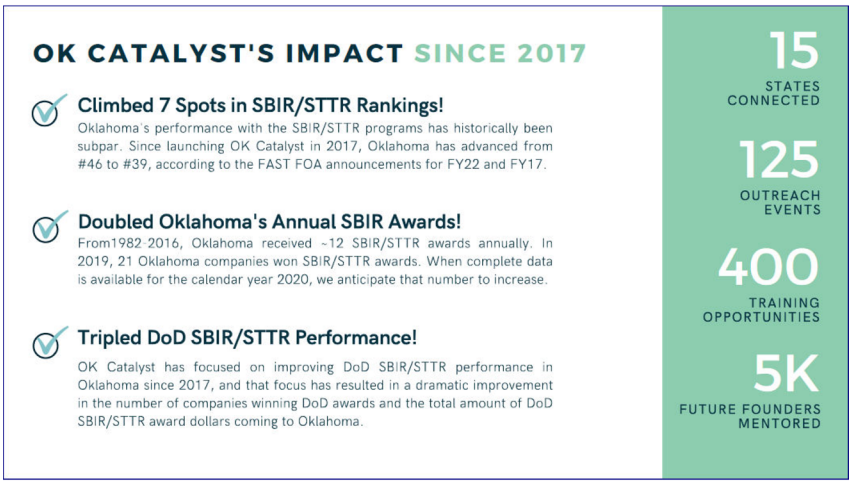
State	Total State employment[1]	STEM Jobs in state (2020)[2]	STEM employment as % total	Total SBIR-STTR Awardees	SBIR-STTR employment[3] (Note 1)	SBIR related STEM employment	% all US STEM jobs
AK	296,300	19,710	6.65%	37	1213	6.15%	0.21%
AL	1,903,210	112,570	5.91%	351	19436	17.27%	1.18%
AR	1,177,860	48,220	4.09%	90	618	1.28%	0.51%
AZ	2,835,100	193,370	6.82%	481	10410	5.38%	2.03%
CA	16,430,660	1,307,860	7.96%	5724	224098	17.13%	13.71%
CO	2,578,000	244,390	9.48%	954	20884	8.55%	2.56%
CT	1,540,870	113,190	7.35%	394	12596	11.13%	1.19%
DC	687,150	72,750	10.59%	135	3539	4.86%	0.76%
DE	426,380	28,710	6.73%	90	2055	7.16%	0.30%
FL	8,441,750	427,060	5.06%	899	20935	4.90%	4.48%
GA	4,308,600	272,580	6.33%	457	7958	2.92%	2.86%
HI	574,010	28,340	4.94%	116	1689	5.96%	0.30%
IA	1,469,920	81,590	5.55%	169	3410	4.18%	0.86%
ID	718,820	44,080	6.13%	100	2349	5.33%	0.46%
IL	5,627,670	337,880	6.00%	732	11329	3.35%	3.54%
IN	5,627,670	337,880	6.00%	327	5356	1.59%	3.54%
KS	1,331,960	79,110	5.94%	120	1342	1.70%	0.83%
KY	1,782,580	80,010	4.49%	183	1901	2.38%	0.84%
LA	1,801,290	69,150	3.84%	122	4414	6.38%	0.72%
MA	3,349,800	320,080	9.56%	2258	100415	31.37%	3.36%
MD	2,523,030	256,930	10.18%	1295	40301	15.69%	2.69%
ME	575,230	30,010	5.22%	126	2676	8.92%	0.31%
MI	3,924,010	291,370	7.43%	707	15466	5.31%	3.05%
MN	2,708,760	199,150	7.35%	393	16375	8.22%	2.09%
MO	2,691,620	156,370	5.81%	290	5334	3.41%	1.64%
MS	1,076,810	38,200	3.55%	66	1448	3.79%	0.40%
MT	455,450	25,760	5.66%	124	2422	9.40%	0.27%
NC	4,288,450	291,450	6.80%	711	15434	5.30%	3.06%
ND	400,040	17,750	4.44%	38	1858	10.47%	0.19%
NE	942,550	56,440	5.99%	80	1327	2.35%	0.59%
NH	619,430	47,970	7.74%	213	10836	22.59%	0.50%
NJ	3,782,740	264,950	7.00%	776	30488	11.51%	2.78%
NM	785,720	52,690	6.71%	349	8396	15.93%	0.55%
NV	1,250,860	48,330	3.86%	99	2362	4.89%	0.51%
NY	8,691,440	489,030	5.63%	1410	34603	7.08%	5.13%
OH	5,137,540	307,910	5.99%	923	23090	7.50%	3.23%
OK	1,562,780	81,190	5.20%	137	3778	4.65%	0.85%
OR	1,806,950	131,590	7.28%	386	11778	8.95%	1.38%
PA	5,512,120	350,520	6.36%	1190	31485	8.98%	3.67%
PR	819,750	36,430	4.44%	24	219	0.60%	0.38%
RI	442,900	28,730	6.49%	122	4574	15.92%	0.30%
SC	2,015,260	102,520	5.09%	166	2658	2.59%	1.07%
SD	411,250	20,380	4.96%	63	830	4.07%	0.21%
TN	2,903,810	150,610	5.19%	284	6422	4.26%	1.58%
TX	12,102,370	811,360	6.70%	1275	34253	4.22%	8.51%
UT	1,489,020	113,790	7.64%	376	11019	9.68%	1.19%
VA	3,701,220	353,730	9.56%	1304	66447	18.78%	3.71%
VT	281,070	16,440	5.85%	84	1566	9.53%	0.17%
WA	3,195,200	340,330	10.65%	796	24018	7.06%	3.57%
WI	2,709,940	167,970	6.20%	388	13834	8.24%	1.76%
WV	650,010	28,690	4.41%	52	1342	4.68%	0.30%
WY	261,690	12,060	4.61%	69	874	7.25%	0.13%
US	142,628,620	9,539,180	6.69%	28055	883460	9.26%	100.00%

SBTC
Small Business Technology Council

Appendix B

FAST Programs in Oklahoma and Montana Provide a roadmap for SBIR Success in Underserved States





SBTC
Small Business Technology Council

Montana
Innovation Partnership
powered by TechLink

Growing Montana's Innovation Economy

The Montana Innovation Partnership (MTIP) powered by TechLink is a cooperative partnership between Montana State University TechLink, a center within the Office of Research, Economic Development, and Graduate Education, the Montana Department of Commerce, and the U. S. Small Business Administration through the Federal and State Technology (FAST) program.

We help early-stage tech founders and researchers learn about and compete for SBIR/STTR seed funding through outreach, training, business and technical assistance, and collaboration with university, industry, and economic development partners.

Expert SBIR/STTR Assistance and Collaboration

Clients receive tailored no-cost expert consulting, coaching, and mentoring designed to ensure that SBIR is right for their business, to help them identify agencies and funding opportunities, provide guidance on building their team, protecting their intellectual property, customer discovery, commercialization of new technologies, and in-depth proposal preparation guidance and reviews.

SINCE 2018

45%
APPLICATION SUCCESS

12
FIRST TIME AWARDEES

35%
OF CLIENTS ARE UNDERREPRESENTED SMALL BUSINESSES

$20M
SBIR/STTR FUNDING TO CURRENT MTIP CLIENTS

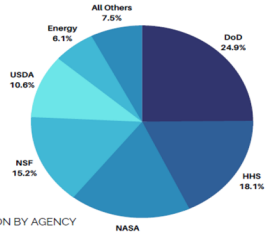
A HISTORY OF INNOVATION

82%
of all Montana SBIR/STTR awardees have received assistance from MTIP/TechLink in the past 21 years

Montana has one of the nation's top **photonics** clusters, a rapidly growing **bioscience** cluster, and cutting-edge research in **agriculture**, **energy**, and **software**. Sectors that drive innovations addressing our nation's technology needs.

Montana small businesses have received **over $233 million in SBIR/STTR funding** since the inception of the program.

SBIR/STTR seed funding has allowed over **110 Montana small businesses** to launch, scale, and, for many, attract talent and investment capital to the state.



MONTANA SBIR/STTR AWARD DISTRIBUTION BY AGENCY



Appendix C

State-by-State SBIR/STTR Figures for Senate Small Business Committee
All 50 states have small high technology businesses developing innovation, products and services based on Federal SBIR R&D. Each project provides the opportunity for a state to birth a new product or service, and to further build their tech sector.

Colorado

	SBIR/STTR	
Year	# Awards	$ Amount
2016	261	$117,195,547
2017	269	$115,208,773
2018	280	$143,951,628
2019	332	$165,647,584
2020	336	$164,828,203
2016-2020	*1478*	*$706,831,737*

Hawaii

	SBIR/STTR	
Year	# Awards	$ Amount
2016	23	$13,034,134
2017	44	$17,111,879
2018	36	$25,449,603
2019	53	$26,824,476
2020	47	$35,853,778
2016-2020	*203*	*$118,273,870*

Delaware

	SBIR/STTR	
Year	# Awards	$ Amount
2016	36	$17,628,004
2017	48	$23,593,900
2018	43	$24,436,685
2019	41	$20,752,825
2020	42	$20,371,210
2016-2020	*210*	*$106,782,624*

Idaho

	SBIR/STTR	
Year	# Awards	$ Amount
2016	10	$3,944,169
2017	4	$3,710,758
2018	6	$2,474,308
2019	7	$2,840,858
2020	14	$5,389,211
2016-2020	*41*	*$18,359,304*

Florida

	SBIR/STTR	
Year	# Awards	$ Amount
2016	153	$62,352,880
2017	176	$75,328,717
2018	177	$84,842,189
2019	211	$119,737,967
2020	200	$94,615,785
2016-2020	*917*	*$436,877,538*

Illinois

	SBIR/STTR	
Year	# Awards	$ Amount
2016	137	$59,315,299
2017	137	$59,186,158
2018	126	$69,659,960
2019	159	$70,261,176
2020	145	$77,194,992
2016-2020	*704*	*$335,617,585*



Indiana

	SBIR/STTR	
Year	# Awards	$ Amount
2016	49	$18,165,132
2017	56	$25,787,032
2018	47	$23,536,414
2019	67	$22,635,050
2020	56	$31,697,851
2016-2020	*275*	*$121,821,479*

Kentucky

	SBIR/STTR	
Year	# Awards	$ Amount
2016	40	$19,900,156
2017	39	$20,664,349
2018	42	$23,127,802
2019	33	$22,182,782
2020	39	$24,079,844
2016-2020	*193*	*$109,954,932*

Iowa

	SBIR/STTR	
Year	# Awards	$ Amount
2016	23	$9,866,603
2017	21	$13,178,114
2018	23	$9,357,882
2019	24	$8,203,051
2020	20	$14,834,720
2016-2020	*111*	*$55,440,370*

Louisiana

	SBIR/STTR	
Year	# Awards	$ Amount
2016	11	$3,739,876
2017	14	$7,373,076
2018	21	$8,049,202
2019	28	$9,716,725
2020	30	$12,482,119
2016-2020	*104*	*$41,360,998*

Kansas

	SBIR/STTR	
Year	# Awards	$ Amount
2016	9	$5,930,196
2017	14	$6,549,569
2018	22	$6,914,915
2019	21	$8,003,117
2020	24	$9,679,956
2016-2020	*90*	*$37,077,753*

Maryland

	SBIR/STTR	
Year	# Awards	$ Amount
2016	254	$134,642,799
2017	300	$141,846,940
2018	274	$148,513,218
2019	303	$174,584,237
2020	346	$191,074,380
2016-2020	*1477*	*$790,661,876*



Massachusetts

	SBIR/STTR	
Year	# Awards	$ Amount
2016	551	$302,188,905
2017	665	$331,008,323
2018	592	$354,303,552
2019	726	$408,526,202
2020	718	$406,770,283
2016-2020	*3252*	*$1,802,797,265*

Nevada

	SBIR/STTR	
Year	# Awards	$ Amount
2016	14	$8,450,112
2017	12	$5,795,176
2018	10	$4,644,449
2019	11	$6,573,137
2020	14	$6,717,333
2016-2020	*61*	*$32,180,207*

Minnesota

	SBIR/STTR	
Year	# Awards	$ Amount
2016	79	$37,954,870
2017	97	$50,338,415
2018	78	$43,648,405
2019	96	$62,420,237
2020	77	$53,046,237
2016-2020	*427*	*$247,408,164*

New Hampshire

	SBIR/STTR	
Year	# Awards	$ Amount
2016	73	$33,219,396
2017	83	$39,266,112
2018	91	$45,658,021
2019	111	$60,618,779
2020	87	$57,367,599
2016-2020	*445*	*$236,129,907*

Missouri

	SBIR/STTR	
Year	# Awards	$ Amount
2016	40	$17,554,613
2017	44	$23,364,320
2018	60	$27,263,342
2019	62	$31,680,401
2020	56	$30,876,151
2016-2020	*262*	*$130,738,827*

New Jersey

	SBIR/STTR	
Year	# Awards	$ Amount
2016	122	$56,448,477
2017	121	$60,681,490
2018	101	$49,584,048
2019	146	$71,147,862
2020	128	$61,782,493
2016-2020	*618*	*$299,644,370*



Oklahoma		
	SBIR/STTR	
Year	# Awards	$ Amount
2016	19	$7,546,360
2017	17	$11,997,731
2018	16	$7,545,586
2019	26	$11,156,481
2020	25	$13,221,342
2016-2020	*103*	*$51,467,500*

Washington		
	SBIR/STTR	
Year	# Awards	$ Amount
2016	114	$63,413,248
2017	110	$60,519,129
2018	104	$59,459,677
2019	125	$62,592,823
2020	151	$84,348,352
2016-2020	*604*	*$330,333,230*

South Carolina		
	SBIR/STTR	
Year	# Awards	$ Amount
2016	22	$12,936,200
2017	26	$14,575,458
2018	24	$11,566,001
2019	33	$17,902,975
2020	40	$18,639,883
2016-2020	*145*	*$75,620,517*

Appendix D

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).*



Appendix E

GSA SBIR Phase III Assisted Acquisition Contracts and Spending

No. of Contracts, Obligations, and Combined Ceiling by Fiscal Year:

Fiscal Year	# Contracts Awarded	Obligations	Total Value
FY18	1	$13,354,952.70	$2,260,720.00
FY19	19	$91,368,632.71	$774,891,303.60
FY20	29	$356,159,459.02	$2,117,542,118.03
FY21	15	$348,681,813.67	$1,707,618,772.13
Total	**64**	**$809,564,858.10**	**$4,602,312,913.76**

The data reflects SBIR Phase III contracts awarded between May 30, 2018 - Sep 14, 2021. The 64 Phase III contracts include 36 IDIQs, 25 Stand-Alone Contracts, and 3 Purchase Orders.

Breakout by Socioeconomic Class:

Socioeconomic Category	Obligations	Total Value
8(a)	$63,721,554.96	$574,612,522.80
EDWOSB	$64,232,405.26	$715,000,000.00
HUB Zone	$3,926,891.70	$12,260,720.00
OTSB	$53,632,797.30	$401,934,657.61
SB	$755,932,060.80	$4,200,378,256.15
SDB	$123,110,873.78	$1,228,194,583.19
SDVOSB	$62,576,885.88	$410,438,034.27
VOSB	$152,081,826.34	$808,897,888.54
WOSB	$256,611,377.63	$1,758,976,907.34

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Appendix F

SBIR Economic Impact

Dollar amounts in millions	DOD ('95-'12)		NCI ('98-'10)	
Awards and Sales	Total $ Amount	Ratio to Investment	Total $ Amount	Ratio to Investment
SBIR/STTR Award Investment	$14,400		$787	
Rate of Commercialization	58%		53%	
Cumulative Sales	$121,000	$8.4:1	$9,144	$11.6:1
Military Sales	$28,000	$2:1	---	---
Follow-on R&D	$15,200	$1.1:1	$957	$1.2:1
Total Acquisition Value of Acquired Firms	$35,600	$2.5:1	$21,630	$27.5:1
Total Outside Investment Funding	$9,500	$0.7:1	$4,260	$5.4:1

Source: Swearingen, Will and Jeffrey Peterson, "1998-2018 National Economic Impacts from the National Cancer Institute SBIR/STTR Programs"; and "National Economic Impacts from the DOD SBIR/STTR Programs 1995-2018"

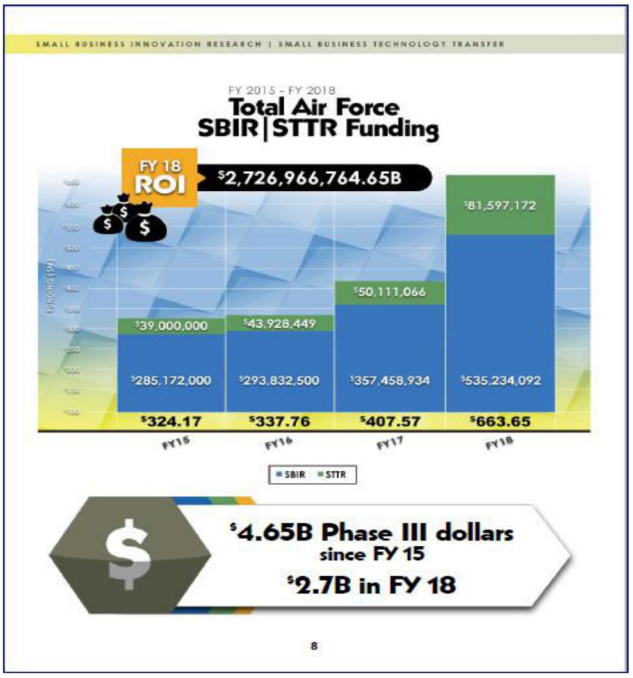
DOD SBIR/STTR Has Been Tremendously Successful



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Non-SBIR Phase III Funding by Service, 2018-2021

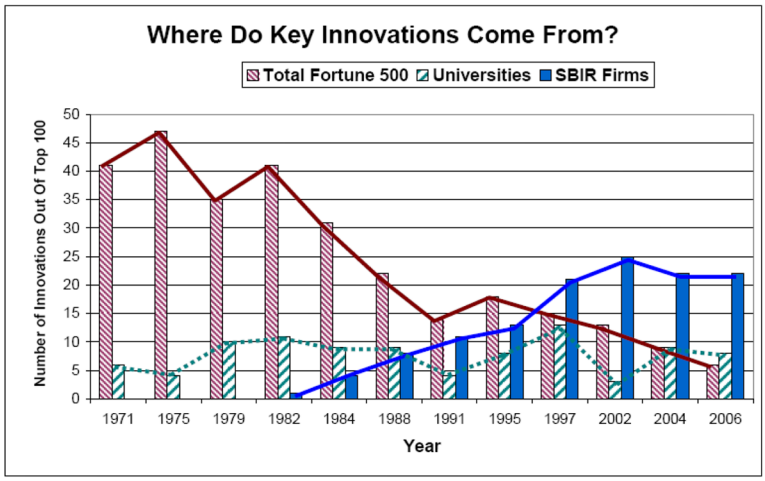
Phase III by Service	2018	2019	2020	First 3 Qs 2021	Total Per Agency
Navy	$743,134,063	$674,313,088	$893,977,509	$535,807,710	$2,847,232,369
Air Force	$391,936,154	$528,850,815	$855,060,886	$359,015,078	$2,134,862,933
Army	$151,651,706	$113,341,936	$170,912,517	$135,925,090	$571,831,249
			AF 1st 3 Qs 2020: $541,662,803		



Source: AF SBIR/STTR Year in Review 2018

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Over 20% of Key innovations Come From SBIR Firms



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11 Out of 15 Top Biotech Firms Won SBIR Awards

Biotech industry:

While one cannot perhaps go quite so far as to suggest SBIR as a/the critical factor in development of biotech, with so many Major Biotechs having an SBIR connection, a viable case can be made for the useful contribution the program probably has made to the emergence, structure and direction of the industry

Early years: Of the Fifteen (15) leading Biotech Firms then identified in a *2016 Forbes article*, Eleven (11) were SBIR Awardees .. at the time

- In receipt of over $32M in SBIR funding - all but two awards (both to Vertex) being NIH SBIRs.
- Only one firm –Pharmacyclics – was in receipt of single award.
- Most others made several successful applications with a significant percentage of projects going to Phase II.

Not trivially, in concert with major pharmaceutical and medical device firms, almost all had (still have) working relationships with various other SBIR-STTR Awardees past and present.

"Modern biotechnology provides breakthrough products and technologies to combat debilitating and rare diseases, reduce our environmental footprint, feed the hungry, use less and cleaner energy, and have safer, cleaner and more efficient industrial manufacturing processes"
BIO (Biotechnology Innovation Organization)

With the rapid and continuing growth of the space and arenas that are designated Biotech, it is estimated (by various sources) that of firms identified as leading-edge in their field, Fifty-Two (52) listed here are/have been SBIR-involved.

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52 SBIR-involved Biotech firms*

- **Abraxis** – immunochemistry products
- **Active Motif** – epigenetic research
- **ActivX** – in situ kinase profiling
- **Aduro Biotech** – engineered immunotherapy for Cancer
- **Advanced Analytical** – high-throughput nucleic acid analysis systems
- **Affymetrix** – genomic analysis
- **Alexion Pharmaceuticals** - orphan drugs to treat rare diseases
- **AllCells** – primary human cells
- **Amgen Inc** - human therapeutics: low white blood cell counts, osteoporosis, and colorectal cancer
- **Aptagen** – aptamer-beacon
- **Biogen Inc**. - neurological and neurodegenerative diseases
- **BioMarin** –rare genetic diseases therapies
- **Caribou Biosciences** – engineering any genome
- **Cellecta** – functional screening and drug target discovery
- **Cellular Research** – high-resolution investigation of single cell
- **Clontech** – cloning tools
- **Covaris** – sample preparation by focused-ultrasonication
- **DiscoveRx** – cell-based assays
- **DNAStar** – innovative and easy to use software for scientists
- **Epitogenesis** – vaccine delivery technologies
- **Fluidigm** – single-cell analysis
- **Genzyme** - rare diseases, blood disorders, neurology, immunology, and oncology.
- **Gilead Sciences** - antiviral drug: HIV, hepatitis B, hepatitis C, and influenza
- **Horizon Technology** – automated sample preparation systems
- **Illumina, Inc**. - analysis of genetic variation and biological function
- **InDevR** – accelerate vaccine characterization and production
- **Integrated DNA Technologies** – custom oligonucleotides
- **InvivoGen** – innate immunology specialists
- **Labcyte** – revolutionizing Liquid Handling
- **Lucigen** – isothermal nucleic acid amplification
- **Lucigen** – simplifying genomics
- **BiomicsMaverix** – manage next generation sequencing data
- **Mimetas** – organ-on-a-chip
- **Mirus Bio** – the Transfection Experts
- **NuGen** – genomic sample preparation
- **Ocata Therapeutics** – regenerative ophthalmology
- **Organovo** – 3D bioprinting
- **Origene** – gene-centric, life science tools
- **ProSci** – affinity-purified polyclonal antibodies
- **RayBiotech** – antibody arrays
- **Ribomed** – biomarker detection
- **Schrodinger** – advanced molecular simulations
- **Second Genome** – Microbiome modulators
- **SeqWright** – next generation genomics
- **Somalogic** – proteomics tools
- **Taconic Biosciences** – research models
- **Transgenomic** – *genetic biomarker identification*
- **Trilink** – *highly modified oligos*
- **Vertex Pharmaceuticals** - *transformative medicines for serious diseases: e.g. cystic fibrosis, Hepatitis C*
- ***Wyatt Technology*** – *macromolecular characterization*
- ***XenoTech*** – *drug metabolism studies*
- ***Zymo Research*** – *genome-wide epigenetic analyses*

* This list incomplete. Does not include very young, newly-formed entities only now establishing an SBIR presence

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Chairman CARDIN. Well thank you for your testimony, and more importantly, thank you for your service in regard to these programs. We really appreciate it.

Mr. Kavetsky?

STATEMENT OF ROBERT KAVETSKY, CHIEF EXECUTIVE OFFICER AND PRESIDENT, ENERGETICS TECHNOLOGY CENTER, INDIAN HEAD, MD

Mr. KAVETSKY. Chairman Cardin, Ranking Member Paul, and members of the Small Business Committee, my name is Bob Kavetsky. I am the CEO of the Energetics Technology Center. ETC is a 501(c)(3) headquartered in Maryland. It has been my great pleasure to head ETC for past 15 years.

I am an engineer by training, and prior to joining ETC I served 32 years at the Department of Defense, working on hypersonics and undersea warfare programs. I greatly appreciate you giving me the opportunity to share my thoughts on the role of small business, in general, and the role of the Small Business Innovative Research program specifically with you today, and I look forward to, after my testimony, answering your questions.

You are all acutely aware of the important role small businesses play in our economy. My fellow panelist has addressed the critical role the SBIR program plays in not only getting new technologies into the hands of warfighters but also serving as an economic catalyst in many parts of the country.

I would like to direct my comments today to the role small businesses play in what I like to call technology-based innovation ecosystems, and the importance of these ecosystems to our national defense.

MIT economists, Gruber and Johnson, in their seminal work, "Jumpstarting America," do an excellent job of documenting the benefits realized from government investments in creating science-based innovations that came out of World War II. More importantly, they recommend that the Federal Government make additional investments to position the U.S. to continue its leadership role as a major economic and military power.

Specifically, they identified 100 regions of the country that were ripe for the creation of technology-based innovation ecosystems. They suggest, and I agree, that such an investment will result not only in distributing our economic prosperity across the country more evenly but also contribute a strong national defense.

Innovation ecosystems bring together industry, academia, and government to provide technology solutions to the government and private sector markets. Two prime examples of this are Silicon Valley's semiconductor and computer industries and Boston in life sciences.

There is an opportunity now to create a whole nation of ecosystems using programs such as SBIR as a primary engine for this development. This is a critically important issue, not only for our national defense but in addressing what I see as a developing economic inequality between regions of the country that have these ecosystems and those that do not.

My organization recently completed a study of energetics for the Department of Defense. Energetics are explosives and propellants

that are used in our weapons systems. We brought together experts from industry, academia, and government, led by Dr. Theresa Mayer, Vice President of Research at Purdue University, to examine what has led to now well-documented shortfalls in U.S. military capabilities when compared to China and Russia.

These shortcomings can be traced in part to two major issues: one, our inability to develop and then transition new material developments into our weapons systems, and two, the fragile condition of the existing supply chain, especially chemicals needed to produce energetic materials.

Small businesses can play a role in addressing both of these challenges. For example, the SBIR program has a strong record of creating solutions to defense requirements in critical sectors. We envision such an investment in energetics would bring new and innovative companies into the energetics research arena.

Second, we need to develop a network of specialty chemicals manufacturing and production facilities to ensure a robust supply chain for energetics. Currently we need approximately 350 specialty chemicals to produce the energetic materials the Department of Defense needs. There is absolutely no reason these chemicals cannot be produced by small and medium-sized companies. This production does not need to be from industry giants. Most critically, we cannot continue to buy these chemicals from our adversaries, such as China.

The second example I would like to highlight is the work the Navy's SBIR program currently has us conducting to reach out and involve underrepresented communities and companies in the program. The catalyst behind this effort is to ensure that the Navy is tapping into the full potential of all of America, not just a handful of communities.

We have created a process called "City TechFire" which we are starting to pilot in Houston, San Diego, Phoenix, Detroit, San Antonio, El Paso, Jacksonville, Cleveland, Greensboro, and Harrisburg. It is already abundantly clear to me that there is a massive untapped potential in these communities.

In closing, I would like to make a few recommendations for the Committee to consider. First, make the SBIR-STTR programs permanent. Second, increase SBIR allocation to 7 percent. Third, increase the STTR allocation to 1 percent. Fourth, expedite security clearances for SBIR and STTR firms. And fifth, require all agencies to set goals of at least 15 percent of all R&D goes to small businesses.

Thank you.

[The prepared statement of Mr. Kavetsky follows:]



Testimony of

Bob Kavetsky

Chief Executive Officer

Energetics Technology Center (ETC)

Indian Head, MD.

BEFORE THE COMMITTEE ON SMALL BUSINESS

UNITED STATES HOUSE OF REPRESENTATIVES

Innovation Ecosystems & Small Business

22 September 2021

ETC provides engineering and data analytics services, policy development, and technology development to the government, academia, and private industry. ETC is a 501 (c)(3) non-profit organization incorporated in Maryland in 2006.



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MIT economists Gruber and Johnson, in their seminal work "Jumpstarting America"[1], do an excellent job of documenting the benefits realized from government investments in creating science-based innovations that came out of World War II. More importantly, they recommend that the federal government make additional investments to position the U.S. to continue its leadership role as a major economic and military power. Specifically, they identified 100 regions of the country that were ripe for the creation of technology-based innovation ecosystems. They suggest, and I agree, that such an investment will result not only in distributing our economic prosperity across the country more evenly but also contribute to a strong national defense.

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[1] Jumpstarting America, Gruber & Johnson.



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3. Increase STTR allocation to 1 percent
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Chairman CARDIN. Thank you very much for your testimony, and particularly your specific recommendations, which we very much appreciate.

We will start five-minute rounds. I want to take a little bit of my time to respond briefly to Senator Paul's opening comments. We disagree. I would like to see us devote more Federal resources to research and development. I think it has shown that this is in the best interest of our country. I was proud to be part of efforts to increase the amount of research dollars at NIH, and the amount of research dollars we do in defense, the amount of research dollars we have under NASA, because those partnerships that we have with the private sector has paid off big time for our national security interests and our public health interests.

And the SBIR and STTR program are not really about the size of the programs. They are more about making sure that the part of the business partnerships are done with small companies, because we know small companies is where innovation takes place at a higher level and jobs are created. So we want to make sure that small businesses are part of our technology firms that we do partnership with.

So I really do not quite follow the point that Senator Paul was raising, but I just want to put on the record that the SBIR and STTR program does not deal with the size of the programs. It does more in making sure the allocation of the private sector, that there is fair allocation for smaller companies.

I also want to point out that as you look at the Federal agencies that support this, the Department of Defense supports these programs, because they know they are getting a better product as a result of the partnerships under the SBIR and STTR programs. So they are supporting it. NASA supports it, because they know it helps them in their mission, their science mission, which is very important to my State and very important to the agenda of climate change. They know that their partnerships with small tech companies helps them complete their mission in a more successful manner. And you gave us the ratios of benefits to cost, which is 22-to–1, 33-to–1. These are pretty large numbers.

I want to ask one question to both of you, if I might, and that is, there have been several studies and reports that have been done on both the SBIR program and the STTR program. They are all very, very positive, about meeting the missions that Congress set to stimulate technology innovation, to use small business to meet Federal research and development needs, to increase private sector commercialization of innovation derived from Federal research and development. All very high grades.

There is one part of the mission that has not gotten high grades, and that is to foster and encourage participation by minority and disadvantaged persons in technology innovation, and I add to that the women-owned small businesses.

So my question to both of you is, how can we do a better job in making sure there is real diversity in the companies that we are working with so that there is opportunity among all of our communities?

Mr. GLOVER. Well, the immediate answer is better outreach and things like FAST and the incubators innovation. That is interesting.

Probably a more in-depth, there is a recent study—not a recent, I am sorry, several years old now, that I just discovered that the National Academy of Sciences has even pushed as one of their own, which looked at pitch days. And what they found was that pitch days discriminated against women in particular. When you see a venture capitalist, we all know tend to discriminate, directly or indirectly against women and minority-owned businesses. They simply do not fund as many proportionally as they do other things. So the system obviously favors, quite frankly, white male-owned businesses.

One of the things the Navy is doing right now is their pitch days are gender neutral. There is no face-to-face contact and there is no way to know whether it is run by a man or a woman. And I think that is working. GSA, which you guys have allowed to happen a few years ago, now is doing $4.6 billion of Phase III contracts. Their process is gender neutral and does not really have people coming in and talking to them face-to-face. Over 40 percent of their $4.6 billion is to women-owned businesses. It is an interesting phenomenon.

If we speed up the process, make it happen very quickly, which it should, then I think you take some of the gender out of this and you will see that the awards are going to be more like the GSA, and we will overcome some of that inherent bias. But we have still got to do a lot more educational outreach. Women business owners need to be able to have places to go and people to work with. But I think there is some hope here that we can make this process work better.

Chairman CARDIN. Mr. Kavetsky?

Mr. KAVETSKY. So I have a couple of near-term pragmatic things that we are actually involved in, as we speak, to address the issue, Chairman Cardin, you raised. As a matter of fact, this morning I had a discussion Vic McCrary, who is at the University of the District of Columbia, in terms of how we can work with UDC to build an innovation ecosystem around his university, tying that actually into DARPA, one of the Defense Department's, as you know, cutting-edge agencies. Because in many cases DARPA program managers do not know about specific technical capabilities at some of the HBCUs, such as University of District of Columbia, North Carolina A&T—we are engaging in discussions with Dean Robin Coger at North Carolina A&T—Morgan State, in your own State, Senator.

But the thing is you have to be present there and start making those connections, intimate connections in the case of the HBCUs, between faculty members and, in my arena, in the world of the Defense Department.

Relative to the issue of females involved in SBIR, a number of states, such as yours, have programs such as ACTiVATE, which was created many, many years ago, encouraging female entrepreneurship. And I think, again, a pragmatic idea we have is to go where the females are. For instance, Purdue University graduates, I think, more female engineers than most universities in the coun-

try. We have a partnership arrangement with Purdue where we are seeing how we can tap into female engineers coming out of Purdue to both start companies and actually work in the defense sector. Thank you.

Chairman CARDIN. Thank you. Senator Shaheen.

Senator SHAHEEN. Thank you, Mr. Chairman, and thank you to both of you for being here and for your testimony. Mr. Glover, I especially appreciate all of your support for the SBIR program. I have been a big fan, as I am sure you know. It was originally introduced by New Hampshire Senator Warren Rudman, and so our businesses in New Hampshire really like the SBIR program.

And Mr. Kavetsky, I appreciated your comments about the Navy. I had the opportunity to do an embark on the U.S.S. *New Hampshire* submarine several years ago, and one of the things they told me was that the biggest concern on a submarine is the potential for fires, because the dryers, the way the dryers are vented. And I was able to tell them that I had just been to a company in New Hampshire that had an SBIR contract to try and address the problem of dryers on submarines. So obviously a very important program when it comes to innovation and what we need to do, both in the defense industry but also in terms of innovation throughout the economy.

Mr. Glover, I understand that one of the things that you have been working on is the question of commercialization of SBIR technology, and, as you know, that is one of the issues that comes up again and again with respect to SBIR. Can you tell us what you have found in your investigation of this issue and what we can do to encourage commercialization of SBIR technologies?

Mr. GLOVER. Well, in 2000, Congress added the requirement in the reauthorization for commercialization would be an evaluation factor. Obviously, the technology, the personnel, a lot of other things go in there, but one factor was added. And commercialization added then has changed the SBIR world. And what you see is every company knows that they have to have a commercialization component. There was some discussion of multiple award winners. Well, those award winners learned, and the companies now have all focused on commercialization.

You know, 2,000 of these companies have been acquired. They did not get acquired because their technology was not commercializable. It was because somebody wanted that technology to put in their weapons system, to put in their business. There is real success there. Sonar and a lot of components of the submarine are SBIR-driven. We gave an award to Dick McNamara, who ran the submarine program at the Navy, many years ago, for reaching $1 billion of SBIR subcontracts on the submarine.

So commercialization has changed. They all do it. They all do it very well. There are many success stories, and the idea that somebody is in this business to win a $1 million award, no. They are in this business to develop a technology that somebody will pay lots of money for, whether it is DoD or somebody else.

Senator SHAHEEN. Thank you. Do you agree with Mr. Kavetsky that we should make the program permanent?

Mr. KAVETSKY. Oh definitely, yes. I believe the ROI on SBIR is pretty clear-cut, so I think the evidence speaks for itself.

Senator SHAHEEN. And do you agree with that, Mr. Glover?

Mr. GLOVER. Yes, indeed.

Senator SHAHEEN. I thought you might.

Mr. Chairman, I hope that this Committee can make the SBIR program permanent, because I think it would be good for innovation in the country. So thank you.

Chairman CARDIN. As I think Senator Shaheen is aware, we do have hopes of getting legislation that can accomplish that purpose during this Congress. Senator Coons.

Senator COONS. Thank you, Chairman Cardin, and thank you to both our witnesses today. I am intimately familiar with the SBIR and STTR programs, and the Small Business Development Center in Delaware has done a great job over many years to help make sure that there are small businesses in Delaware, in our community, and our innovation ecosystem who are able to take advantage of the resources that this pries loose from otherwise very large research-oriented conglomerates. And it creates opportunity, opportunity for small businesses to innovate and opportunity for the agencies that this is essentially directed at to achieve their mission. So I see real value in making SBIR and STTR permanent programs.

I was proud to contribute to the Support Strong Startup Businesses Act to the NDAA, and to introduce the RAMP for Innovators Act, which I hope we will consider again on the path toward reauthorization.

Mr. Glover, if you would, what would be the outcome for businesses if we failed to reauthorize these programs? What would be the consequences, both for the agencies that rely on them and for the businesses that have participated?

Mr. GLOVER. Well, there is very little that we have in American as an advantage over the rest of the world. SBIR is one of those things. Now it is being copied, but not doing it as well or as effectively as we have. You lose SBIR, you lose that innovation spur. Most of the companies that get SBIR funding would not have developed that technology otherwise, the studies have shown. So we would lose that.

We would also lose a lot of job-creating potential. In my testimony I list all the success stories, and I list, in particular, a number of companies that have come out of the SBIR program and have grown and developed. Things not only like your cellphones, Qualcomm starting, but some Symantec and a whole bunch of other companies would not have gotten their start.

Eleven of 15 top biotech companies would not have gotten their money. At critical stages in economic development the government needs to provide funds because the private sector will not. Half of venture capital now goes overseas. It is no longer just an American phenomenon. And SBIR, without that, you would lose thousands of companies, thousands of individuals who would never have a chance to see if their technology, their ideas could grow into new markets and new businesses.

Senator COONS. Mr. Glover and Mr. Kavetsky, some criticize SBIRs and tend to try to characterize them as just sort of repeat funding by the Federal Government of businesses that never actually produce anything, that do not commercialize, that do not come

to scale. What do you think are the biggest remaining barriers to helping those who are successful in winning SBIR-STTR contracts and then developing technology? What are the biggest barriers to actually getting integrated into larger systems, or getting acquired, or being able to scale, that we should be mindful of as we move toward reauthorization?

Mr. GLOVER. As I understand the question—and there is a little echo here so I might not have gotten it exactly right——

Senator COONS. What are the barriers to commercialization?

Mr. GLOVER. The commercialization is in areas one never expects it to be. Innovation drives new industries, new technologies that did not exist before, and they make things a lot better, and the SBIR program, by and large, goes into those areas. But it does provide one thing that is very important. The government needs research done. And when a company gets a 2nd or 3rd or 10th or 100th award, it is because the people reviewing it decided that was the very best proposal, the very best company to give them the research they need.

Senator COONS. Mr. Kavetsky, did you want to contribute briefly, and then we will move on.

Mr. KAVETSKY. I have a very specific answer to that, that—I do not know if it is DoD unique. I think perhaps it is—and that is we need to make sure that people in the defense contracting business understand the contracting flexibilities that have, under the SBIR program, to rapidly acquire products and further R&D work from these companies. Many of our defense contract shops are very wedded to what we call the FAR, the Federal Acquisition Regulation system——

Senator COONS. I am quite familiar with it.

Mr. KAVETSKY [continuing]. That would choke an elephant if you tried to eat it. And frequently they do not take advantage of the flexibilities afforded them under SBIR to more rapidly transition technology, which, from our standpoint, is imperative that the Defense Department be able to move nimbly in acquiring new technology.

Senator COONS. Thank you for that input. Thank you, Mr. Chairman, for this hearing. I hope that we will proceed with reauthorization.

Chairman CARDIN. Thank you, Senator Coons. Senator Hirono?

Senator HIRONO. Thank you, Mr. Chairman. I always wonder why people who say that they support small businesses and yet criticize programs such as the SBIR and STTR programs, without which small businesses would not be able to compete for the billions of dollars in Federal money that the Federal Government lets out. And so I always wonder, you know, what the thinking is, but maybe there is not that much thinking going on.

Okay. So when we meet with small businesses, particularly with women-owned small businesses, they always say that access to capital is one of the real barriers to them being able to get started. That is why I have been a very long-term supporter of both SBIR and STTR programs. You talked a little bit, both of you, about what would happen if these programs were not in place. And, in fact, there is a lot of innovation that comes out of the small business sector of our economy, not from the big corporations. Isn't that

true, there is a lot of innovation that comes out of small, you know——

Mr. GLOVER. Absolutely. Years ago there was a study that showed two-thirds of major innovations come from small business. More recently, there is a study that says 20 percent of key innovations come from the SBIR program itself.

Senator HIRONO. And that is why, for a lot of us, it is very clear the import and importance of these programs.

I do want to ask you a question, for both of you, about the SBA's Growth Accelerator Fund Competition, which has been an effective program when it comes to promoting startups, but especially those by women and minorities and those in underserved areas.

Senator Booker and I recently introduced legislation to expand the program, called the SOAR Act, which would provide increased support for organizations that work with these businesses, and I am happy to report that Accelerate Hawaii, which is a growth accelerator in Honolulu, recently received an award through this program, and that President Biden has requested increased funding for fiscal year 2022, from $10 million compared to $2 million in fiscal year 2021.

Can either or you, or both of you, discuss why growth accelerators are so important for businesses in the SBIR-STTR programs and the broader innovation ecosystems more generally?

Mr. KAVETSKY. Well, I think Mr. Glover mentioned earlier, these types of programs, these funding sources provide some critical capital in the development cycle, even before, sometimes, the venture firms get involved. We find that is absolutely critical. That actually also applies to even technology and research done in defense labs as well. We call it the "valley of death," that we try to get these companies through, if you will.

So I think programs such as you were mentioning, Senator, are absolutely critical for providing those kinds of resources.

Mr. GLOVER. The growth accelerators, FAST, those operations—and I attached two of those to my testimony to sort of what local organizations can do to increase the SBIR program and make them do work better—is critical, absolutely. And there are many states. Hawaii has had some great SBIR firms through the years. But it needs some additional infrastructure to help it match and compete with companies coming from Silicon Valley; Austin, Texas; Boston. And those accelerators and FAST programs do provide that knowledge and training that helps them understand.

If you are in Boston you walk down the street and ask somebody what to do. You cannot do that in most of the country.

Senator HIRONO. So, of course, you would support increasing the funding for these accelerator programs, and I am glad you mentioned that. It is not easy for the entrepreneurs and innovators in Hawaii. We are kind of removed from the venture capital community, and often they want to be right there. And so you need these programs to get these companies to the point where they could attract venture capital. Would you agree?

Mr. GLOVER. Absolutely.

Senator HIRONO. I also wanted to ask you about the SBA's Federal and State Technology Partnership Program, the FAST program, which provides competitive grants that can be used to pro-

mote diversity in the SBIR-STTR programs. I am very committed to increasing the opportunities for women and for minority-owned enterprises to have access to these kinds of grants. And so the FAST program is a partnership with the states to really facilitate this kind of diversity.

President Biden has requested a substantial increase for the FAST program next year—$10 million compared to $4 million for 2021. I take it you would support that kind of increase also.

Mr. GLOVER. We strongly support FAST. It is a great program. There is a chance to succeed if you are just really good and do everything right, without any help. But boy, it sure helps to be able to meet with people, talk to people, have people who know what they are doing, to facilitate your learning curve. It makes it much quicker, much faster, and much better.

Senator HIRONO. Thank you. Thank you, Mr. Chairman.

Chairman CARDIN. We were joined by Senator Young via Webex. I just really wanted to acknowledge that he was present. He indicates he has no questions he wants to ask.

I will recognize Senator Hawley.

Senator HAWLEY. Thank you, Mr. Chairman. Good timing. Thank you for waiting for me. Thanks to the witnesses for being here.

Mr. Glover, if I could just start with you. I have seen some reports depicting the distribution of the SBIR awards, and I noticed that some of these reports include heat maps that suggest that there is a relative concentration of awards that are allocated to the East and West Coasts and to larger metro areas that already have a lot of capital, I mean, just by the nature of what they are and who they are. By comparison, more rural states like mine, Missouri, have been granted relatively fewer awards, and that is true even when you adjust for the population differences.

So my question is, what do you think accounts for this geographical discrepancy?

Mr. GLOVER. As an individual from a small rural town of 1,400 people in Tennessee, I have had that fight and debate and discussion for a long time. And I entered into a debate at NYU some years ago in which they were saying that the Boston folks were saying there was no venture capital shortage in America. And I explained, I said, "To the women in the audience, and to anybody outside the coast, it is a problem," and it certainly is.

What we see, though, is that the SBIR program does about as well on science indicators, or maybe actually better in different science indicators like R&D, scientists, engineers, money going to universities—it does a little bit better than average in most states. Indiana has a very good system, and it works pretty well.

We need to do more, and I think the FAST, the growth accelerator programs and others, one, should be increased, and two, should focus on underserved areas and populations. I was surprised and disappointed when I saw some limited FAST money going to California and Boston. Now, I understand it was going to rural areas that might be a little underserved, but quite frankly there are a lot of other states that are much more underserved.

So we can do more there. It is a merit-based program, which is the beauty of it. If you do put a geographical requirement or a quota or a percentage, you would lose the merit-based, and that

would make it have ripple effects in terms of getting people to accept the technology. Right now, when you win an SBIR and you go through a competitive round, your technology is vetted and reviewed in most cases, and people say this technology has at least a government seal of approval, so let's look at it. You take that away and it is just like anything else. The hardest thing to do is to convince somebody your technology has merit.

Senator HAWLEY. Let me ask you—thanks for that answer—let me ask you about something that you wrote in your testimony. You said the SBIR program needs to do a better job of attracting high-quality, rural technology companies. So on a similar theme here, what tangible steps do you think the program can take to try to attract and recruit companies that fit that profile?

Mr. GLOVER. You know, the universities are really helpful, but they are, again, more geographically focused. Like in Indiana you have got major universities doing good things and it is easy to build a company around university-driven technology. When you get away from that in the area, so that is when you get into—and SBA is doing a much better job than it used to, of online education, online training, so that a good, smart inventor, entrepreneur anywhere in America can win. And while we focus on the general area, we always want the best science to win but we want to make sure that the best scientist has an opportunity to compete and a fair chance.

Senator HAWLEY. Mr. Kavetsky, do you have any thought on that?

Mr. KAVETSKY. Yes, I do. Relative to rural activity, I had a couple of thoughts. First, there are large businesses in all these rural areas. Frequently they are farming or agricultural businesses. If you talk to a farmer, and actually I happen to be married to the farmer's daughter so I have some experience in this arena, you find they have a whole host of problems that technology and programs like SBIR could help them with.

And so I think part of it is really engaging with the major industries in any region and really understanding their problems, and bringing them then to the program that can actually help them. I am mainly a defense guy, but, you know, there is SBIR in agriculture and other arenas, and certainly I think that would be part of a specific thing.

I have seen, as well, some states actually offer an SBIR match. They have seen the SBIR program is so good for them economically, you know, from an economic development standpoint, that the State actually matches an award from the Federal program with State dollars, which I would encourage rural states to consider as well.

Senator HAWLEY. Very good. Thank you both for your testimony, and thank you for being here. Thank you, Mr. Chairman.

Chairman CARDIN. Thank you. I know that we were joined by Senator Rosen, and I understand that she did not have questions. I know Senator Markey has been with us. I am not sure he is ready now for questioning. Senator Hickenlooper is on his way, I have been told.

So what I am going to do, I have a couple of questions I would like to ask. Mr. Kavetsky, in your recommendations you are sug-

gesting that we increase the percentages that are allocated to both programs. I have been in the Congress when we have increased those numbers, and I know at times we have had different views from different stakeholders in regard to the changing of the percentage. I am just interested as to your assessment as to if the various stakeholders are prepared for us to increase the percentages of these two programs.

Mr. KAVETSKY. Yes. Thank you, Chairman Cardin. I think the short answer to that question is yes. Again, I work mainly in the defense sector, mainly with the Army and the Navy, and I know both of those program offices are ready to scale their program dramatically. They suffer, if you will, from many more proposals, good proposals, that they would like to fund that they cannot fund because they just do not have the resources to do that. I think that would engender additional competition, which is important to delivering quality products to our military, and also it would be an increased economic development engine across the country, if you will.

Chairman CARDIN. And a related question is that there are different eligibilities for agencies that are part of the SBIR and STTR programs. Do we have that right on the agencies that are included in those programs, obviously more on SBIR program because of the lower threshold than in the STTR program. Do we have that right?

Mr. GLOVER. I pretty much think so. I think an SBIR program—and it is permissible for any agency to do an SBIR. And there have been some discussions about some of the agencies below the threshold, you know, could take advantage of using the program. And that may have been tried once or twice. But SBA can facilitate that if it is desirable.

Chairman CARDIN. So we will be looking at—we are looking at permanency, and I appreciate both of you strongly support that. At the same time, we would look at whether there are provisions that need to be updated or changed. And it seems like you are saying that increase the percentages should be under consideration but the eligibility of agencies that have to participate, you think it is pretty well—working fairly well, at the current dollar amounts?

Mr. GLOVER. The real concern that I hear most often is the uncertainty that the program's life, and when we went through that with 14 continuing resolutions over a period of three years or so, the agencies stop-start, everybody cannot plan, cannot budget. It becomes a real serious problem not to have it continued, and that is why we would urge SBIR be continued as quickly as possible.

Chairman CARDIN. And Mr. Kavetsky gave us some specific recommendations. Mr. Glover, do you have other specific changes that you would like to see in the statute, other than permanency and perhaps considering increasing the percentage amounts?

Mr. GLOVER. We have a variety of those. I will be happy to send you those. But yes, they are very similar to Bob's list of recommendations.

Chairman CARDIN. Good. That would be helpful if you have that information.

I believe Senator Hickenlooper may be on the Webex?

Senator HICKENLOOPER. I am here.

Chairman CARDIN. You are up.

Senator HICKENLOOPER. Sorry about that. I was out racing around trying to, you know, get through wind and peril and other aspects of it. Give me one second here.

All right. And part of this we heard as I was listening in, in transit, or my staff was. Colorado is a center of tech innovation. I think our State is home to over 30 Federal labs. How much further can we support STTR in bridging that gap between these labs and the smaller innovators? The innovators would be entrepreneurs, you know, putting that research into action.

That is for both witnesses.

Mr. KAVETSKY. Yes, I would like to comment on that, Senator. We are actually working on just such a program with the Army Research Lab, and the Army Research Lab is the Army's corporate research institution, about 1,500 Ph.D.'s there. They have actually asked us to focus on finding those small businesses that should be collaborators with the Army Research Lab scientists and engineers, and that is a national effort. That is not just in the State of Maryland, where ARL is headquartered.

Some of you may be aware that the Army Research Lab instituted a program called "Open Campus" about six years ago under Dr. Tom Russell, where they opened up branch campuses. They are all across the country. And part of the motivation for that was to tie into these innovation ecosystems across the whole nation and not just those geographically proximate to ARL headquarters in Maryland.

So I think that is one example I would offer as a specific example of the type of work that, in this case, the Army Research Lab has an organization like us helping them with in terms of being kind of a tech scouter, tech hunter, and connecting small businesses to their researchers. Thank you.

Senator HICKENLOOPER. All right. And then the second question, and the famous "valley of death" that, you know, stage between research and successful innovation. In other words, that period where you get up and going but then you find all the glitches. Beyond making the SBIR-STTR permanent, how do we, or should we require agency goals around R&D to go specifically to small businesses? How do you look at that?

Mr. GLOVER. Interestingly enough, the SBIR law never expected to be the only program driving small business to the Federal R&D. They expected there to be goals, and there is a very specific requirement in the law that there be goals for small business, in general. We always expected there would be follow-on programs, once SBIR was proven to be so good that there would be other programs.

That is a requirement. I think it is absolutely important. It is essential. With the most effective sector of the innovation economy, why shouldn't the government be spending more than maybe 6, 7, 8 percent with small business? The government ought to be spending a lot more. There definitely should be goals. I know that the Air Force is considering putting goals in place for small businesses, and I think the other agencies should do so as well.

Senator HICKENLOOPER. Good. Well, we agree on that, and I think there are a lot of avenues that we can do to work on that.

Another one of our priorities is ensuring equitable—you know, a level playing field for entrepreneurs who may come from socially

disadvantaged background. Can you expand on how SBIR and STTR support diverse entrepreneurs and innovators?

Mr. KAVETSKY. If I could offer a specific example, Senator, that I touched on briefly in my comments, the Navy SBIR program actually is funding my organization to do exactly that. We have, over the last year, created a methodology. We call it "City TechFire" to give it a little bit of glitz. We have actually identified an initial set of 10 cities across the country, 10 regions, where our focus is really on reaching into underrepresented groups, if you will, of businesses, and even colleges, if you will. Because in many cases you find the entrepreneurs, you need to get to them when they are in college so that when they are coming out of college those that have an entrepreneurial bent have a forum and a pathway ahead for creating their own business.

So again, the Navy program actually has us doing that as a focused effort, with the idea being we could expand that from our lessons learned from this initial set of 10 cities to cities all across the country, cities and regions all across the country.

Senator HICKENLOOPER. Does that seem viable at this point?

Mr. KAVETSKY. Oh yes. I mean, what we are finding is there is a real appetite in each of these communities, not surprisingly. We are working with the P-TECH network which is, in some cases, an underutilized network. But we are really finding a real hunger for this. And as with any other program, you find some areas are hungrier than others, and those are the organizations we like to work with, where a local economic development group is really trying to do what we like to call technology-based economic development. And we focus in on working with those organizations. But we are having some initial success, especially in places like El Paso, as one specific example where we are getting some really good traction.

Chairman CARDIN. If we can I want to go to Senator Markey and allow him to ask the questions so I do not have to go into recess, because of a vote that is pending, with Senator Hickenlooper's cooperation, if you have completed your questioning.

Senator HICKENLOOPER. Yes, absolutely.

Chairman CARDIN. Senator Markey.

Senator MARKEY. Thank you, Mr. Chairman, very much, and thanks to our witnesses from Maryland who have joined us today. Maryland and Massachusetts are not that dissimilar in terms of the overall makeup of our economy. And there is no question that SBIR and STTR programs have played a crucial ingredient in the economic vibrancy of Massachusetts, like Maryland itself.

So far, 24,000 SBIR and STTR grants have been given to Massachusetts companies, which is an astounding number, 24,000. And just in 2020, we had 718 Massachusetts companies receiving over $400 million worth of investment. And it works. It has created hundreds of thousands of jobs, ultimately, in Massachusetts. And they are smaller companies, innovative companies.

And I know, Mr. Kavetsky, that you support making SBIR and STTR programs permanent. I do as well. Why don't I just give you a minute to make the case for why these programs should be permanent. How long, oh Lord, do we have to go while recognizing the

absolutely indispensability that these programs play in the economic growth of our country.

Mr. KAVETSKY. Yes. Thank you for that question. I will give you a very specific example of why the permanency is absolutely critical, and that has to do with the time it takes for the Defense Department to implement what we call a program of record, whether it is a weapon or a ship or whatever platform we are developing. And those program executive offices, we call them, they need to know that the SBIR program is going to be there.

And people like Dick McNamara, many years ago, as Mr. Glover noted, used SBIR to really disrupt the base for submarine technology companies, and used SBIR as the fulcrum to do that. If he did not know that SBIR was going to be around for five or six or eight years during the development cycle of that submarine, he would not have stuck his neck out as he did, as the PM, to make that happen.

So I think there is a very pragmatic reason, at least in the world of defense, that we need this program to be permanent, so if a PEO does want to stick their neck out and look at adopting emerging technology they know SBIR is going to be there to provide that critical funding to mature the technology to the point where the program can adopt it.

Senator MARKEY. Thank you, and I think you put your finger right on it. We need predictability. Companies, private sector companies, they need predictability.

And over to you, Mr. Glover. Can you give us an example of an agency, a Federal agency, that takes the SBIR program and simplifies it, streamlines it in a way that you believe is absolutely a model for how the program should be operating across the whole country, because so many different Federal agencies participate. But can you give us a good example of one that does it, in your mind, at the top of the level of excellence?

Mr. GLOVER. I really cannot give you a model agency that has simplified it. Congress passed a law a couple of years ago that said the agencies should standardize, simplify, and expedite the contracting process. There has been some improvement in that area, but we still do not have that compressed.

The shocking GAO study said it was taking 300 days between Phase I and Phase II to get contracts. That ought to be automatic. You ought to have a simple contract, you go to Phase I. Some grant agencies send you the grant when they tell you you have their word. Why can't contracting the agencies do exactly the same thing? The same for Phase II and Phase III.

What we do know about GSA, when they started writing Phase III contracts they cut that down to 90 days, that had been well over a year, and almost impossible in some cases, ever. They get it down to a year and they are doing a very good job of it.

And I want to reiterate that over 40 percent of their awards are going to women-owned business. That process is not discriminating against women, because they are doing very well under the program.

Senator MARKEY. And how about minorities?

Mr. GLOVER. Minorities are doing okay, but the women is what was really shocking, how much better they were doing. But minorities are doing better than the regular.

Senator MARKEY. Well, let's hope that a year from today we can say how shocking it is how well minorities are doing, as well as women. That should, in my opinion, be the objective which we seek to achieve.

So thank you both for your great testimony today, and back to you, Mr. Chairman.

Chairman CARDIN. Thank you, Senator Markey, and I want to thank both of our witnesses not only for their testimony but for what you have done in regard to these programs. This testimony will be very helpful to us as we look at legislation in regard to both programs.

With that the Small Business and Entrepreneurship Committee will stand adjourned.

[Whereupon, at 3:23 p.m., the Committee was adjourned.]

APPENDIX MATERIAL SUBMITTED

The SBIR Program at 44: Accomplishments and Questions

Sabrina Howell and Josh Lerner

A Submission to the Hearing, "A Review of the SBIR-STTR Program"
Committee on Small Business and Entrepreneurship
U.S. Senate

Thank you for the chance to contribute this testimony.

Governments around the world today are seeking to promote entrepreneurial activity, largely by providing financing to young businesses. The Small Business Innovation Research (SBIR) program, a pioneering effort originated by the U.S. National Science Foundation in 1977 and rolled out across the Federal government in 1982, is the largest such effort in the United States and one of the most substantial in the world.

The initial rationale for the SBIR initiative, and the many subsequent programs modeled after it around the globe, was plausible. At the time of the program's initiation, the private venture capital industry was very modest in size, and highly concentrated in terms of the geographies and industries of the firms that received financing. The idea of supplementing these private funds with public awards to struggling entrepreneurial businesses was reasonable. Moreover, given the difficulty of engaging young entrepreneurial businesses in the Federal procurement process, the program offered an alternative on-ramp to meet the Federal government's technological needs.

Indeed, empirical studies suggest that in many respects the program's ambitious goals have been accomplished. In a 2017 paper published in the *American Economic Review*, Sabrina Howell shows that Phase 1 awards from the U.S. Department of Energy have large positive effects on

measures of innovative, financial, and commercial success.[1] Consistent evidence emerges when Jessica Bai and co-authors look at similar programs around the world: countries that implement these programs experience a boost in innovation after program inception.

Given this evidence, it might be thought that the case for making the SBIR program permanent is "open and shut." But there are two sets of important considerations that make such a decision not nearly as clear cut as it may initially seem. We will highlight these two issues here: the rapid growth of private entrepreneurial finance and the well-documented issues with the design of the SBIR program.

First, in the 44 years since the formation of the SBIR program, private sector funding for entrepreneurial businesses has exploded. This growth can be illustrated by looking at the venture capital industry. In 1977, venture capital-backed firms worldwide raised less than $200 million worldwide according to Thomson Venture Economics; in 2021, the amount is estimated by Preqin to exceed *$700 billion*. Similarly, angel groups, accelerators, incubators, corporate venturing initiatives, and many other innovative ways of financing young firms have blossomed. What was once a Silicon Valley-centered process has also become more geographically dispersed: for instance, companies based in Maryland and Kentucky, the homes of the chair and ranking member of this committee, attracted $1.4 billion dollars of venture financing between them in 2020 (according to the National Venture Capital Association). This rapid growth of the private sector raises the question of whether the SBIR program is still needed, or if it should continue, whether

[1] She uses administrative data to establish causal effects, comparing outcomes between winners and losers close to the threshold for winning. Specifically, she finds that winning a Phase 1 award increases a firm's subsequent citation-weighted patents by at least 30 percent. Such an award increases a firm's chance of receiving venture capital investment from 10 percent to 19 percent and increases the amount of money raised and the number of deals. It also almost doubles the probability of positive revenue and, conditional on positive revenue, increases sales by 30 percent. Finally, an award increases the probability of firm survival and successful exit (IPO or acquisition).

it needs to continue at the same scale. Indeed, what was arguably the most successful public entrepreneurial finance initiative worldwide, Israel's Yozma program, was ultimately shut down by the government on the grounds that its mission had been accomplished.

The second issue relates to program design. We highlight here three aspects.

We believe that the most significant issue is the *troublesome impact of the companies that have managed to capture a disproportionate number of awards*. These "mills" dominate SBIR spending, yet commercialize far fewer projects than those firms that receive no more than a handful of SBIR grants. This issue has been documented in policy research at least since the Government Accountability Office's 1992 report, and in the academic literature since Josh Lerner's 1999 work. The positive effects of SBIR grants that Howell (2017) finds are driven by *first-time applicants.*[2] This pattern exists for all the financing and commercialization outcomes she studies, but it is especially troubling for patenting. A small subset of applicants win many awards and appear to be dependent on grants. Even leaving aside measures such as venture capital (which they may not be seeking) or direct sales, if their R&D is productive, it should yield patents. Instead, additional grants to the same firm yield few additional patents. Similarly, Lauren Lanahan and Maryann Feldman (2018) find that state SBIR match grants are only useful for firms without previous SBIR awards.

Despite the widespread consensus about the deleterious effect of the "SBIR mills" on program effectiveness, they continue to receive a disproportionate volume of awards, most disturbingly when calculated as a percent of total program funds because of their dominance in the

[2] For example, the effect on innovation as measured using patent citation declines by more than one-half when only firms with more than two wins are included. Further, the interaction between award and the number of previous non-DOE awards is strongly negative; for each previous SBIR award, the effect of an award on citation-weighted patents declines by 20 percent.

Phase 2 process. It is hard not to attribute the failure to address this problem to the fact that these firms often have staffs in Washington that focus only on identifying opportunities for subsidy applications. These problems have proven difficult to eliminate, as "mill" staffers tend to be active, wily lobbyists.

A second issue with program design is the *mixture of funding provided.* Howell's 2017 study suggests while the initial Phase I awards made up only 20% of total of $2.8 billion of awards in fiscal year 2018 (U.S. Small Business Administration, 2020), essentially all the program's positive benefits resulted from those initial grants. The benefits of Phase II awards appear very modest, presumably because the bulk of the Phase I awardees who have promising projects "graduate" to the private financiers and never apply for Phase II funding. Many of the remaining Phase II awardees are likely to have much less attractive commercial prospects. These striking findings suggests the benefits from reallocating money (i) from larger, later stage grants to more numerous small, early-stage grants

A final suggestion regarding program design relates to the need to *rethink the way in which the program is traditionally implemented.* The desirability of such creativity is suggested by Howell and co-author's (2021) study of the efforts by U.S. Air Force to experiment with their SBIR grants. They study both the traditional program and a new program that targeted potentially high-growth startups without Department of Defense (DoD) experience. The hope of this "Open" program, which allows firms to suggest any technology that may potentially be useful to the Air Force, is to ultimately expand the defense industrial base. The study suggests that the Open

program is much more successful in boosting commercialization (both in the private sector and within DoD), patenting, and financing, especially for very young firms.[3]

How would we recommend that Congress proceed? We have two key recommendations:

- First, rather than making the current design of the SBIR permanent, Congress should address some of the design flaws that evaluations have identified.
    - Foremost among these are adding iron-clad prohibitions against the participation of repeat winners.
    - We also urge Congress to return the program to its emphasis on financing young entrepreneurial firms. Rather than focusing on "small" firms, the program should focus on "young" firms. This would naturally also help reduce the impact of "mills," which tend to be older enterprises.
    - Congress might consider shifting the mixture of the program towards an emphasis on Phase I awards, in part by scaling back the number of Phase II awards. This would help ensure a higher return on the investment of Federal research and development dollars.
- Second, the evaluation gap should be addressed. As the discussion above suggests, much of what we know about the impact of the SBIR program has come from academic research, rather than the public and public-chartered bodies that have been formally assigned by Congress to evaluate these programs. Even august organizations such as the National Academy of Sciences have compiled assessments of programs that consist of little more than

[3] This research suggests that the FY22 NDAA amendment proposed by Congressman Jacobs, requiring every DoD service to have an Open program may be a useful mechanism to encourage young startups to participate in DoD SBIR programs, and reduce lock-in to the program.

a compilation of anecdotes of firms that received government funding and then had commercial success (see, for instance, Wessner, 2000). Raising the bar on the methodological rigor and the independence of the evaluaitons that Congress relies upon to make decisions is thus essential to good policymaking here.

Thank you for the chance to contribute these comments.

References

Bai, Jessica, Shai Bernstein, Abhishek Dev, and Josh Lerner. *Public Entrepreneurial Finance around the Globe*. Working paper no. 28744. National Bureau of Economic Research, 2021.

Howell, Sabrina T. "Financing Innovation: Evidence from R&D Grants." *American Economic Review* 107 (2017), 1136-64.

Howell, Sabrina T., Jason Rathje, John Van Reenen, and Jun Wong. *Opening Up Military Innovation: Causal Effects of "Bottom-Up" Reforms to US Defense Research*. Working paper no. 28700. National Bureau of Economic Research, 2021.

Lerner, Josh. "The Government as Venture Capitalist: The Long-Run Effects of the SBIR Program." *Journal of Business* 72 (1999), 285-318.

Lanahan, Lauren, and Maryann P. Feldman. "Approximating Exogenous Variation in R&D: Evidence from the Kentucky and North Carolina SBIR State Match Programs." *Review of Economics and Statistics* 100 (2018), 740-752.

U.S. General Accounting Office. *Federal Research: Small Business Innovation Research Shows Success But Can Be Strengthened.* Washington: GAO, 1992.

U.S. Small Business Administration. *FY 2018 SBIR/STTR Annual Report*. Washington, Small Business Administration, 2020.

Wessner, Charles W., editor. *The Small Business Innovation Research Program: An Assessment of the Department of Defense Fast Track Initiative*. Washington: Board on Science, Technology, and Economic Policy, Policy Division, National Research Council, 2000.

About the Witnesses

Howell is an Assistant Professor of Finance at New York University's Stern School of Business and a Faculty Research Fellow at the National Bureau of Economic Research (NBER). Lerner is the Jacob H. Schiff Professor at Harvard Business School and the Co-Director of the NBER's Productivity, Innovation, and Entrepreneurship Program. Howell's research in this area is funded by the Ewing Marion Kauffman Foundation and Lerner's by Harvard Business School's Division of Research and Faculty Development. Lerner has received compensation from advising institutional investors in private capital funds, private capital groups, and governments designing policies relevant to private capital. All opinions expressed here are our own, and not necessarily those of our co-authors, funders, or institutions.

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ROGER MARSHALL, KANSAS

United States Senate
COMMITTEE ON SMALL BUSINESS & ENTREPRENEURSHIP
WASHINGTON, DC 20510-6350
TELEPHONE: (202) 224-5175 FAX: (202) 224-5619

October 7, 2021

Mr. Jere W. Glover
Executive Director
Small Business Technology Council
1004 Oak Lane
Annapolis, MD 21403

Dear Mr. Glover,

Thank you for appearing before the Committee on Small Business and Entrepreneurship on September 22, 2021, at the hearing titled "A Review of the SBIR-STTR Program."

Enclosed are questions for you that have been submitted by Senators Coons, Rosen, Risch, Inhofe and Young for the hearing record. Please submit your answers to these questions by Thursday, October 21st via electronic mail to kathryn_eden@sbc.senate.gov. To facilitate the publication of the record, please reproduce the questions with your responses.

Again, thank you for your assistance. Please contact Sean Moore of the Majority Staff at sean_moore@sbc.senate.gov or Meredith West of the Minority Staff at meredith_west@sbc.senate.gov with any questions you may have. We look forward to reviewing your answers.

Sincerely,

Benjamin L. Cardin

Benjamin L. Cardin
Chairman

Senate Committee on Small Business and Entrepreneurship Hearing
September 22, 2021
Follow-Up Questions for the Record

Questions for Mr. Glover

Questions from:

Senator Coons

Attracting a large and diverse pool of SBIR / STTR program participants is a critical component of federal support for innovation. Earlier this year, I introduced the IGNITE HBCU Excellence Act, which would invest federal funds in modernizing Historically Black Colleges and University (HBCU) campuses and equipping HBCU graduates with 21st century knowledge and skills. But we must ensure that broad range of opportunities awaits to HBCU students after graduation. While I was pleased to hear in your testimony that the portion of SBIR awards going to women-owned businesses has increased to 40%, I was troubled by your statement that similar progress has not been made for minority-owned businesses, especially considering that Delaware leads the union in percentage of minority female-owned firms.

I want to clarify this statement – the figure of 40% of women-owned businesses is at one agency, the GSA, under its Assisted Acquisition program, which facilitates Phase III contracting with other agencies, and has thus far generated over $4 billion worth of Phase III contracts. The average across the entire SBIR program for women-owned businesses is around 15%. While this is consistent with woman-ownership participation levels across STEM fields, more needs to be done, and SBTC supports more being done to foster increased participation by women-owned and minority-owned businesses in the SBIR program. We note that the SBIR winners as a group are a nationwide technology cluster.

QUESTION 1:

Do you have any recommendations for supporting minority-owned businesses that compete for SBIR / STTR grants?

The organizations that are funded by the FAST program are tasked to reach out to minority-owned business to encourage and strengthen participation in the SBIR program, and to strengthen skills relevant to success in new technology development. Reauthorizing and strengthening this program with focus on underrepresented groups would provide a resource to these businesses that many would otherwise not have access to.

SBIR winners also benefit from being in areas of high broadband access, high access to other technology businesses, and other access to local or even remote technology resources. We also believe that the increased focus at both the federal and state level to create and nurture growing technology clusters around the country will broaden the distribution of firms winning SBIR awards.

The Biden Administration has requested funding for FAST and the Growth Accelerator Fund Competition (GAFC) program at $10 million each. SBTC believes programs like these could help, particularly with Congressional backing. These programs both support start-up accelerators and incubators working with underrepresented entrepreneurs, and the SBIR Catalyst competition facilitates collaborative partnerships aimed at building connections across entrepreneur support organizations that foster innovation-driven entrepreneurs from underserved communities, including minority- and women-owned businesses. These types of initiatives can help build the R&D infrastructure and support system that many underserved populations currently lack.

Universities and their faculty have been primary contributors to over half of SBIR projects. SBA and the Administration should work with HBCUs to foster technological partnerships with minority-owned businesses. Forming relationships with universities and gaining access to their resources is invaluable for start-up high tech small businesses to develop their technologies and grow their businesses. HBCUs are uniquely positioned to help support black-owned small businesses that are historically underrepresented in the high-tech R&D world, and more funding from the federal government would be helpful to ameliorate this.

One mission of the Hollings Manufacturing Extension Partnership program is targeted outreach to startups and growth-oriented manufacturers. In support this mission, MEP centers provide direct support for small manufacturers looking to participate in the SBIR and STTR programs. For example, the Delaware MEP center partners with the National Institute for Innovation in Manufacturing Pharmaceuticals (NIIMBL) to facilitate knowledge transfer and provide hands-on services.

QUESTION 2:

Do you have any recommendations that would further align the Hollings MEP program and the SBIR / STTR programs and thereby increase the rate of research commercialization by small businesses?

The Hollings Manufacturing Extension Partnership is not a program that the SBTC has worked on closely or is particularly familiar with. Having cost-effective manufacturing options in the United States is certainly something that would help SBIR firms, particularly as they work to achieve market entry and the US tries to reduce its dependence on China for manufactured goods. Further, the small high tech businesses in the SBIR program are especially interests in US manufacturing as their tendency is to create U.S. jobs and the MEP is directed to help small businesses become more successful manufacturers. We'd be happy to talk to your office more about how to further align the MEP program with SBIR needs.

In Delaware, agriculture contributes nearly $8 billion a year to the state's economy and accounts for 30,000 jobs in the state. The state supports ag research, technology transfer, and small business innovation, such as its investment in a 250-acre farm lab at the University of Delaware. Agricultural technology businesses conduct R&D in Delaware to improve crop breeding and develop digital ag technologies. Initiatives like these contribute to Delaware being the top state in patents per capita, yet we must keep innovating. China focuses on agricultural technology as one of ten key industries in its Made in China 2025 strategy, and our country must harness the power of small business to drive innovation and boost U.S. competitiveness in the agricultural sector.

QUESTION 3:

What more can be done within the SBIR and STTR programs to support small businesses in sectors such as agriculture that are often overlooked?

SBTC has worked closely with the USDA SBIR office over the years, and they have had many under-the-radar success stories. In fact, American agriculture is a marvel of world agricultural productivity, with technology an important driving factor. Although the USDA has a small SBIR budget, they have funded many important SBIR research projects developing many successful innovations. A few years ago we recognized Charles Cleland, the former longtime Director of the USDA SBIR Office, for his years of leadership. Increasing the SBIR allocation could help provide more funding to an office that has long been underfunded. This might be especially helpful in an agency that serves such a distributed sector of the economy facing increasing international competition.

We are also increasingly seeing agriculture-supporting topics by other agencies who have mission interests relating to agriculture, such DOE, EPA and NIH. Crossover interests among agencies are often areas for especially highly productive innovation.

Also, as I mentioned in my testimony, China is aggressively funding research and development in a number of key areas, including agriculture. Venture Capital rarely funds agricultural research or development, leaving SBIR as the essentially only source of funding for such research for small businesses.

Questions from:

Senator Rosen

SBIR-STTR Underperforming States

Nevada historically receives fare fewer than its fair share of Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) awards. According to current data from the U.S. Small Business Administration, nationally there were 7,136 SBIR and STTR awards amounting to over $3.8 billion in 2020. However, there were only 14 awarded in Nevada that same year, which accounted for far less than one percent of total SBIR and STTR awards made last year.

QUESTION 1:

Given the need for enhanced support to my state and other underperforming states, particularly those like Nevada that are already facing high unemployment, what kinds of solutions do you recommend that would provide regional parity for SBIR and STTR programs in order to maximize those underserved states not on the coasts, especially at the very start of a business venture?

One effective way to increase the number of awards going to underserved states and regions is to increase the amount of Federal R&D funding going to small business. Congress has not increased the SBIR allocation since 2011, when it raised the share of Federal R&D for small business from 2.5% of extramural R&D funding to 3.2%. Meanwhile, some 35% of American scientists and engineers are employed by small business: a huge mismatch between capabilities of the small businesses who employ our engineering and scientific talents and their utilization by Federal R&D. We'd also suggest that when the government wants to speed transition of new technologies into the economy, having them grown in small businesses puts them where our entrepreneurial talents are most employed.

Generally, SBIR/STTR awards in a given state are proportional to percentages of various science and STEM indicators such as number of STEM and R&D focused businesses, number of PhDs, % of state funding going to S&E universities, etc. In virtually every underserved state, SBIR/STTR provides far broader and deeper investment and awards in technology development than does venture capital as a percentage of STEM establishments. In turn, early stage SBIR investing allows firms to develop and prove their innovative products, creating opportunities supporting later stage investment by bank loans and VCs.

There is more that can be done, because regions do vary in their economic environment for high technology development. Aside from an allocation increase, there are a number of things that can help grow the number of SBIR/STTR awards going to underserved states.

The first is to reauthorize and increase funding for the Federal and State Technology Partnership Program (FAST) at SBA. There are indications that the FAST program is working and effective in certain states. In my testimony under Appendix F, I highlighted Montana and Oklahoma as two states where the FAST program has seen tremendous success in bringing in SBIR awards and dollars. With more support and funding it could help other underserved states be more competitive as well. We would argue to focus awards on helping underserved states as well as under-represented groups such as women and minorities.

The FAST program has not been reauthorized in many years. We have worked with Senator Risch on an amendment to improve and reauthorize the FAST program, which we strongly support. In prior FAST authorizations, there was there was a requirement that underserved states and populations should be targeted, and SBTC believes this is necessary. The Fast Program has been continued primarily because Senator Kennedy has, through the appropriations process, supported FAST. My understanding that the Administration has asked for increased funding in its budget request.

The SBA is also beginning to unroll new initiatives that will help underserved states and areas. The Growth Accelerator Fund Competition (GAFC) will support start-up accelerators and incubators working with underrepresented entrepreneurs. The SBIR Catalyst competition facilitates collaborative partnerships aimed at building connections across entrepreneur support organizations that foster innovation-driven entrepreneurs from underserved communities. These type of initiatives can help build the R&D infrastructure and support system that many underserved regions currently lack. With Congressional support and oversight, these programs could be even more focused on underserved regions and populations.

In addition to FAST and supporting accelerators and incubators, another reform that would have a huge effect on firms in underserved states is to simplify and streamline access to the program. For a new firm that has never done contracting with the government, the amount of paperwork and regulations firms face is daunting, and is often a major obstacle. For example, SBIR application processes in recent years have grown substantially more complicated while some agencies have grown much less helpful and accessible in answering questions. Rules have grown significantly, contracting in some agencies has been a major barrier, award processes have lengthened or varied substantially, and subsequent transitions support has been erratic. In another example, some agencies have used prior VC access as selection criteria, which makes it harder for small businesses without ready VC access to win. We believe these bureaucratic barriers have made it harder (and certainly more expensive) for a new or small firms to win, and certainly are far from the original SBIR concept of simplified proposals and awards. Improvements would include stronger SBIR requirement on agencies to reduce these barriers and greater agency commitments to resolve these issues.

Further, companies in tech clusters like Silicon Valley have closer access to tech support resources (faster and more reliable internet networks, mentors, colleagues facing similar issues,

knowledge bases) that those in more rural states may not. We note that with better broadband we may be able have less physical presence. There should be increased focus on ensuring that firms in underserved regions have better access to the resources that will help them thrive, both in the SBIR program and in an increasingly connected national economy. All such activities will go even beyond SBIR in helping underserved regions develop greater technological strength, growth potential and resilience.

SBIR-STTR Participation of Women-Owned Businesses

Nevada has more than 80,000 women-owned small businesses, and has led the nation in growth of women-owned businesses over the past decade. Last year, the National Women's Business Council and the U.S. Small Business Administration conducted a comprehensive study of SBIR-STTR programs, and found that women-owned businesses made up between only thirteen to fifteen percent of SBIR-STTR Phase 1 applications and awards from 2011-2018.

QUESTION 2:

How can we foster and encourage more SBIR-STTR participation of women-owned businesses, especially those owned and operated by those from socially and economically disadvantaged backgrounds?

Some progress has been made with increasing participation by women-owned business. GSA's Assisted Acquisition Program, which facilitates Phase III contracts for other agencies, has registered over 40% of its contracts to women-owned business. However, we agree that women-owned businesses still win too few SBIR awards.

One of the biggest obstacles is roughly 15% of the high-tech STEM firms that work in the areas SBIR funds are women-owned, which correlates to the number Phase I proposals submitted by women-owned businesses. Strengthening the FAST program will help this, as would strengthening of the STEM support network (broadband, tech centers, etc.) especially in areas where it is less concentrated. More should be done on a broader level to foster and encourage new STEM-focused companies started by women.

The FAST program and Growth Accelerator Fund Competition (GAFC) are two programs that SBA runs that awards funding to accelerators and incubators that provide targeted assistance to underrepresented populations in the high-tech STEM focused areas, such as women-owned small businesses. Although it continues to be appropriated, FAST has not been reauthorized in many years, and does not currently have the funding to make a huge difference. Reauthorization and greater Congressional support and oversight of this program could help women-owned businesses and other underrepresented populations compete on a more even level in SBIR program.

Questions from:

Senators Risch

I'm proud to be a strong supporter of the SBIR/STTR program which has helped thousands of American small businesses partner with the federal government to advance groundbreaking technologies and innovations.

However, I'm deeply concerned that underserved states like Idaho have received some of the lowest numbers of SBIR/STTR awards in the country. For example, so far in 2021, Idaho has only received two SBIR/STTR awards while California has received 252 awards and Massachusetts has received 121 awards. To address this issue, I recently reintroduced bipartisan legislation which would reform the Small Business Administration's Federal and State Technology Partnership Program to encourage federal research and development grants to be awarded to small businesses and universities in states that have historically lacked SBIR and STTR awards. If enacted, my bill would encourage more awards to underserved states like Idaho to commercialize ideas, compete in the global marketplace, and create local jobs.

QUESTION 1:

Mr. Glover, while I believe my bill would be a step in the right direction what other strategies could be used to help underserved states like Idaho receive more SBIR and STTR awards?

I am also concerned that many SBIR/STTR awards are going to "SBIR mills," or companies that use these awards as their primary revenue stream rather than leveraging these funds to help create new and innovative products.

Using SBA data, the State Science and Technology Institute found that potential mills received more than 21 percent of all awards during the period from 2009 to 2019. These "mills" have been clustered in states with large metropolitan areas like New York, California, Virginia, and Massachusetts, which already receive a much larger share of awards compared to underserved states like Idaho. This not only crowds out new competitors for the program, but hurts small businesses in rural states like mine that have historically received fewer awards.

Relating to underserved areas, increasing the proportion of Federal R&D funding going to small business would boost underserved areas. Congress has not increased the SBIR allocation since 2011, when it raised the share of Federal R&D for small business to 3.2%. With some 35% of American scientists and engineers employed by small business, this reflects a major deficit between an under-tapped engineering and scientific talent in small businesses and its very low utilization by Federal R&D, and it misses the chance to have new technologies grown in small businesses with entrepreneurial talent and drive for speedy transition.

SBIR award levels generally track other relevant STEM indicators such as number of STEM and R&D focused businesses, number of PhDs, % of state funding going to S&E universities, etc., and

SBIR far outstrips VC investment in early stage technologies in underserved areas. But there is more that can be done.

Aside from an allocation increase, there are a number of actions that could help grow the number of SBIR/STTR awards going to underserved states.

The first is to reauthorize and increase funding for the Federal and State Technology Partnership Program (FAST) at SBA. There are indications that the FAST program is working and effective in certain states. In my testimony under Appendix F, I highlighted Montana and Oklahoma as two states where the FAST program has seen tremendous success in bringing in SBIR awards and dollars. With more support and funding programs such as these could help other underserved states be more competitive as well. We would argue to focus FAST awards on helping underserved states as well as under-represented groups such as women and minorities.

The FAST program has not been reauthorized in many years. We have worked with Senator Risch on an amendment to improve and reauthorize the FAST program, which we strongly support. In prior FAST Authorization, there was there was a requirement that underserved states and populations should be targeted, and SBTC believes this is necessary. The Fast Program has been continued primarily because Senator Kennedy has, through the appropriations process, supported FAST. My understanding that the Administration has asked for increased funding in its budget request.

The SBA is also beginning to unroll new initiatives to help underserved states and areas. The Growth Accelerator Fund Competition (GAFC) will support start-up accelerators and incubators working with underrepresented entrepreneurs. The SBIR Catalyst competition facilitates collaborative partnerships aimed at building connections across entrepreneur support organizations that foster innovation-driven entrepreneurs from underserved communities. These type of initiatives can help build the R&D infrastructure and support system that many underserved regions currently lack. With Congressional support and oversight, these programs could be even more focused on underserved regions and populations.

In addition to FAST and supporting accelerators and incubators, we also note that easing access to the SBIR program would have a huge effect on firms in underserved states, by simplifying and streamlining access to and operation within the program. For a new firm that has never done contracting with the government, or has done little of this, the amount of paperwork and regulations firms face is daunting, and is often a major obstacle. The SBIR application processes have recently grown substantially more complicated and some agencies have grown much less helpful in answering questions and providing other access to assistance. Rules have often grown, contracting in some agencies has been a major barrier, award processes have lengthened or varied substantially, and subsequent transitions support has been erratic. Some agencies have used prior VC access as selection criteria, which makes it harder for small businesses without ready VC access to win. We believe these bureaucratic barriers have made

it harder (and certainly more expensive) for a new or small firms in underserved areas to win, especially when there is not a supportive tech cluster around them to help educate them. Making the SBIR proposal process simpler and easier will help reduce this impact.

We know technology tends to cluster, and we refer to places like Silicon Valley as technology clusters, where all tech businesses benefit from easier access to tech support resources (faster and more reliable internet networks, mentors, knowledgeable bankers, colleagues facing similar issues, knowledge bases) than are necessarily present underserved states. The key here isn't always physical presence – much of it can be replicated with virtual presence, and with linkages among multiple smaller clusters. In fact, the SBIR winners themselves become a powerful network across the entire nation, linked by their common interests and by SBA and agency efforts to have them meet There should be increased focus on ensuring firms in underserved regions have better access to the resources that will help them thrive. This also includes the general focus of programs to achieve stronger technology outreach to rural areas, such as enhanced broadband and supporting new technology clusters in regions where these are less dense. All such activities will go even beyond SBIR in helping underserved regions develop greater technological strength, growth potential and resilience.

Related to the question on SBIR mills, please see the Addendum "Response to Questions for the Record on 'SBIR Mills''

Questions from:

Senator Inhofe

Implementation of CMMC at DOD

Mr. Glover, as you both know, the Department of Defense accounts for the largest share of funding in both the SBIR and STTR programs. DOD recently began implementing the Cybersecurity Maturity Model Certification (CMMC), its new protocol to ensure a unifying standard for cybersecurity across the Defense Industrial Base. While it is important that the Department have strong cybersecurity guidelines, my staff hear regularly from small businesses that the current process forward on CMMC is confusing and may be extremely costly for small businesses to comply with.

QUESTION 1:

Mr. Glover, could you both address what you've heard from small businesses in regards to DOD's CMMC requirements and how those could affect participation in the SBIR-STTR program?

Cybersecurity Maturity Model Certification requirements create real problems for current and new firms attempting to do business with the DOD, including through the SBIR program. The burdens expand the challenges already posed by the NIST SP 800-171, which itself is very challenging. Even large defense contractors have difficulty complying with NIST and CMMC. Despite a firm's best efforts, they remain at risk of breaches in their cybersecurity implementation. One of SBTC's members that has government contracts in the cybersecurity area had to spend 2,300 person-hours to plan and develop their NIST compliant cybersecurity program. In addition to this labor, the firm had to purchase $300,000 in hardware and software to meet or exceed all 110 NIST control requirements. This example demonstrates how hard it is to become compliant with cybersecurity requirements. You can imagine how difficult this would be for a smaller firm with only one or several employees. These rules are placing heavy financial and administrative burdens on small firms. We recognize there is also a real risk of data loss, and effective cybersecurity implementations are critical to our national defense interests, but the current requirements are overly complex, financially burdensome, and insufficiently supported by useful guidance to meet the compliance bar. For more details on this please see Karen Harper's 2019 testimony before the Senate Small Business Committee on cyber security:

https://sbtc.org/wp-content/uploads/2021/10/Karen-Harper_Senate-Sm-Biz-Testimony_Cyber_NIST_FINAL.pdf

Many small firms choose not to do business with the Federal Government because of the difficulty in complying with the Government's rapidly changing, vaguely defined, and not well-supported cybersecurity requirements. Many firms are simply overwhelmed by these

requirements. If a firm does not comply, its contracts and perhaps its business are at risk. This is true for the SBIR Program as well. SBTC has offered recommendations the DOD in the past to have approved cybersecurity program and software solutions that a small business could purchase that would allow them to more simply and easily comply with cybersecurity requirements, and make it easier to do business with the Government. We still believe this is the best solution to helping small business overcoming this burden without weakening our defense industrial base's protection from cyber threats.

Current cybersecurity rules are written to oddly potentially cause all SBIR firms to be required to meet the toughest standards, not because they have government-originated confidential unclassified information (CIU), but because the government states that the very innovative new SBIR data produced by the SBIR firms is itself CUI that triggers the NIST and CMMC requirements. Therefore the company's innovation, that it is encouraged to commercialize and share (assuming not ITAR, etc.) becomes the basis for the company to have to incur a high-cost cybersecurity compliance regimen. This is a barrier to entry and participation for a small firm. There is of course the good argument that no firm wants its valuable technology stolen, and even the smallest companies will work to ensure this, but enforcing a one-size-fits-all cybersecurity rule on all regardless of size, capability, and need to host Government-generated CUI imposes a large financial cost upon even then smallest. Until there is a safe harbor solution that can be purchased and economically applied to all firms, including the smallest, perhaps the rules could clarify that SBIR data that does not contain ITAR material or government-provided CUI or other specifically restricted information will not be automatically considered to require NIST/CMMC compliance. Or modify the NIST/CMMC rules to exempt data produced solely by small businesses except in identified restricted categories

Questions from:

Senator Young

Mr. Glover, in your written testimony you emphasized that businesses who do not receive enough funding in the U.S. turn overseas for additional support. Specifically, you highlighted a Chinese organization that has provided over $616 million to commercialize U.S.-funded research, helping to bring 108 U.S. projects to market.

While commercializing is only a small segment of the SBIR program, Congress should always remain cognizant of American businesses offshoring commercial jobs – especially as we rebuild our capacity to innovate.

QUESTION 1:

What are ways Congress can lower the barriers to commercialization?

First, it must be noted that, compared to other Federal R&D programs, SBIR does a great job commercializing its technology. The National Academy of Sciences study showed a commercialization rate of between 50 and 60%. The National Cancer Institute and DOD economic Impact Study four similar rates of Commercialization (see chart below). For every dollar invested in the SBIR Program, there was 8-11 dollars of follow on sales, a dollar in follow on R&D, and over $3 in Federal and state taxes.

*Dollar amounts in millions	DOD ('95-'12)		NCI ('98-'10)	
Awards and Sales	Total $ Amount	Ratio to Investment	Total $ Amount	Ratio to Investment
SBIR/STTR Award Investment	$14,400		$787	
Rate of Commercialization	58%		53%	
Cumulative Sales	$121,000	$8.4:1	$9,144	$11.6:1
Military Sales	$28,000	$2:1	---	---
Follow-on R&D	$15,200	$1.1:1	$957	$1.2:1
Total Value of Acquired Firms	$35,600	$2.5:1	$21,630	$27.5:1
Total Outside Investment Funding	$9,500	$0.7:1	$4,260	$5.4:1

Source: Swearingen, Will and Jeffrey Peterson, "1998-2018 National Economic Impacts from the National Cancer Institute SBIR/STTR Programs"; and "National Economic Impacts from the DOD SBIR/STTR Programs 1995-2018"

The first primary barrier to commercialization that Congress could help with is agency follow-up to Phases I/II: This can be improved in all agencies, and some agencies even focus only on their SBIR Phase I/II programs, relatively indifferent to tracking the technology outcomes their R&D funding has created. Greater agency interest in SBIR outcomes will provide a self-improving mechanisms for reducing commercialization barriers.

- **Agencies should track their SBIR projects into Phase III to know what has worked and what has not.** This will help them continuously improve their SBIR programs (e.g. for topic selection, company selection, new opportunity identification, and improving agency operations to better increase the likelihood of success). It will also provide them with closer insight into whether their larger R&D programs may want to build on the SBIR technologies they have funded.
- **Agencies should be committed to identify all agency-funded SBIR Phase IIIs** for the same reasons, to track SBIR success, to better recognize how the SBIR program may be supporting advanced agency R&D objectives, and to better execute the SBA's SBIR Policy Directive on SBIR Phase IIIs. Not identifying the Phase IIIs increases the barriers to commercialization, which creates resistance in many agencies to making agency SBIR Phase III awards even when won through full and open competition.
- There are a number of other provisions written into the SBIR law intended to make it easier for agencies to use Phase III contracting that, for one reason or another, have not been fully implemented by the agencies. Congress could hold the agencies to stronger management of their supported SBIR technologies.
    1. Some examples of this are sole-source awards and requirement that offices award Phase III work to the company that has completed a Phase II "to the greatest extent practicable", enabling faster transitions when the agency wants to advance a successful technology.
    2. In many cases the SBIR policy directive is updated with Congressionally mandated changes, but the FAR and DFARS are not. Although the law and policy directive should supersede the FAR and DFARS, contracting officials are often unfamiliar with them or not well trained enough to know what is in the law. Passing a law requiring the FAR and DFARS to be updated to reflect changes to the SBIR law and policy directive would be helpful.

Congress can also reduce commercialization barriers by reducing the unnecessary bureaucratic overhead imposed upon SBIR firms that are working to develop and later commercialize their innovations. This is accomplished by streamlining proposal processes, contracting and requirements placed upon active SBIR projects.

We noted in the answer to Senator Inhofe that the way cybersecurity rules are currently written forces all SBIR firms in agencies to which these apply to have to incur the high cost burden of full certification triggered solely by their innovative work. This is a barrier to commercialization, as it is a barrier to participation in the SBIR program.

Most broadly, we should recognize that anything that reduces commercialization barriers to new technologies will assist in SBIR commercialization. Getting a new technology to the market is challenging and risky, and that is why the SBIR program is so well-structured to enlist the entrepreneurial energies and drive of our small businesses, and why the focus on merit in the program is so important to select our best technologies for the investment.

QUESTION 2:

Do you believe the SBIR program would see an improvement in commercialization if businesses are allowed to use technical assistance funds to hire in-house marketing and business expertise instead of third-party vendors? If so, what is the advantage to having in-house expertise in this case?

In the last Congress Senator Coons and Senator Rubio introduced a bill called the "RAMP for Innovators Act" to add language clarifying the Technical and Business Assistance (TABA) to allow businesses to use in-house marketing and business personnel to perform work under TABA. SBTC supported that bill, and would support it again if introduced. The advantage is in many cases it is more effective and cost-efficient to task someone inside your company to perform marketing or business assistance work than having to contract an outside consultant. If the company already has someone who can perform the required work on staff, they shouldn't be forced to go outside to pay a third party vendor.

For years, the Small Business Administration has tried to rein in SBIR abuse, but dozens of businesses use SBIR awards as a steady source of revenue. These businesses are commonly referred to as "SBIR mills," collecting millions of SBIR dollars. While this practice is inexcusable and robs taxpayers from utilizing investment funds, many businesses seem to slip through the cracks during the application review process.

QUESTION 3:

What do you believe federal agencies can be doing to curtail "SBIR mills" and redirect awards to younger firms that have a true focus on innovative research, quality products, and jobs?

Please see the Addendum "Response to Questions for the Record on 'SBIR Mills'"

Closing comments

SBIR Succeeds as a Science and Merit-based Program

The SBIR Program was originally established to achieve 4 purposes:

1. *To stimulate technological innovation*
2. *To use small business to meet Federal research and development needs*
3. *To foster and encourage participation by minority and disadvantaged persons in technological innovation*
4. *To increase private sector commercialization innovations derived from Federal research and development*

Over the nearly 40 years of SBIR's history, there have been seventeen National Academy of Sciences studies conducted on the SBIR, totaling over 6,000 pages. These studies have found that SBIR had achieved these goals, with the exception of minorities ("Women-owned businesses" was added later). The Academy found that SBIR awards were consistent with the number and percentages of minority and women owned businesses in science but had not improved on the national averages.

The SBIR program works because it is a merit-based program that focuses on providing the best technologies to serve the agencies' mission needs. SBTC opposes any change to the program that would move SBIR away from this focus. Putting caps or limits on the number of awards a company can win would force agencies in many cases to pass on the best technology and to select the second or third best technologies. A big reason the SBIR program is successful is that Government Program Managers and others know that the SBIR technology, has been reviewed by top U.S. Government scientists and has been selected because it is the best proposal and the best technology small business has to offer. Merit review is critical to the SBIR Programs the most successful government research program in the world. (Seventeen countries have copied it)

We agree that more needs to be done to help companies in underserved states be competitive in the SBIR program, but the government putting its thumb on the scale to generate desired outcomes would harm the program, and open the door for other interested parties to change the evaluation criteria to better serve their own constituencies.

Additionally, there is no reason to believe capping awards or kicking multiple award winners out of the SBIR program will result in more awards to underserved states. The challenges that currently exist for high-tech firms in low technology cluster states will still remain, and more likely than not the awards would simply flow to new companies in states and regions that already have a high concentration of awards.

The solution to the underserved states problem lies in finding ways to help companies in underserved states submit more and higher quality SBIR proposals, not in reducing proposals from states or companies that have won "too many". Generating more proposals in underserved states not only would lead to more awards in those states, but would boost technology strength in those states, and would make SBIR even more competitive as well as give the agencies greater choices and options.

Meanwhile, uncertainty over renewal of the SBIR program (expiring September 2022) will certainly lead agencies to shorten their time horizons and will cause potential SBIR proposers to incur heavy planning and restructuring costs relating to how to finance their new innovations, and in many cases to simply abandon the effort until the uncertainty is removed (because SBIR fills a key and relatively unique role in the American innovation economy). It hurts the program and the US economy to leave the program in an uncertain status.

SBTC proposes at least the following legislative actions to help improve the SBIR program and extend its reach to more states.

1. Reauthorize the SBIR program for at least five (5) more years or make it permanent.
2. Reauthorize the FAST program, and appropriate additional funds for underserved states and populations.

Addendum

Response to Questions for the Record on "SBIR Mills"

There were a number of questions related to "SBIR Mills" that stated or implied that multiple award winners were a barrier to broader participation in the program. This is also tied to the concept that SBIR is simply a set-aside program providing grants to support small businesses. The core genius of this program is that SBIR is a high performance mechanism to mobilize American small business to best and competitively apply its innovative and entrepreneurial nature (and its 35% of America's scientists and engineers) to meet agency technology needs and objectives. We believe the nature of the program has made it a highly productive component of America's innovation economy, and that removing the most successful innovators risks reducing the program to another subsidy.

In order to give the proper context and provide a better understanding of what "SBIR Mills" are, and explore the challenges facing new firms, I want to provide some detail and context.

First, the SBIR program works because it is a merit-based program that focuses on providing the best technologies to serve the agencies' mission needs. SBTC opposes any change to the program that would move SBIR away from this focus. Putting caps or limits on the number of awards a company can win would force agencies in many cases to pass on the best technology and to select the second or third best technologies. A big reason the SBIR program is successful is that Government Program Managers and others know that the SBIR technology has been reviewed by top U.S. Government scientists and has been selected because it is the best proposal and the best technology small business has to offer. Merit review is critical to the SBIR Program, the most successful government research program in the world. (Seventeen countries have copied it.)

The question on SBIR mills was first raised decades ago, when there was a concern that some firms were winning SBIR awards and not commercializing the technology. This was first addressed in the 2000 SBIR Reauthorization Act, which included commercialization as an evaluation factor in award selection. Later, SBA and the agencies proposed and implemented "Benchmarks for Commercialization." Under these regulations, SBIR firms that didn't meet the Benchmarks are thrown out of the program.

These two actions have changed the conduct of firms that were primarily in the program for research dollars. In 2000, the firm that was singled out as the worst "SBIR Mill" with the lowest commercialization rate was Foster Miller. After 2000 they became so successful at commercialization, Foster Miller was acquired by multinational defense and aerospace firm QinetiQ for $163 million. Today, few firms fail to meet the benchmarks for commercialization, both because the firms are working to commercialize and because the proposal process itself provides typically 1/3 of the merit selection score based on the commercialization plans, which include discussion of prior commercialization success.

In its 2008 assessment of the SBIR program, the National Research Council looked into the "SBIR Mill" issue and found:

> *Multiple-award winners do not appear to constitute a problem for the SBIR program at any agency. At all agencies except DoD, only a limited number of companies win a sufficiently large number of awards to meet even the loosest definition of a "mill."*[1]

Ultimately, what determines if a company is or is not an "SBIR mill" is whether or not it is commercializing the technology that is being funded at a sufficient rate. Simply winning a certain number of Phase I awards is not in any way indicative of whether or not a company is an "SBIR Mill". There are plenty of examples of productive, commercially successful firms that have won multiple SBIR awards. One such example is Progeny Systems, which has won over 300 SBIR awards dating back to 1996. In 2018 Progeny Systems was awarded a contract worth up to $379 million to support and upgrade the Navy's MK 54 lightweight hybrid torpedo system, and in a year later they won a $186 million contract to support and upgrade Navy's Mk 48 torpedo system.

Multiple award winners commonly "graduate" from the SBIR program, not by growing beyond the 500 employee limit, but by being acquired or bought out by large firms. One large company, L3 Communications, has acquired 41 SBIR firms. In total, over 2,000 SBIR firms have been acquired (8 % if all SBIR firms).

Further, the presence of experienced firms helps the entire program in many ways. They have experience and energy with which to encourage improvements to the program, and they often help the less experienced companies succeed. And agencies benefit from the experience base; for example, the DOE SBIR program uses experienced multi-award winners as volunteer mentors for their Phase I winners especially relating to strategies for improving commercialization plans.

In 2017, the top 10 Universities in Federal R&D funding received a combined $8 billion[2]. The largest, Johns Hopkins, received over $2 billion alone. All of these universities are in states that were among the top 15 states that have received SBIR funding. In 2020 the top 10 largest prime contractors received a combined $213.8 billion in government contracts, with Lockheed alone receiving $75.8 billion[3]. If there are caps or limits to the amount of federal funding a small business can win, shouldn't there also be limits to universities and large firms?

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[1] National Research Council of the Academies, *The Small Business Innovation Research Program: An Assessment of the SBIR Program*. The National Academies Press, Washington, DC, (2008) Sec. 5.9.6, pages 220-222, Multiple-Award Winners

[2] https://finance.yahoo.com/news/universities-getting-most-money-federal-182701619.html
[3] https://about.bgov.com/news/these-are-the-top-10-government-contractors/

We agree that more needs to be done to help companies in underserved states be competitive in the SBIR program, but the government putting its thumb on the scale to generate desired outcomes would harm the program, and open the door for other interested parties to change the evaluation criteria to better serve their own constituencies.

Additionally, there is no reason to believe capping awards or kicking multiple award winners out of the SBIR program will result in more awards to underserved states. The challenges that currently exist for high-tech firms in low technology cluster states will still remain, and more likely than not the awards would simply flow to new companies in states and regions that already have a high concentration of awards but still offer weaker solutions.

SBIR's multiple award winners are almost all there because they are high quality performers that provide high quality R&D services, almost all are directed to multiple technologies and technologies applications, and all are required to commercialize. We do not cull the multiple award winners in other competitive solicitations involving large businesses, we do not cull the multiple award winners among universities, we do not cull the multiple award winners among our national labs as they advance their technologies, and we should not screen out the multiple award successes from the SBIR program.

Senate Committee on Small Business and Entrepreneurship Hearing
September 22, 2021
Follow-Up Questions for the Record

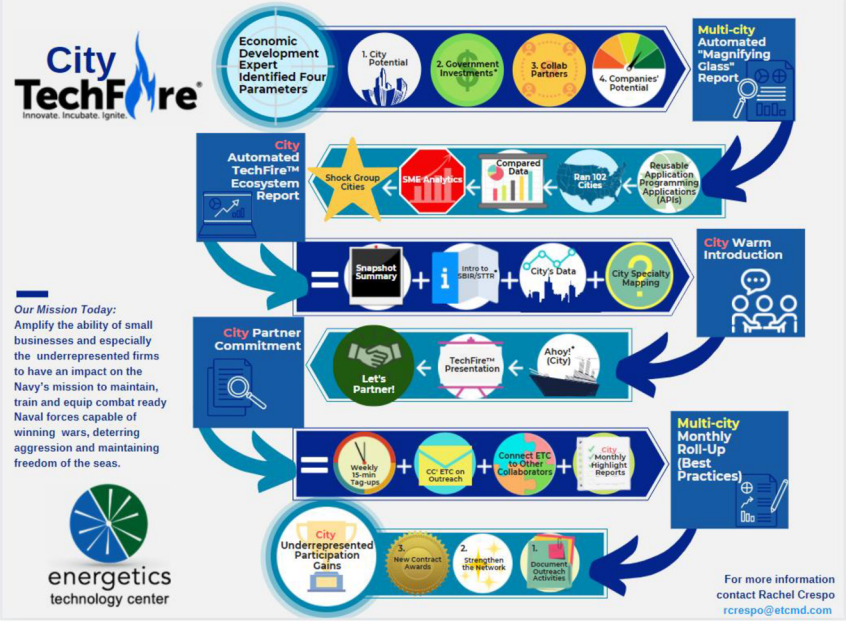
Questions for Mr. Kavetsky

Senator Coons Question:

In your testimony you highlighted the Navy's initiative "City TechFire", which has the goal of encouraging SBIR program participation in underrepresented communities and companies across America. The pilot program has thus far been conducted in major cities including Houston, San Diego, Phoenix, Detroit, San Antonio, El Paso, Jacksonville, Cleveland, Greensboro, and Harrisburg.

How effective has the "City TechFire" program been in reaching communities and companies less well represented among SBIR recipients?

Kavetsky Answer:
City TechFire® has been successful in strengthening the network of the local collaborators and organizations that are responsible for reaching out to small businesses and entrepreneurs. When entering a region, the key is to really understand the stakeholders in the community and each of their roles. Prior to outreach, ETC compiles an ecosystem assessment report to identify the organizations present and develops a snapshot of the technology in the defined area. The assessment pulls data from the U.S. Census and other sources to add a quantitative aspect to the analysis. In the success of the City TechFire®, ETC has a much better ability to assess those organizations truly driving innovation in an ecosystem and ones that are in contact with technology companies capable of pursuing SBIR opportunities. In the outreach phase, ETC hones their knowledge of the potential city collaborators and develops a practical understanding of their collective mission / metrics. There are many interested organizations in these ecosystems and finding motivated collaborators has tremendously aided the current project. Raising awareness of the SBIR/STTR programs to organizations that were previously unaware of SBIR/STTR is an outcome metric ETC captures to track the effectiveness of the project. Below is the City TechFire® process ETC has developed and is executing for the Navy.



How can the "City TechFire" program be expanded to reach more cities as well as innovators in rural regions?

Kavetsky Answer:
As mentioned, the most crucial step is to become fully aware of the organizations and innovation communities in a particular city or region. Once organizations are known, outreach to those entities and alignment to a common mission really does accelerate bringing opportunities to small business networks. Occasionally, ETC reaches out to an ecosystem to then learn that their technology priority or concentration is something that does not align well with the Department of the Navy's SBIR/STTR needs. In these cases, ETC promotes the broader SBIR/STTR Program and has found there is usually new mutual opportunities with other agencies for consideration.

Senator Rosen

SBIR-STTR Underperforming States

Nevada historically receives fare fewer than its fair share of Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) awards. According to current data from the U.S. Small Business Administration, nationally there were 7,136 SBIR and STTR awards amounting to over $3.8 billion in 2020. However, there were only 14 awarded in Nevada that same year, which accounted for far less than one percent of total SBIR and STTR awards made last year.

Given the need for enhanced support to my state and other underperforming states, particularly those like Nevada that are already facing high unemployment, what kinds of solutions do you recommend that would provide regional parity for SBIR and STTR programs in order to maximize those underserved states not on the coasts, especially at the very start of a business venture?

Kavetsky Answer:
The key is to fully understand the ecosystem and have a strong network in that given area. Some states have robust investing initiatives in specific technology domains and create a pipeline of companies in that technology domain. What ETC has found in the City TechFire® effort is that universities are a major force in an ecosystem and contribute to research/innovation momentum. A close relationship with the economic development organizations in a region can provide tremendous insight. ETC has found that some states provide additional funding to the startup / small business environment, including SBIR/STTR resources which seems to be a real differentiator. The Federal and State Technology Partnership Program (FAST) grant and the Mentor-Protégé Program (MPP) are strong potential contributors as well. For example, the Department of Energy (DOE) has an MPP that operates separately from the SBA's program and fosters long-term business relationships between small businesses and DOE primes. This helps increase participation and maximize opportunities for small businesses to work with the government.

SBIR-STTR Participation of Women-Owned Businesses
Nevada has more than 80,000 women-owned small businesses, and has led the nation in growth of women-owned businesses over the past decade. Last year, the National Women's Business Council and the U.S. Small Business Administration conducted a comprehensive study of SBIR-STTR programs, and found that women-owned businesses made up between only thirteen to fifteen percent of SBIR-STTR Phase 1 applications and awards from 2011-2018.

How can we foster and encourage more SBIR-STTR participation of women-owned businesses, especially those owned and operated by those from socially and economically disadvantaged backgrounds?

Kavetsky Answer:
In our ecosystem assessments in City TechFire®, ETC noted organizations that specifically work with underrepresented small businesses and entrepreneurs (i.e., WOSB, SDVOSB, HUBZone,

and SDB). For example, ETC will document and leverage if a region has a Women's Business Center, which is partly funded by the SBA. Another entity ETC came across in our Houston outreach was the Women's Chamber of Commerce which has locations across the US. For STTR outreach, a possible collaboration is with the Society of Women Engineers, a great advocate and catalyst for change for women in engineering and technology. There are a variety of societies and associations that specifically focus on educating and bringing opportunities to underrepresented communities. There are many great organizations that can assist in this mission.

Senators Risch

I'm proud to be a strong supporter of the SBIR/STTR program which has helped thousands of American small businesses partner with the federal government to advance groundbreaking technologies and innovations.

However, I'm deeply concerned that underserved states like Idaho have received some of the lowest numbers of SBIR/STTR awards in the country. For example, so far in 2021, Idaho has only received two SBIR/STTR awards while California has received 252 awards and Massachusetts has received 121 awards. To address this issue, I recently reintroduced bipartisan legislation which would reform the Small Business Administration's Federal and State Technology Partnership Program to encourage federal research and development grants to be awarded to small businesses and universities in states that have historically lacked SBIR and STTR awards. If enacted, my bill would encourage more awards to underserved states like Idaho to commercialize ideas, compete in the global marketplace, and create local jobs.

Mr. Kavetsky, while I believe my bill would be a step in the right direction what other strategies could be used to help underserved states like Idaho receive more SBIR and STTR awards?

Kavetsky Answer:
In assessing and driving to fully understand the strengths and weaknesses of the national innovation ecosystem network ETC has learned a lot. First, for the Navy program, the technology needs to be applicable to Navy needs and the small businesses need resources to aid them in their pursuit of SBIR/STTR. As stated, universities have a strong impact on the research focus of the region. In partnership with a local institution, one recommendation is to "work upstream" to find entrepreneurs. For example, there might be opportunities to discuss in a senior engineering design class. Secondly, a strong connection to academia can provide insight on their R&D portfolios and in the long run increase the number of SBIR/STTR awards. As mentioned by the SBA, STTR's most important role is to bridge the gap between performance of basic science and commercialization of resulting innovations. Finally, connecting the university efforts, the economic development efforts, and the efforts of entities that are working directly with small businesses can lead to an overall strengthening of a particular ecosystem.

I am also concerned that many SBIR/STTR awards are going to "SBIR mills," or companies that use these awards as their primary revenue stream rather than leveraging these funds to help create new and innovative products.

Using SBA data, the State Science and Technology Institute found that potential mills received more than 21 percent of all awards during the period from 2009 to 2019. These "mills" have been clustered in states with large metropolitan areas like New York, California, Virginia, and Massachusetts, which already receive a much larger share of awards compared to underserved states like Idaho. This not only crowds out new competitors for the program, but hurts small businesses in rural states like mine that have historically received fewer awards.

Mr. Kavetsky, in your testimony you discuss your work with the Navy in helping underserved firms access the SBIR program and you clearly understand the importance of having new businesses enter the program. Can you recommend any solutions to stop these so-called SBIR mills from receiving a large share of the awards?

Kavetsky Answer:
As our Underrepresented Outreach Project is focused on four underrepresented communities - Women-Owned Small Businesses, Service-Disabled Veteran-Owned Small Businesses, HUBZone Small Businesses, and Small Disadvantaged Businesses, ETC is currently not looking into the data you are referencing. However, in the Navy project ETC has tended to do more outreach in cities / states with lower-than-average SBIR/STTR participation.

Senator Inhofe

Integration of Technology at DOD
Mr. Kavetsky, while the SBIR-STTR program has helped the Department of Defense get advanced and innovative technologies to the warfighter, the Department still struggles to keep up with the pace at which technology evolves. Due to the Department's lengthy budget cycle, certain technologies can be out of date or less-efficient by the time they are funded as a Program of Record.

Mr. Kavetsky, what insight can you provide regarding this problem, and what recommendations would you suggest to the SBIR program to ensure innovative technologies could be plugged into existing Programs of Record to equip the warfighter with the most up-to-date equipment and technology?

Kavetsky Answer:
The SBIR and STTR programs enable small businesses to explore their technological potential, stimulating high-tech innovation. This innovation answers the research and development needs of the Federal government including the Department of Defense. As stated by the Navy, most Naval topics address a specific need from a PEO/PM office (i.e., military application) thus, leading to a higher technology commercialization rate. The SBIR/STTR Programs are mission-oriented, providing companies the opportunity to become part of the national technology base that can feed both the military and private sectors of the nation.

Implementation of CMMC at DOD
Mr. Kavetsky, as you know, the Department of Defense accounts for the largest share of funding in both the SBIR and STTR programs. DOD recently began implementing the Cybersecurity

Maturity Model Certification (CMMC), its new protocol to ensure a unifying standard for cybersecurity across the Defense Industrial Base. While it is important that the Department have strong cybersecurity guidelines, my staff hear regularly from small businesses that the current process forward on CMMC is confusing and may be extremely costly for small businesses to comply with.

Mr. Kavetsky and Mr. Glover, could you both address what you've heard from small businesses in regards to DOD's CMMC requirements and how those could affect participation in the SBIR-STTR program?

Kavetsky Answer:
Defense Acquisition University (DAU) is leading in providing guidance and education on CMMC requirements and can be utilized as a great resource for small businesses. Recognizing that security is foundational to DoD, CMMC requirements are a major change for any small organization. As our City TechFire® outreach has been more to organizations, rather than directly working with individual small businesses, we are unsure to what the full impact is of CMMC. Clearly, it affects every small business differently. For us at ETC, a nonprofit 501(c)(3), achieving CMMC compliance cost us $80,000 in overhead funding, and a 200 manhours of ETC labor for ETC staff.

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