

**Hearing of the Senate Small Business Committee
Golden Age of American Innovation: Reforming SBIR-STTR for the 21st Century**

Testimony of

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Good afternoon, Honorable Chair Ernst, Ranking Member Markey, and all other members of the Senate Small Business Committee. Thank you for the opportunity to speak at today's hearing. I am pleased to share my insights into how the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs have enabled Triton Systems to make a significant impact in both the military and commercial space, as intended by Congress, helping to sustain America's technology leadership in both spheres.

First, a few words about myself. I received my Masters and Doctorate degrees from Rensselaer Polytechnic Institute (RPI), in Chemical Engineering. I have been working in advanced materials and their commercialization by US industry for over 35 years. I am an inventor, with over 30 patents in this space. Currently, I am responsible for coordinating our efforts in supporting the warfighter within Triton Systems. I received the Tibbets award from the Small Business Administration (SBA) in 2017, on behalf of Triton Systems, for our success in commercializing SBIR derived technologies.

Overview of Triton Systems Inc. (Triton)

Triton, based in Chelmsford, MA, was founded in 1992 with a mission to accelerate the transition from innovative ideas to practical solutions, with a focus on bringing early-stage technologies to both commercial and military markets. Triton embraced the core goals of the SBIR program:

- i) Stimulating technological innovation by leveraging small business entrepreneurship
- ii) Utilizing small businesses to meet Federal research and development needs
- iii) Increasing the private sector commercialization of innovations derived from Federal research and development

Triton is a 100% US-owned company, with significant employee ownership. We exclusively employ U.S. persons, located across multiple states. Our primary focus is to address national security needs, and our technical team consists mainly of cleared personnel who possess highly specialized technical skills and a deep understanding of emerging threats and critical technology gaps in the military.

Over the years Triton has consistently demonstrated an exceptional track record in commercialization, exceeding the standards set by Congress. Our success in transitioning SBIR-derived technologies into the marketplace was recognized with the prestigious Tibbetts Award from the SBA. As you will see in our success stories, many of which have had significant impacts on national security and the economy, there are numerous pathways for transitioning and commercializing innovations that extend well beyond the metrics of traditional Phase III funding.

I will first provide an overview of how the SBIR/STTR program has benefited Triton and its ability to have a significant impact on retaining our nation's technological advantage in both national security and healthcare — two sectors where the U.S. holds a global leadership position. Additionally, I will

highlight how Triton has successfully partnered with academia and businesses across the country to address critical technology needs for the country through the SBIR program.

Impact on National Security and the Economy

1. National Security: Impact areas – Cost Savings, Warfighter Lethality and Health

- a) Mission critical component for the F-35 Joint Strike Fighter aircraft: Triton developed a mission critical component for the F-35, replacing a foreign source. **The F-35 is the Department of Defense’s (DoD) largest weapon system ever. The Air Force estimates our solution will result in over \$550 million in savings in sustainment costs for the F-35 fleet and** minimize the health risk to military maintenance personnel from exposure to hazardous substances. This was announced as a small business success story by the Air Force. It is important to note that these cost savings to DoD would not show up in the commercialization metrics that we report to the SBA.
- b) Mission critical component for the F-22 Raptor aircraft: Triton developed a product for the F-22 Raptor that is being used to attach materials critical for aircraft performance and survivability. Our solution greatly simplifies the repair and sustainment process and is expected **to result in over \$200 million in life-cycle cost savings for the F-22.** Again, these cost savings to DoD would not show up in the commercialization metrics that we report to the SBA.
- c) Personal Air Mobility for expeditionary forces: Triton’s advanced paraglider system to enhance the mobility and lethality of Marines is being qualified for acquisition with the **program of record starting in 2026.** We have set up a venture for manufacturing in the state of Washington. **To support the program of record, we are creating a Berry compliant US based supply chain consisting of companies in North Carolina, Tennessee, Massachusetts, Pennsylvania and Rhode Island, in addition to the state of Washington, re-establishing a manufacturing capability that had moved overseas.**
- d) Bladder Relief for Aviators: Triton’s Aeroflow product is being qualified for use by both male and female military aviators for bladder relief in extended combat missions, and for long range reconnaissance missions to monitor adversaries, by the Navy and Air Force. Previously there were very limited options for female aviators in particular.
- e) Hearing protection for aircrew: Hearing loss and tinnitus are the top two health concerns among veterans. As of 2020 over 1 million veterans were receiving compensation for hearing loss and over 2 million for tinnitus per the VA. Triton’s hearing protection and communication device for aircrews addresses this problem for Army aircrews.

These are all technologies that are critical for the warfighter, but with no clear near-term major commercial market.

2. Healthcare: Impact Areas – Heart Disease Treatment, Cancer Therapy

Heart disease and cancer are the two leading causes of death in the US, and SBIR derived technologies have allowed Triton to make a significant impact in addressing both. Sensor technology developed by one of our spin off companies enabled the world’s smallest heart pump. An SBIR derived cancer immunotherapy technology ultimately had an IPO on NASDAQ and was later acquired by a major pharmaceutical company.

Our company is considered an experienced firm under the FY 2022 reauthorization language, and hence we are subject to enhanced metrics. We have reported over \$400 million in primarily private sector investments in SBIR derived technologies to the SBA, greatly exceeding the enhanced commercialization metric at \$1.7 million per Phase II over our lifetime. Once again, this does not include greater than \$700 million in cost savings to DoD generated by these technological advancements. These savings are not captured by the traditional metrics Congress uses to assess companies participating in the SBIR program, nor are the significant health benefits to the warfighter. The 2022 legislation also revised the Phase I to Phase II conversion metric, doubling it for experienced firms, and we fall slightly short of the new metric. This conversion metric does not measure commercialization success and is often dependent entirely on the agency's practice. For example, the Air Force has in the past given out many small dollar Phase I awards with the intention of only awarding one or a few Phase IIs, in order to capture as many as good ideas as possible. This represents a good value to the government by capturing many good ideas at low initial cost. However, it is not consistent with a 50% Phase I to II conversion metric. Keeping this metric will only discourage firms from putting forth innovative ideas and firms will consequently only focus on proposing programs where they are certain they can get to Phase II. This undermines one of the goals of the program to make small early bets in many technologies in order to pick the best. We urge Congress to only consider metrics that promote commercialization, transition and merit, which will result in the best technologies for the country and the warfighter.

Impact on the Local Economy

In addition to its significant impact on our national security, the SBIR program also serves as a key driver of local economies across the country. While many companies can attest to the positive effects they have on their communities, I would like to specifically highlight Triton's unique contributions to the local economy.

Our facility, in which we have invested well over \$7 million of internal funds to build capabilities to support the warfighter, serves as the anchor tenant for the town of Chelmsford's newly established technology and business corridor. Triton is recognized every year by our neighboring university, the University of Massachusetts Lowell (UML), as a Preferred Partner due to the substantial research collaboration we sponsor at UML. Finally, we are currently investing over \$ 3mm in internal funds to build a large scale metallic additive manufacturing pilot facility. This will be the first of its kind in the US to allow fabrication of large-sized additively manufactured metallic parts for use by DoD. This internal investment has a 10-15 year cycle to adoption, with no immediate commercial returns, as is common with the adoption of advanced new materials. Only companies with the scale and commitment to support government agency mission goals would take on the challenge to develop a capability that our adversaries do not yet have and is important for the US to stay ahead in the technology race. SBIR program support will be required to nurture and transition this new technology for use by our defense and aerospace industry. This is an example of why it is so critical for the SBIR program to be reauthorized without restrictions on the number of merit-based awards.

Collaboration with Higher Education

Triton has successfully established a strong presence in the national innovation ecosystem by collaborating with over 60 higher education institutions across 28 states, to transform campus ideas into practical solutions and support and facilitate the subsequent transition of these technologies.

Some examples that might be of interest to this committee is our work with the Missouri University of Science & Technology (Missouri S&T), Rolla, MO, to develop new materials for hypersonic

vehicles, the University of South Alabama, Mobile, AL, to develop new air cleaning systems for submarines, the University of Montana, Missoula, MT, to develop new drugs for hearing restoration for the warfighter, and the University of New Hampshire, Durham, NH, to develop underwater acoustic models for the Navy for anti-submarine warfare. Additionally, Triton's cancer immunotherapy spin-off IPO, Aduro Biotech, also started with a collaboration with the University of Massachusetts, Lowell.

Most of these collaborations are Phase III (non SBIR) contracts. None of these would have been possible without seed investments from the SBIR program.

Suggestions for Improving the SBIR Program

As this Committee and Congress begin to debate and discuss the reauthorization of the SBIR and STTR programs I would like to take this opportunity to provide suggestions to further improve these programs based on our experience with both the program and the agencies involved.

The SBIR program has proven to be the most successful innovation program in the country, using only 3.65% of federal extramural research and development (R&D) funding. All comprehensive studies, such as at least 18 studies conducted by the National Academy of Sciences validate the success of this program. Studies by DoD and NIH show that for every dollar invested, there is an up to \$30 return.

We believe this success is because of its uncompromising focus on merit, its relentlessly competitive nature and the flexibility incorporated in the SBIR legislation to allow the agencies to adjust the program to meet their mission needs. As an example of flexibility, while some agencies have set a cap on the number of programs a company can win in a given year, DoD has determined that multi award winners serve critical needs for the DoD mission (OSD memo to Congress in 2022). We believe that any change that significantly impacts these core foundational pillars of the program, specifically the merit-based nature and agency flexibility to adapt to their mission needs, would ultimately undermine the program.

Areas where we believe the program can be significantly improved include:

1. Incentives for Transitioning Technologies to Phase III

Transitioning SBIR technologies to Phase 3 remains extremely challenging to most small businesses despite multiple efforts in Congress to address the barriers. In particular, as it relates to DoD, most military platforms are built by only a few large prime contractors. Since most small businesses build components or sub-components, it is very challenging for the small business to derisk, mature and qualify the technology in isolation. Incentives in the SBIR legislation for the prime contractors to adopt new innovations from small businesses, as well as recognizing government program managers for their success in doing so, would greatly facilitate this effort.

2. Improving the Contracting Process

Long delays in the contracting process will often result in the small business failing due to inability to meet payroll or losing personnel with critical skills. The SBIR legislation can mandate standardized contracts for each agency for Phase I and II programs, to streamline the process to the greatest extent possible.

3. Improving Geographical Distribution

The SBIR program plays a critical role in providing seed funding for small businesses. Unlike venture capital, which is often concentrated in a few sectors and regions of the U.S., SBIR awards help thousands of new businesses engage with the federal government each year across diverse sectors. To further enhance the program's impact, it would be beneficial for SBA and government agencies to establish stronger communication with small businesses to better understand the needs of the agency. Additionally, current SBIR awardees can play a pivotal role by mentoring businesses or higher educational institutions that are interested in becoming involved in the process. Strengthening outreach efforts, such as through programs like Federal and State Technology (FAST) Partnership program and allocating funding specifically for outreach initiatives can help broaden participation. Collaboration with experienced firms skilled in transitioning technologies can also help ensure greater success, as we have shown. Expanding the program will also provide more opportunities for under-represented businesses to benefit from SBIR awards.

4. Foreign Risk Management Provisions

The foreign risk management provision incorporated into the last reauthorization bill was timely and is important in keeping SBIR technologies out of the hands of our adversaries. However, it is our perception that most of the agencies do not appear to be adequately resourced to conduct a thorough investigation of any issues flagged and to engage with the small business to investigate and allow for corrective action (similar to the process that the Defense Counterintelligence and Security Agency (DCSA) uses with contracts larger than \$ 5 million). It will be important to allocate such resources to each agency to implement this provision in a fair and transparent manner with the small businesses. In addition, many small businesses will require significant education to protect against inadvertent foreign involvement or intrusion.

5. Making the SBIR Program Permanent or Long Term

Making the program permanent or extending for 8 years as was the case in earlier reauthorizations will give the small businesses and agencies some certainty to ensure continuity.

Finally, I want to thank all members of the Small Business Committee, without whose support and championship, the SBIR program would not continue to exist. Our employees are composed of uniquely skilled and innovative engineers and scientists who are passionate about directly benefiting the warfighter and making a difference. They have given up many other more lucrative opportunities in most cases to do so. The SBIR program has provided a pathway for them to do this as you have seen from my testimony, and this would not have been possible without your support.



SUCCESS STORIES



Triton Systems

Chelmsford, Massachusetts

MATERIALS TECHNOLOGY SET TO LOWER COSTS, REDUCE ENVIRONMENTAL HAZARDS IN F-35 AND OTHER AIRCRAFT

The Air Force is poised to reduce hazardous materials in aircraft, and save big dollars over the long haul, through a small business partnership.

With the backing of a SBIR contract, Massachusetts based Triton Systems successfully developed a technology to produce nickel-free material systems. In addition to eliminating nickel and associated environmental hazards, Triton's technology provides compelling cost savings for F-35 and other aircraft platforms. On the U.S. F-35 fleet alone, this could lead to an estimated \$550 million savings across the life cycle of the program.

The technology has been developed and demonstrated in close collaboration with F-35 manufacturers, Northrop Grumman and Lockheed Martin.

Triton used the manufacturing process and pilot manufacturing scale equipment to demonstrate several relevant product forms. Triton also has demonstrated fully-formulated resin systems meeting specific technical requirements for the F-35.

Current fighter aircraft incorporate nickel-based materials to meet various system requirements, which creates several problems. In addition to high costs, nickel is a hazardous material that has been identified for removal to

The newer Triton technology provides a path to eliminate nickel from a number of mission-critical material systems used on aircraft platforms. For the F-35 Joint Strike Fighter program, replacing nickel-based material systems with lower-cost, non-nickel based material systems is a high priority. The idea is to reduce hazards and address high operational and sustainment costs.



Courtesy U.S. Air Force

The technology is now positioned for transition to several applications on the F-35 program.

Triton's initial success under the SBIR program led to additional funding through the Rapid Innovation Fund (RIF) program. The RIF award allowed Triton to bring the technology and product to a maturity level ready for qualification and transition.

The company has a solid track record of driving early-stage technologies from the laboratory to the marketplace. Triton has spun-off a number of successful companies, attracting more than \$200 million in external venture financing.

On the U.S. F-35 fleet alone, this could lead to an estimated **\$550 million savings** across the life cycle of the program.

the widest extent possible because of its environmental, health and safety concerns. Nickel based materials require additional handling procedures during many steps in the installation process and their regulatory impacts include limitations on application equipment and controls as well as allowable worker exposure.

ACHIEVEMENTS

FOR THE AIR FORCE FROM SMALL BUSINESS