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Department of Defense: SBIR/STTR Grants and Other Contracts

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Summary

- Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) grants are a government funding program offered by eleven federal departments and awarded to small businesses looking to develop and bring a product to market.

- The Department of Defense (DoD) and its twelve agencies award more than half of all SBIR/STTR grants; they solicit proposals for designated projects biannually.

- Broad Agency Announcements (BAAs) are another source of funding that can widen the scope of possible proposals but is not limited to small businesses. BAAs can be awarded to small and large businesses as well as academic institutions and nonprofits.

- Small business grants are vital in many research startups, and have shown themselves to be helpful to both the DoD (which may often purchase the technology) and the American workforce.

Department of Defense:
SBIR/STTR Grants and Other Contracts

Julia Kelly[1] and Richard Sensenig, MS[2]

Topic Relevance by Timeline

Summary

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- Small business grants are vital in many research startups, and have shown themselves to be helpful to both the DoD (which may often purchase the technology) and the American workforce.

Introduction

Small Business Innovation Research and Small Business Technology Transfer (SBIR/STTR) awards are a class of government grants and contracts provided to small businesses in order to help create companies, advance research, and bring products to market that address specific federal agency goals. The Department of Defense has a wide range of medical and research needs for which they seek technological solutions, funded through SBIR and STTR awards. Areas of research include medical simulation and information sciences, military infectious diseases, military operational medicine, combat casualty care, radiation health effects, clinical and rehabilitative medicine, traumatic brain injury (TBI), and soldier protection, among others. Many DoD activities

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offer various types of funding opportunities for medical research and development outside of the SBIR/STTR program, generally advertised through Broad Agency Announcements (BAA). These agencies include each of the services as well as a number of joint organizations like the Defense Advanced Research Projects Agency (DARPA), the Office of the Secretary of Defense (OSD), the Special Operations Command (SOCOM), the Chemical and Biological Defense Program (CBD), and the Defense Health Agency (DHA). One of the limitations in the academic entrepreneur's use of DoD funding is that since the DoD has specific requirements, the funding opportunities are in general more focused than those of other government research organizations, such as the National Institutes of Health (NIH) or the National Science Foundation (NSF). The DoD does not offer anything equivalent to the NIH's investigator-initiated R01 awards. An advantage of a DoD program is that the DoD has additional later-stage development funding options that do not exist in the NIH and NSF and can fund a project to production status. Furthermore, an additional significant opportunity for the company is that the DoD may be interested in purchasing the technology that was developed with the SBIR/STTR grant, thus creating a further avenue for successful commercialization.

Securing DoD and SBIR Grants

In all federal agencies with extramural research budgets in excess of $100 million, funding must be set aside for the Small Business Innovation Research program (SBIR). The Department of Defense is the largest sources of SBIR funding, awarding $2 billion in grant funding annually (see the chapter "SBIR/STTR Grants: Introduction and Overview"). Like other agency SBIR/STTR grants, they are intended for supporting small businesses with fewer than 500 employees, with an emphasis on women and minority-owned businesses. Roughly 20% of DoD SBIR/STTR grants are funded each year, and, depending on the product, between 40% and 75% of products developed by DoD grants produce some sales. Three Broad Agency Announcements soliciting proposals are released each year and are open for about three to four weeks, during which researchers can submit their grant proposals. After the window closes, grants are evaluated, and awards of ~$150,000 over six months are given for Phase I applications and $1 million over a year are given for Phase II applications. Phase II awardees also have the opportunity to extend the contract for one year as a Phase II enhancement, with private matching and total awards varying by agency. For example, DARPA provides a 1:1 match up to $500,000, so if the startup can raise up to $500,000 in funding, the agencies may match the funds ("Getting Started on Phase I"; "Process Acceleration: How to Qualify for Phase II Enhancement").

SBIR awards, which have a significant amount of funding from the DoD, must fulfill an area preselected by the departments. The DoD releases sets of SBIR topics three times a year. There is a two-month window after the release date in which researchers can submit a proposal. Topics are rarely repeated. Notification of SBIR releases can be obtained by subscribing to the DOD SBIR listserv, sbiroutreach@bytecubed.com. SBIR grants are reviewed by the point of contact within the department—who is also the primary contact person during the grant submission process—

and a group of DoD researchers, as opposed to the study section (scientific review group) committees of the NIH, which have a diverse group of researchers and business reviewers. Additionally, less emphasis is placed on the qualifications of the principal investigator (PI) and more on the design of the overall project, leaving applications open to a wider range of researchers. Because these projects are selected to fulfill a certain need in the department, SBIR grants can be issued in as little as three months. For an SBIR grant, the PI must be employed primarily by the company during the grant period and cannot work full-time for another employer. This is a concern for academic researchers and professors, who must get a part-time appointment or take a sabbatical during an SBIR grant, or identify another individual based in the company who can act as PI. Conflict of interest is an important consideration, especially if other members of a PI's academic lab not affiliated with the company are working on the associated research (see the chapter "Understanding Conflict of Interest for Academic Entrepreneurs"). The average SBIR award for Phase I is $150,000 over a period of six to nine months, as outlined in Table 1. Some departments give a base award of $100,000, but will consider proposals of up to 50% over the budget, with extra time allowed on the award. However, any proposals that exceed the 50% threshold will usually be automatically rejected.

In order to ensure that researchers at nonprofit institutions (such as universities) who wish to work more closely with for-profit companies are also covered by small business grants, federal agencies with extramural research budgets in excess of $1 billion are required to fund Small Business Technology Transfer (STTR) grants. STTR grants are a smaller portion of the DoD budget—at $100 million annually—and not all agencies within the department participate, but they were modeled off the SBIR program. In STTR-funded projects, the company must partner with a federal lab, a university, or a nonprofit research and development (R&D) platform, as opposed to being a standalone entity. This is intended to promote collaboration and can be useful in areas where the PI wants to retain a leading role but is unwilling to give up their university position ("Program Descriptions").

Broad Agency Announcements are used to solicit ideas for a number of DoD grants by broadcasting the needs of the agency to the general public. Although SBIR and STTR grants are covered under the BAAs, other grants offered by the program are not specific to small businesses, but are open to them and create a wider pathway to funding for ideas. Each BAA has a specific goal (environmental study, proof of concept pilot program, forensic science research, etc.) and associated grants that will help to fund the research and commercialization project. Agency BAAs are not as specific as the SBIR and STTR solicitations, and can offer funding opportunities for products that do not fit the SBIR/STTR solicitations for that funding period. Additionally, BAAs may have application and funding windows of several years, which will allow for longer preparation time and more applications ("Federal Acquisition Regulation (FAR)").

Table 1. DoD Awards and Expectations.

DoD Component	Cost	Duration	Phase I Option	Discretionary Technical Assistance
Army	Base NTE $100,000 + Phase I Option NTE $50,000	6 Month Base + 4 Month Phase I Option	Required	$5,000
Navy	Base NTE $125,000 + Phase I Option NTE $100,000	6 Month Base + 6 Month Phase I Option	Required	$5,000
Air Force	Base NTE $150,000	9 Month Base	Not Applicable	Not Available
Air Force *	Base NTE $50,000	2 Month Base + 1 Month Reporting Period	Not Applicable	Not Available
DHA	Base NTE $150,000	6 Month Base	Not Applicable	Not Available
DLA	Base NTE $100,000	9 Month Base	Not Applicable	$5,000
DMEA	Base NTE $150,000	6 Month Base	Not Applicable	$5,000
DTRA	Base NTE $150,000	7 Month Base	Not Applicable	$5,000
MDA **	Base NTE $100,000 + Phase I Option NTE $50,000	6 Month Base + 6 Month Phase I Option	Required	$5,000
NGA	Base NTE $100,000	9 Month Base	Not Applicable	Not Available
OSD (SCO)	Base NTE $225,000	6 Month Base	Not Applicable	Not Available
USSOCOM	Base NTE $150,000	6 Month Base	Not Applicable	Not Available

Source: Adapted from Department of Defense Small Business Innovation Research (SBIR) Program, SBIR 18.2 Program Broad Agency Announcement (BAA), April 20, 2018.

*The Air Force has special pricing as stated in the Phase I and Phase II description for topics AF182-001, AF182-002, AF182-003, AF182-004, AF182-005, and AF182-006 – AF will accept Phase I proposals up to $50,000 with a technical period of performance of 2 months and a final reporting period of 1 month. AF will accept from Phase I Awardees Phase II proposals of up to $750,000 and 15 months of technical and final reporting. Please refer to the Air Force SBIR 18.2 Instructions for additional information about Phase I and Phase II requirements.

** MDA Phase I Option is only exercised for firms who are selected for Phase II award.

SBIR Application Process

There are general application instructions that apply to all DoD SBIR applications as well as component-specific (army, navy, etc.) instructions available at https://sbir.defensebusiness.org/topics/instructions.

In broad strokes, the application process involves:
Step 1: Determine eligibility. Businesses must fit into the SBIR requirements for employee size (<500) and ownership eligibility. Companies applying for the grant should determine if they are eligible for an SBIR or an STTR grant, and ensure they know the limitations of each before applying.

Step 2: Find a topic. Applications can only be submitted if the research falls within the topics outlined by the DoD release at the time. Current announcements can be found at https://www.acq.osd.mil/osbp/sbir/solicitations/index.shtml and are released three times a year.

Step 3: Ask questions. The DoD highly encourages communication between applicants and topic authors during the pre-release period—the period when topics are announced but before applications are accepted. During the open period when applications are being accepted, communication is not allowed between applicants and topic authors, but questions may still be submitted to https://sbir.defensebusiness.org/topics/, where the applicant may ask questions anonymously, and anonymous respondents may post answers or solutions. Asking questions can help clarify if a project is eligible for a topic, as well as help with ensuring the application is as complete and correct as possible (Getting Started on Phase I).

Step 4: Prepare the proposal. Each program announcement may have specific requirements for a proposal, but all will follow a similar format, as described below:

> Each proposal must contain a cover sheet, prepared using the DoD application website, a technical proposal, cost volume, and a company commercialization report (used more for Phase II). Because each application involves a narrow topic, the application portal allows for public Q&A with the point of contact, where PIs can ensure that their project falls within the application scope and can look over previous questions asked about that specific application (Greenwood).
>
> The cover sheet must contain any company information, certifications that prove the small business is eligible for the grant, business information, proposed cost, proprietary information, a 200-word technical abstract, anticipated benefits, teaming arrangements, PI efforts, and corporate contacts (Greenwood). The technical proposal should be uploaded as a PDF and must identify the significance of the problem in a way that demonstrates that the applicant understands the problem—because each category is chosen by the DoD, there is no need to convince the reviewer that the problem exists. Additionally, the technical proposal must outline technical objectives and a statement of work, as well as related work. A plan for future research/R&D must be demonstrated with a commercialization strategy. Because the projects are DoD funded, all key personnel and foreign citizens must be disclosed. Some DoD projects also prohibit work from foreign citizens. Finally, facilities, equipment, subcontractors, consultants, and any pending, prior, or current proposals and awards must be disclosed. Cost

volume is a proposed budget for the project (see Figure 1)—the DoD SBIR program differs from that of other agencies in that there is no salary cap in the budget. Indirect and overhead costs may be incorporated into the salary structure of the budget and are often discretionary, as the salary structure is more flexible than that of other agencies.

Step 5: Submit the proposal. The application is then submitted through the DoD SBIR/STTR portal of the project area of interest at https://sbir.defensebusiness.org/user/login/ (Getting Started on Phase I).

A process acceleration through Phase III for SBIR/STTR awardees called the Commercial Readiness Program (CRP) is available through some agencies. The CRP is available through the army, navy, and air force for projects that have a high transition-to-market potential and fulfill a high-priority need within the department. Projects that qualify can be matched with collaborators, facilities, and customers, and can receive assistance with technology transition plans and other agreements. In some cases, additional funding can be provided, or the CRP can help to link grant awardees with investors. Each department has different specifications for qualifications, as well as different resources available once a project is selected for the accelerator program. Oftentimes, it is useful to identify a potential customer within the department of interest, known as a technical point of contact (TPOC), who will then contact the CRP technology analyst (TA). The TA can then decide to move the product into the CRP or not. Additionally, the air force offers Small Business Industry Days (SBIDs), which allow for in-person marketing of products and for networking between grant recipients and DoD departments. Grant recipients who may want to participate in the CRP after Phase I/II should work to make and keep department contacts during the grant periods. Identifying a potential customer in a department, office, or contractor who can then vouch for the idea to the TA creates a strong application for the CRP ("Commercialization Readiness Program"). Note that the army CRP only applies to SBIR programs.

Commercializing a Project

Commercialization is the end goal of most, if not all, SBIR/STTR awards, as well as BAAs. An analysis of the DoD's commercialization reports showed that approximately 40%–70% of projects funded by SBIR/STTR grants reach the market stage (see the chapters "SBIR/STTR Grants: Introduction and Overview" and "Intellectual Property: Commercializing in a University Setting"). These numbers vary within the department and by year, but show an overall positive impact of the grants on bringing a product to market. Specific studies from the army and navy SBIR/STTR programs showed that for a $6.25 billion investment, $28.5 billion was made in revenue by the startups on the receiving end: an almost 350% return on investment. Additionally, there was $11.5 billion spent on sales back to DoD contractors, showing a direct benefit of the program to the DoD. The same study showed that annually about 30,000 jobs are generated by the SBIR/STTR grant programs, most falling into the high-paying category (>$60,000). Additionally,

in 70% of projects, the SBIR/STTR grants were the major source of startup capital, meaning that the startup would not have made it off the ground without the funding (Gaster).

These programs also generate cost savings for DoD contractors and departments. Patents are licensed to the government, and can be used even if the investor does not directly commercialize them, but anything commercialized can then be bought at a discount. Lockheed Martin identified $500 million in savings on the production of several government contracts as a direct result of technologies developed through the grants program (Gaster).

Patents

Patents are not needed to apply for an SBIR/STTR award, but they do help in the application process. If the patent is filed before the application, it will be done through the university technology transfer office (TTO) or equivalent offices (see the chapter "Working with the University Technology Transfer Office"). The idea must first be disclosed to the TTO, and a technology licensing officer will then help the inventor to assess whether a patent is needed and what needs to be done in the application process. Once a patent is filed by the technology transfer office and is granted by the U.S. Patent and Trademark Office, it is owned by the university and can subsequently be licensed back to the inventor or other interested parties for use in a startup or commercialization venture ("The Bayh-Dole Act at a Glance") (see the chapter "Intellectual Property: Commercializing in a University Setting").

Once work is funded by a DoD SBIR/STTR or a BAA grant, any inventions must be disclosed to the government agency awarding the funding, under the Bayh-Dole Act (see the chapter "Intellectual Property: Ownership and Protection in a University Setting"). If a patent is owned by the university, the university must disclose a patent discovery to the original funding federal agency within two months of the inventor (typically a university faculty or staff member) disclosing it in writing to the TTO, and generally prior to any publications or presentations at open meetings ("Bayh-Dole Regulations"). The patent owner (usually the university) then has two years to decide if they themselves want to file a patent, after which point the federal government is given the right to file a patent if it deems it necessary. The patent application must be filed within one year of the patent owner electing to do so. The patent owner must then report the filing number and date, and provide an annual utilization report of the invention to the federal government after filing. Disclosures to the federal government must first occur through iEdison ("iEdison: Welcome to iEdison"), the online portal used by most federal agencies that offer SBIR/STTR grants. The portal can also be used to claim the disclosure, disclose patent filing and information, and update the government on patent utilization. The government assumes a nonexclusive, nontransferable license to the invention in order to assure that the public can benefit from the taxpayer-funded research if possible ("Invention Reporting").

Figure 1. Example Budget.

TOTAL DOLLAR AMOUNT FOR THIS PROPOSAL:		**$149,989.68**	
DIRECT LABOR:		Base:	
Category and/or individual:	Rate/Hour	Est. Hours	Cost
	$76.92	360	$27,691.20
	$50.48	200	$10,096.00
	$25.00	24	$600.00
	$38.46	40	$1538.40
	$20.00	40	$800.00
Subtotal Direct Labor (DL):			$40,725.60
Fridge Benefits, if not included in Overhead, (rate 0.0000 %) x DL =			$ 0.00
Labor Overhead (rate 33.9639 %) x (DL + Fringe) =			$13,830.41
Total Direct Labor (TDL):			$54,556.01
DIRECT MATERIAL COSTS:			Base:
Mold Materials (wood, rubbers, resin, reinforced plastic, fiberglass, foam)			$13,642.00
Protype Material (silicons, plastics, foams, fiberglass)			$7,468.00
Sculpting Material (clay, rubbers, resin, rigid/flexible foams)			$1469.00
Assembly and Misc Materials (glues, adhesives, fasteners, fabrics)			$2,320.00
Subtotal Direct Materials Costs (DM):			$24,899.00
Material Overhead (rate 16.0000 %) x DM:			$3,983.84
Total Direct Materials Costs (TDM)			$28.882.84
OTHER DIRECT COSTS:			Base:
Subtotal Other Direct Costs (ODC):			$ 0.00
Direct Cost Overhead (rate 0.0000 %) x ODC):			$ 0.00
Total Other Direct Costs (TODC):			$ 0.00
G&A (RATE 68.0000 %) X (BASE: TDL + TDM + TODC):			$56,738.42
Total Cost:			$140,177.27
Fee or Profit (rate 7.0000 %):			$9,812.41
TOTAL ESTIMATED COST:			$149,989.68
DISCRETIONARY TECHNICAL ASSISTANCE:			$ 0.00

Obtaining Counsel/Advice

Academic researchers wishing to commercialize their technology should research the support their individual universities offer in terms of technology transfer, patenting, and commercialization advice. Large research universities such as the University of Pennsylvania and Stanford often have technology transfer offices that offer legal assistance with patent filing and licensing (see the chapter "Working with the University Technology Transfer Office"). University innovation and entrepreneurial centers, incubators, accelerators, and other programs can provide additional help with startup development, networking, and commercial contacts (see the chapter "Accelerators and Incubators"). For a first-time grant applicant, these offices can also be used for assistance in compiling a grant application as well as navigating which grant is appropriate for the project. In addition, it is highly likely that other faculty at the university have applied for DoD grants and can serve as an invaluable resource.

Conclusion

The Department of Defense's SBIR/STTR program is a vital source of funding for small businesses and an important economic tool for bringing research to market. While the criteria for topics are strict, they fulfill a known need in the departments, meaning that there is a known market for any technologies that are produced. Additionally, Broad Agency Announcements open up the possible topics if a certain idea does not fit into the year's SBIR/STTR application topics.

Resources

1. The federal government's website for the SBIR/STTR program: https://www.sbir.gov/
    a. The site provides many general resources for first-time applicants, including general program overviews and guidance; funding overviews; events for SBIR and STTR networking; and tutorials and samples.
2. The DoD SBIR/STTR website: https://www.acq.osd.mil/osbp/sbir/sb/resources/index.shtml
    a. The website provides many resources for applying to the programs, including web-based training; conferences and other events; sample proposals; model contracts; brochures; interviews; and invention disclosure.

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