



## POSITION STATEMENT

### SMALL BUSINESS INNOVATIVE RESEARCH

*Adopted by the IEEE-USA  
Board of Directors, 18 Sept. 2014*

The Small Business Innovation Research (SBIR) and related Small Business Technology Transfer (STTR) programs are strong examples of public-private partnership designed to advance technology development toward successful commercialization into products that benefit society and generate economic growth in the United States. To continue to improve the SBIR program, IEEE-USA recommends that any future legislative or regulatory action related to the SBIR program focus on the following:

1. Preserve the Basic Phase I, Phase II and Phase III structures. Do not allow bypassing of the competitive Phase I feasibility stage.
2. Conduct regular evaluations through annual reports and internal and external reviews--to ensure quality program management, accountability, improved program output, and responsiveness to the needs of small business applicants.
3. Improve the program process, by assuring topics are defined from the bottom-up, and selection process and cycle time/milestones are transparent.
4. Maintain the new higher allocation for SBIR funding.
5. Maintain a policy of evaluating program applicants' past performances and commercialization successes: Do not limit participation by organizations with many successful grant applications.
6. Assure first time applicants receive adequate consideration.
7. Develop and increase funding for commercialization assistance programs like the NSF Phase II-B program, the NIH continuation awards, and the Navy's Phase II.5 and Phase III programs. Standardize these programs across all agencies, as far as possible.
8. Create a cross-agency SBIR database listing past topics, funded proposals and current status, to improve interagency collaboration, and reduce duplicative research and development efforts.

9. Work to preserve the intent of the 2012 SBIR reauthorization limiting venture capital participation in SBIR.
10. Implement commercialization assistance programs, such as the Navy Technology Assistance Program (TAP), and the Department of Energy Commercialization Assistance Program (CAP) across all agencies for participants receiving Phase II funding.
11. Review incentive structures to encourage women and minority entrepreneurs to apply to SBIR programs and implement the best approaches across all agencies.

This statement was developed by the IEEE-USA Research and Development Policy Committee and represents the considered judgment of a group of U.S. IEEE members with expertise in the subject field. IEEE-USA serves the public good and promotes the careers and public policy interests of more than 200,000 engineering, computing and technology professionals who are U.S. members of IEEE. Positions taken by IEEE-USA do not necessarily reflect the views of IEEE or its other organizational units.

## **BACKGROUND**

### **The Importance of Small Business for Job Creation**

Congress has demonstrated an ongoing interest in the small business sector. Addressing issues related to economic growth and competitiveness, special consideration has been given to small, high-technology firms for several reasons, including that data validates that such companies tend to be highly innovative, play a significant role in technological advancement, and contribute to a high standard of living in the United States.

In the middle of the 2001-2002 recession, more than two million net jobs disappeared at large companies. This pattern persisted well after the end of the recession. More recently, however, small business job creation slowed in the wake of the 2008 financial crisis, and the constant uncertainty of the policy environment at the federal and state levels. Despite consistent attention paid to small business interests in Congress, those efforts are undermined by the lack of a coherent economic and budget policy. Without predictability on future opportunities, small businesses are having increasing difficulty playing their traditional roles as job creators.

Historically, small businesses are the largest source of jobs for engineers and scientists; and are the leading source of breakthrough innovations to meet federal research and development needs. However, in the midst of the recent economic crisis, the collective assets of U.S. venture capital firms shrank by 24% in 2008, to \$197 billion [2], amounting to the lowest investment in small companies and startups since 1990. While the recovery has enabled a return to profitability for many large firms and the financial sector, the environment for securing small business capital remains difficult.

## **The Role of the SBIR Program**

In 2008, Congress tasked the National Research Council with studying how the SBIR program has stimulated technological innovation, and enabled small businesses to contribute to government research and development (R&D) needs. A series of reports was produced on SBIR efforts at the Department of Defense (DOD), the Department of Energy (DOE), the National Aeronautics and Space Administration (NASA), the National Institutes of Health (NIH), and the National Science Foundation (NSF), accounting for 96% of SBIR program operations. Some of the conclusions of this effort were [1]:

- SBIR is a commercial enabler for small firms
- A small number of programs accounts for the majority of successes
- SBIR permits flexibility for programs to adapt to government agency missions
- A large number of firms have benefited from SBIR awards

The 2012 SBIR renewal validated the program success, and included several positive changes to strengthen it, including:

- Increasing the SBIR program allocation from 2.5% to 3.2%, and the STTR allocation from 0.3% to 0.45%, giving small businesses an increased role in the federal R&D enterprise
- Allowing small businesses with majority venture capital and private capital support to participate in the program, increasing competition
- Helping participating agencies combat SBIR and STTR program waste, fraud and abuse, protecting taxpayer dollars in the program
- Tasking the National Research Council with evaluating the effectiveness of both the SBIR and the STTR programs
- Enabling participating federal agencies to utilize three percent of program funds to improve program administration; combat waste, fraud and abuse; and conduct outreach to underrepresented businesses

Innovation-driven job creation was a key rationale behind legislation creating the SBIR program. SBIR's goal was to increase that portion of the federal R&D budget provided to small enterprises for work associated with the government departments and agencies mission responsibilities. Believing that small companies were underrepresented in government R&D activities, P.L. 97-219 established agency SBIR programs--to guarantee this sector a portion of the government's research and development budget--to compensate for what was viewed as a federal contracting preference for large corporations.

Current law requires that every federal department with an extramural R&D budget of \$100 million, or more, must establish and operate an SBIR program. Until recently, agencies were required to allocate 2.5% of their R&D budgets for SBIR funding. The 2012 reauthorization increased that amount on an annual basis, starting at 2.6% in FY2012, and increasing incrementally to 3.2% in FY17. Historically, this allocation has resulted in more than \$2 billion in annual SBIR funding across the agencies. The increased allocation for SBIR has become increasingly critical, as federal R&D budgets face severe pressure, and likely, sustained cuts.

Currently, eleven federal departments administer SBIR programs, including the Departments of Agriculture, Commerce, Defense, Education, Energy, Health and Human Services, Homeland Security, and Transportation; the Environmental Protection Agency; the National Aeronautics and Space Administration; and the National Science Foundation. Each agency sponsors SBIR activity reflecting its institutional R&D priorities. Individual departments select R&D interests, administer program operations, and control financial support. Funding may be disbursed in the form of contracts, grants, or cooperative agreements. Separate agency solicitations are issued at established times.

The Small Business Administration (SBA) creates broad policy and guidelines under which individual departments operate SBIR programs. In late 2012, the SBA implemented size and ownership regulations for SBIR participants, pursuant to a requirement in the 2012 SBIR reauthorization. The agency also developed and published policy directives to guide the various agencies in their SBIR program administration. The SBA monitors and reports to Congress on the conduct of the separate departmental activities, and provides a form of oversight and a regulatory umbrella over the SBIR program.

To be eligible to compete in the program, a company must be:

- Independently owned and operated
- Not dominant in the field of research proposed
- For profit
- The employer of 500, or fewer, people
- The primary employer of the principal investigator
- At least 50% directly owned and controlled by one or more individuals who are citizens or permanent residents of the United States

Agency SBIR efforts involve a three-phase activity. In the first phase, awards up to \$150,000 (for six months) are provided to evaluate the scientific or technical merit and feasibility of a new concept. The project must be of interest to, and coincide with, the mission of the supporting organization. Projects that demonstrate potential after the initial endeavor may compete for Phase II awards of up to \$1,500,000 (for a maximum of 24 months) to perform the principal R&D. Phase III funding is directed at the commercialization of the product or process, and is expected to be generated in the private sector. Federal dollars, but not SBIR funds, may be used in Phase III, if the government perceives that the final technology or technique will meet public

needs. P.L. 102-564 directed agencies to weigh commercial potential as an additional factor in evaluating SBIR proposals.

## **Background on Recommendations**

1. The 2012 SBIR reauthorization was successful in preserving the Basic Phase I, Phase II and Phase III structures. The final version of the legislation removed a clause from the House Small Business Committee bill that would have allowed agencies to bypass Phase I. However, a limited pilot program for direct Phase II funding is still pending at NIH, DOD, and the Department of Education. IEEE-USA opposes efforts to bypass Phase I, as this stage includes the critical feasibility analysis needed to increase the chances of success in Phase II, and subsequent commercialization. Furthermore, in a zero-sum funding scenario, permitting companies to apply directly to Phase II could significantly reduce funds available for Phase I projects, where the fundamental SBIR program innovations are born.
2. Conduct regular evaluations through annual reports, internal and external evaluations to ensure quality program management, accountability, improved program output, and responsiveness to small business applicants' needs. The 2012 SBIR reauthorization implemented new and more robust reporting requirements for distributing SBIR funds through the various agencies. IEEE-USA supported those efforts, and encourages agencies to implement the required protocols efficiently--maintaining close controls and visibility on SBIR funds expenditures.
3. Improve the program process by assuring topics are defined bottom-up, the selection process and cycle time/milestones are transparent, and pilot programs are developed
4. The 2012 reauthorization increased the required allocation for SBIR funding. IEEE-USA supported that policy, and would oppose any future efforts to reduce or curtail the growth of required increases in SBIR program allocations. Future policies should focus additional attention on awarding Phase I funds; as well as ensure Phase I and Phase II funding limits are reflective of the broader economy, and research and developments costs.
5. The 2012 reauthorization required for the first time that agencies put in place metrics to evaluate past performance and commercialization success; and it rejected efforts to limit SBIR participation by organizations with many successful grant applications. Agencies should act quickly to implement those metrics, understanding that the SBIR program exists to identify and nurture new technology feasibility, but not to underwrite repeatedly unsuccessful awardees. Proposal evaluation focus should be on performance, as specifically measured by Phase II commercialization success, and acquisition—as in the case of the DOD.
6. Many firms that successfully complete Phase I and Phase II programs encounter the so-called “Valley of Death” funding gap to commercialization. IEEE-USA recommends further developing and funding such mechanisms as the NSF Phase II-B program, the NIH continuation awards, and the Navy’s Phase II.5 and III programs--that support companies in this gap. FSBIR topics must be written with commercialization in mind, for

these programs to be effective.

7. SBIR agencies often lack the necessary mechanisms to effectively manage the development pipeline for SBIR awards and future category needs. Future policies should seek to improve upon the program evaluation and management requirements that exist under the reauthorization; and work to improve inter-agency collaboration to reduce duplicative research and development efforts, which have the potential to divert resources from other capabilities. A specific mechanism for this purpose is creating a cross-agency SBIR database listing past topics, funded proposals and current status. New SBIR topics should be compared to this database, before they appear to limit duplication--at the outset. At present, all eleven R&D federal agencies have their own report and output criteria embodied in data, scientific and engineering publications, patents and patents licenses, presentations, analytical models, algorithms, new research equipment, reference samples, prototypes products and processes, spin-off companies, and new "human capital" (enhanced know-how, expertise and knowledge sharing). Centralizing these reports and outputs is critical for exploitation and data mining by all U.S. businesses looking for innovative ideas, and possible commercial markets.
8. The 2012 reauthorization expanded the scope of participation for venture capital in the SBIR program. Though it is appropriate that some access to the SBIR program be afforded to small businesses with venture capital backing, the SBIR program should not become an alternative source of early stage funding for venture capital operating companies. Congress should resist any efforts to undermine the intent of the 2012 reauthorization to limit venture capital (VC) participation in SBIR. Currently, if the VC firm is a large business, with 500 or more employees, including affiliates and subsidiaries, then it may seek or hold only a minority position in an SBIR company to participate in the SBIR Program. On the other hand, if the VC is a small business, with 499 or fewer employees, including affiliates and subsidiaries, then it may participate in the SBIR Program in any manner it wishes, as either a majority or a minority shareholder.
9. The 2012 reauthorization directed new resources for agencies participating in the SBIR program to use part of their allocation to assist participants with developing commercialization plans. Agencies should work quickly to put commercialization success programs into place and these efforts should lead to a broader adoption of specific and detailed commercialization plans, as a norm for participants receiving Phase II funding. The Navy Technology Assistance Program (TAP) and Department of Energy Commercialization Assistance Program (CAP) are good models for this effort. Although in many cases, SBIR awards have been vital inputs for success, most major commercialization successes need substantial post-SBIR research and funding from a variety of sources. This recommendation is intended solely to improve the commercialization possibilities of the SBIR program by authorizing experiments with funding beyond Phase II, to bridge the "Valley of Death."
10. While the Congress has made a point of encouraging women and minority entrepreneurs to participate in federal research and development, more needs to be done to encourage underrepresented demographics to apply as principal investigators and senior investigators for SBIR awards. According to [1], "While support for woman-owned businesses is increasing, support for minority-owned firms has not increased."

The fraction of Phase I awards to minority-owned firms at the DOD has declined since the mid-1990s, falling below 10% for the first time in 2004 and 2005. Furthermore, R&D agencies do not have a uniformly positive record in collecting data and monitoring funding flows for research by woman- and minority-owned firms. Congress and agencies should consider which incentive structures have shown greatest promise in effecting these desired outcomes, and use them more broadly in the SBIR context.

## References

1. “An Assessment of the Small Business Innovation Research Program”, Charles W. Wessner, Editor, Committee on Capitalizing on Science, Technology, and Innovation: National Research Council, National Academy Press (2009). Available online at: [http://www.nap.edu/catalog.php?record\\_id=12441](http://www.nap.edu/catalog.php?record_id=12441)
2. “The Incredible Shrinking Venture Capital” by John Browning, *Nature*, volume 460, 23 July 2009, page 459.