



January 2018

# SMALL BUSINESS RESEARCH PROGRAMS

## Agencies Need to Take Steps to Assess Progress Toward Commercializing Technologies

Accessible Version

# GAO Highlights

Highlights of [GAO-18-207](#), a report to the Committee on Science, Space, and Technology, House of Representatives

## Why GAO Did This Study

Through the SBIR and STTR programs, federal agencies have awarded about 162,000 contracts and grants totaling \$46 billion to small businesses to help them develop and commercialize new technologies. Eleven federal agencies participate in the SBIR program, and 5 agencies also participate in the STTR program. Each program has three phases, which take projects from initial feasibility studies through commercialization activities. SBA oversees both programs.

In response to the 2011 reauthorization of the programs, SBA and the participating agencies developed benchmarks to measure small businesses' progress in developing and commercializing technologies. GAO was asked to review SBA's and the agencies' efforts related to these benchmarks. This report examines the extent to which SBA and the participating agencies have implemented these benchmarks, including assessing businesses against them and establishing the consequence of not meeting them. GAO analyzed award data and interviewed officials from SBA and the 11 participating agencies.

## What GAO Recommends

GAO is making 11 recommendations to SBA and other agencies to take actions to improve implementation of the benchmarks, including improving the reliability of award data; implementing or revising the Commercialization Benchmark; and updating information about the consequence of not meeting the benchmarks. SBA and these agencies agreed with GAO's recommendations.

View [GAO-18-207](#). For more information, contact John Neumann at (202) 512-3841 or [neumannj@gao.gov](mailto:neumannj@gao.gov).

January 2018

## SMALL BUSINESS RESEARCH PROGRAMS

### Agencies Need to Take Steps to Assess Progress Toward Commercializing Technologies

## What GAO Found

Data challenges have limited the Small Business Administration's (SBA) and the 11 participating federal agencies' efforts to assess businesses against two benchmarks—the Transition Rate Benchmark and the Commercialization Benchmark—of the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs.

- **Transition Rate Benchmark.** Small businesses that received more than 20 awards for the first phase of the programs in the past 5 fiscal years—excluding the most recent fiscal year—must have received an average of 1 award for the second phase of the programs for every 4 first phase awards. Since 2014, SBA and the agencies participating in the programs have regularly assessed small businesses against this benchmark. From 2014 through 2017, SBA determined that 4 to 7 businesses did not meet the benchmark each year. SBA officials provided GAO guidance on how to enter data into the programs' awards database they said is available to agencies, but GAO found evidence that suggests agencies are not fully utilizing it. For example, GAO found that the database used to perform the assessments contained inaccurate and incomplete data, such as about 2,700 businesses with multiple records with different spellings of their names and more than 1,400 instances in which a unique identification number had errors, such as an incorrect number of digits, all zeros, or hyphens. Thus, it could be difficult to determine which small businesses should be subject to the benchmark.
- **Commercialization Benchmark.** Small businesses that received more than 15 awards for the second phase of the programs in the past 10 fiscal years—excluding the most recent 2 fiscal years—must have received a certain amount of sales, investments, or patents resulting from their efforts. SBA and participating agencies have assessed small businesses against this benchmark only once, in 2014, and identified 12 businesses that did not meet the benchmark. This is, in part, due to challenges in collecting and verifying the accuracy of the data that small businesses report and that are needed to implement the benchmark, according to officials from SBA and several agencies. For example, agency officials told GAO that some needed data, such as for reported sales, are not consistently applicable across agencies or projects. The Small Business Act and policy directives provide flexibility in how the agencies can implement the benchmark. Working together to implement it as designed or revise it so that it can be implemented could allow the agencies to fulfill statutory requirements.

SBA and the participating agencies have provided inconsistent information to small businesses about the consequence of not meeting the benchmarks. SBA and the agencies agreed to change how the consequence of not meeting the benchmarks was to be implemented, starting in 2017, from ineligibility to receive certain awards to ineligibility to submit certain proposals. However, as of November 2017, some agencies had not updated this information in their project solicitations. Furthermore, SBA has not updated this information in its policy directives. Without consistent information, businesses may be confused about their eligibility to submit proposals or receive awards and could invest time developing and submitting proposals when they are not eligible to do so.

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**Abbreviations**

|      |                                      |
|------|--------------------------------------|
| R&D  | research or research and development |
| SBA  | Small Business Administration        |
| SBIR | Small Business Innovation Research   |
| STTR | Small Business Technology Transfer   |

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January 31, 2018

The Honorable Lamar Smith  
Chairman  
The Honorable Eddie Bernice Johnson  
Ranking Member  
Committee on Science, Space, and Technology  
House of Representatives

Federal agencies support research or research and development (R&D) projects at small businesses through the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs. Federal agencies have awarded about 162,000 contracts and grants, totaling about \$46 billion, since the programs' inception in 1982 and 1992, respectively. Through the SBIR and STTR programs, federal agencies have sought to help small businesses develop and commercialize innovative technologies. For example, an SBIR award from the Department of Health and Human Services helped a small business develop glasses that allow people with color vision deficiency to see the full color palette, and this business has made more than \$20 million in annual sales, according to information on the SBIR website.

Federal agencies with obligations of \$100 million or more for extramural R&D are required to participate in the SBIR program, and federal agencies with obligations of \$1 billion or more for extramural R&D are required to also participate in the STTR program.<sup>1</sup> Currently, 11 agencies participate in the SBIR program, and 5 of these agencies also participate in the STTR program, as shown in table 1.

**Table 1: Agencies Participating in the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Programs**

| Agency                    | SBIR | STTR |
|---------------------------|------|------|
| Department of Agriculture | Yes  | No   |
| Department of Commerce    | Yes  | No   |
| Department of Defense     | Yes  | Yes  |

<sup>1</sup>Agencies' R&D efforts generally include funding for two types of R&D: intramural and extramural. Intramural R&D is conducted by employees of a federal agency in or through government-owned, government-operated facilities. Extramural R&D is generally conducted by nonfederal employees outside of federal facilities.

| Agency  | SBIR | STTR |
|---|------|------|
| Department of Education                       | Yes  | No   |
| Department of Energy                          | Yes  | Yes  |
| Department of Health and Human Services       | Yes  | Yes  |
| Department of Homeland Security               | Yes  | No   |
| Department of Transportation                  | Yes  | No   |
| Environmental Protection Agency               | Yes  | No   |
| National Aeronautics and Space Administration | Yes  | Yes  |
| National Science Foundation                   | Yes  | Yes  |

Source: Small Business Administration. | GAO-18-207

The Small Business Act authorizes the SBIR and STTR programs, and the Small Business Administration's (SBA) Office of Investment and Innovation is responsible for overseeing and coordinating the participating agencies' efforts for the programs. As part of SBA's oversight and coordination role, the agency issued SBIR and STTR policy directives to explain and outline requirements for agencies' implementation of these programs.<sup>2</sup>

The SBIR and STTR programs each include three phases:

- In phase I, agencies make awards to small businesses to determine the scientific and technical merit and feasibility of ideas that appear to have commercial potential. Phase I awards normally do not exceed \$150,000. For SBIR, phase I awards generally last up to 6 months. For STTR, these awards generally last 1 year.
- In phase II, small businesses with phase I projects that demonstrate scientific and technical merit and feasibility, in addition to commercial potential, may compete for awards of up to \$1 million to continue the R&D for an additional period, normally not to exceed 2 years.
- In phase III, small businesses pursue commercialization of technology developed in prior phases. Phase III work derives from, extends, or completes an effort made under prior phases, but it is funded by sources other than the SBIR and STTR programs. In this phase, small businesses are expected to raise funds from private investors, the capital markets, or funding sources within the agency that made the initial award other than the agency's SBIR or STTR program.

<sup>2</sup>Small Business Administration, *Small Business Innovation Research (SBIR) Program Policy Directive* (Washington, D.C.: Feb. 24, 2014), and *Small Business Technology Transfer (STTR) Program Policy Directive* (Washington, D.C.: Feb. 24, 2014).

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Agencies can also participate in phase III by, for example, purchasing the technology developed in prior phases.<sup>3</sup>

The 2011 reauthorization of the SBIR and STTR programs amended the Small Business Act to require participating agencies to establish, and SBA to approve, minimum standards for businesses' progress in developing and commercializing technologies.<sup>4</sup> In response to this requirement, SBA and the participating agencies worked together to develop two "benchmarks" to serve as those minimum standards across all the participating agencies:

- **Transition Rate Benchmark:** Businesses that received more than 20 phase I awards over the prior 5 fiscal years—excluding the most recent fiscal year—must have received an average of 1 phase II award for every 4 phase I awards during this period. That is, the ratio of phase II to phase I awards must be at least 0.25.<sup>5</sup>
- **Commercialization Benchmark:** Businesses that received more than 15 phase II awards over the prior 10 fiscal years—excluding the most recent 2 fiscal years—must have received an average of at least \$100,000 in sales, investments, or both per phase II award received, or have received a number of patents resulting from the work equal to or greater than 15 percent of the number of phase II awards received during this period.<sup>6</sup>

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<sup>3</sup>For examples of how one agency has participated in phase III by purchasing technology developed in prior phases, see GAO, *Small Business Innovation Research: DOD's Program Supports Weapon Systems, but Lacks Comprehensive Data on Technology Transition Outcomes*, [GAO-14-96](#) (Washington, D.C.: Dec. 20, 2013).

<sup>4</sup>Legislation enacted in 2011 reauthorized the SBIR and STTR programs for fiscal years 2012 through 2017. SBIR/STTR Reauthorization Act of 2011, Pub. L. No. 112-81, div. E, tit. LI, §§ 5001-5168, 125 Stat. 1298, 1822-62 (codified at 15 U.S.C. §§ 638-638b (2017)). In addition, legislation enacted in 2016 extended the programs for fiscal years 2018 through 2022: National Defense Authorization Act for Fiscal Year 2017. Pub. L. No. 114-328, § 1834 (2016). The current Transition Rate Benchmark and Commercialization Benchmark were last published respectively at 78 Fed. Reg. 30,951 (May 23, 2013) and 78 Fed. Reg. 48,537 (Aug. 08, 2013).

<sup>5</sup>The SBIR and STTR policy directives refer to this benchmark as either the Phase II Transition Rate Benchmark or the Transition Rate Benchmark, and other agencies' project solicitations refer to it as the Phase I to Phase II Transition Rate Benchmark. For the purpose of this report, we refer to this benchmark as the Transition Rate Benchmark.

<sup>6</sup>The SBIR and STTR policy directives refer to this benchmark as the Commercialization Rate Benchmark, but SBA's website and two agencies' project solicitations refer to it as the Commercialization Benchmark. For the purpose of this report, we refer to this benchmark as the Commercialization Benchmark.

The reauthorization act states that, generally, small businesses that do not meet the minimum standards may not participate in phase I of the SBIR or STTR program. The policy directives state that small businesses that do not meet the Transition Rate or Commercialization Benchmarks are ineligible to receive phase I awards starting on June 1, when the consequence period takes effect, through May 31 of the following year.<sup>7</sup>

You asked us to review SBA's and the participating agencies' efforts related to the benchmarks. This report examines the extent to which SBA and the participating agencies have implemented the Transition Rate Benchmark and the Commercialization Benchmark, including assessing businesses against them and establishing the consequence of not meeting them.

To accomplish this objective, we reviewed relevant legislation and the SBIR and STTR policy directives to determine the requirements of SBA and the participating agencies for implementing the benchmarks. We reviewed project solicitations and agencies' websites, and we interviewed officials from SBA and each of the 11 participating agencies to obtain information about the agencies' efforts to implement the benchmarks. We reviewed the applicable lists of small businesses that SBA assessed as not having met a benchmark from 2014 through 2017 and analyzed SBIR and STTR program award data.<sup>8</sup> Further, we reviewed *Standards for Internal Control in the Federal Government* and SBA's data policy and guidelines.<sup>9</sup> We also performed electronic testing of the data to search for missing or incorrect information, and interviewed officials from SBA about the data. We found instances in which the award data were unreliable, which we discuss later in this report.

We conducted this performance audit from April 2017 to January 2018 in accordance with generally accepted government auditing standards.

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<sup>7</sup>Small businesses that did not meet either of the benchmarks would also have been ineligible to receive direct-to-phase II awards under the SBIR program, which are phase II awards to a small business that did not receive a phase I award for that R&D. The Small Business Act states that, from fiscal years 2012 through 2017, the Department of Defense, the National Institutes of Health (within the Department of Health and Human Services), and the Department of Education may issue such direct-to-phase II awards.

<sup>8</sup>SBA and the participating agencies first assessed small businesses against the Transition Rate and Commercialization Benchmarks in 2014, according to SBA officials.

<sup>9</sup>GAO, *Standards for Internal Control in the Federal Government*, [GAO-14-704G](#) (Washington, D.C.: September 2014).

Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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## Background

The SBIR program was initiated in 1982 and has four main purposes: (1) use small businesses to meet federal R&D needs, (2) stimulate technological innovation, (3) increase commercialization of innovations derived from federal R&D efforts, and (4) encourage participation in technological innovation by small businesses owned by women and disadvantaged individuals. The STTR program was initiated a decade later, in 1992, and has three main purposes: (1) stimulate technological innovation, (2) foster technology transfer through cooperative R&D between small businesses and research institutions, and (3) increase private-sector commercialization of innovations derived from federal R&D.

The SBIR and STTR programs are similar in that participating agencies identify topics for R&D projects and support small businesses, but the STTR program requires the small business to partner with a nonprofit research institution, such as a college or university or a federally funded research and development center.<sup>10</sup>

Each participating agency must manage its SBIR and STTR programs in accordance with program laws and regulations and the policy directives issued by SBA. In general, the programs are similar across participating agencies. All of the participating agencies follow the same general process to obtain proposals from and make awards to small businesses for both the SBIR and STTR programs. However, each participating agency has considerable flexibility in designing and managing specific aspects of these programs, such as determining research topics, selecting award recipients, and administering funding agreements. At least once a year, each participating agency issues a solicitation

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<sup>10</sup>Federally funded research and development centers are government-funded entities operated by nongovernmental organizations to meet long-term research or development needs that cannot be met as effectively by existing governmental or contractor resources. These entities typically assist government agencies with scientific research and analysis, systems development, and system acquisition.

requesting proposals for projects in topic areas determined by the agency. Each participating agency uses its own process to review proposals and determine which proposals should receive awards. The agencies that participate in both SBIR and STTR programs usually use the same process for both programs. Also, each participating agency determines whether to provide the funding for awards as grants or contracts.

According to the policy directives, SBA maintains a system that records SBIR and STTR award information—using data submitted by the agencies—as well as commercialization information, such as information about patents, sales, and investments reported by small businesses that received these awards. SBA is to use these data to assess small businesses that received awards against the benchmarks and identify any small businesses that did not meet the benchmarks. SBA is to initially assess the small businesses against the benchmarks and then in April of each year notify those that do not meet the benchmarks so that the businesses can review their award data and work with participating agencies to correct the database if necessary. SBA then is to analyze the award data again to identify, on June 1, those small businesses that still do not meet the benchmarks. These small businesses are then ineligible for certain awards from that date through May 31 of the following year.

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## Data Challenges Have Limited the Implementation of the Benchmarks, and SBA and Participating Agencies Have Provided Inconsistent Information about the Consequence

Data challenges have limited SBA's and the 11 participating agencies' efforts to fully implement the benchmarks. Since 2014, SBA and the participating agencies have regularly assessed small businesses against the Transition Rate Benchmark, but the assessments have been based on inaccurate or incomplete data. SBA and the participating agencies have assessed small businesses against the Commercialization Benchmark only once, in 2014, because of challenges in collecting and verifying the accuracy of data. In addition, SBA and the participating agencies have provided inconsistent information to small businesses about the consequence of not meeting the benchmarks.

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## SBA and Participating Agencies Assessed Small Businesses against the Transition Rate Benchmark, but the Assessments Have Been Based on Inaccurate or Incomplete Data

Since 2014, SBA and the participating agencies have regularly assessed small businesses against the Transition Rate Benchmark, which, in general, measures the rate at which businesses move projects from phase I to phase II.<sup>11</sup> From 2014 through 2017, SBA determined that 4 to 7 small businesses did not meet the benchmark each year and placed those businesses on a list of those ineligible to receive certain additional awards.<sup>12</sup>

However, we found instances in which the data used to generate the list were inaccurate or incomplete. For example, we identified an instance in which the data in the awards database changed considerably after SBA's initial assessment, indicating that the data used for that assessment were inaccurate. SBA's list of small businesses subject to the benchmark in 2015 showed that a small business received 297 phase I awards during the assessment period. However, data received from SBA officials in August 2017 showed that this small business received only 1 phase I award. Agencies can update their data in the awards database at any time to, for example, submit additional award data or correct previously submitted award data, which is what an SBA official stated may have caused this change. Because the small business received only 1 award, it would not have been subject to the Transition Rate Benchmark. In this case, the change meant that SBA did not miss identifying a small business that should have been ineligible for an award; however, in other instances, changes to the data may lead SBA to miss identifying a small business that should have been ineligible for awards.

In addition, we identified instances in which the publicly available data on awards were incomplete, including data that were missing or otherwise unusable. For example, based on our review of the award data from 2007 through 2016, we identified more than 2,700 small businesses that had

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<sup>11</sup>As previously stated, the Small Business Act states that, from fiscal years 2012 through 2017, certain agencies may issue phase II awards under the SBIR program to a small business that did not receive a phase I award for that R&D.

<sup>12</sup>As discussed below, we identified data problems that prevented us from determining an accurate count of the number of small businesses subject to the benchmark.

multiple records with different spellings of the same business's name. Furthermore, we identified more than 1,400 instances in which a unique identification number had errors, such as having an incorrect number of digits, all zeros, or hyphens.<sup>13</sup> SBA officials told us that the quality of the award information in the database has been an issue, and that accurate information is important because small businesses may avoid being identified as subject to the benchmark if their business names and identification numbers are different across multiple records. For example, if the database contains 18 phase I awards made within the assessment period to a small business with a certain unique identification number but also contains 3 other phase I awards within that period with a different or missing unique identification number, the small business may avoid being identified as subject to the benchmark because the data would suggest it did not meet the threshold of receiving more than 20 phase I awards, even if it did. As a result, it could be difficult to determine which small businesses actually received more than 20 awards and should be subject to the benchmark.

*Standards for Internal Control in the Federal Government* state that management should use quality information to achieve the entity's objectives, and SBA's Information Quality Guidelines state that SBA seeks to ensure the quality, utility, and integrity of the information it shares with the public, among other things.<sup>14</sup> SBA's policy directives for the SBIR and STTR programs state that SBA maintains a system that records SBIR and STTR award information, which is publicly available, and uses this information to calculate small businesses' performance against the benchmark. SBA officials told us they depend on the accuracy of the data received from the participating agencies to perform SBA's assessment. These officials also acknowledged that confirming the accuracy of SBA's annual assessments against the benchmarks has been challenging because agencies can update their data over time. SBA officials stated that they have sought to improve the quality of the data after the data are entered into the database, such as fixing instances in which small businesses' names were spelled differently across multiple records; however, the officials said that correcting the data already entered in the awards database is an ongoing and time-consuming process. SBA officials told us that there are errors in the database, in part

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<sup>13</sup>We also identified more than 1,100 instances of these unique identification numbers being blank, but small businesses are not required to provide the information.

<sup>14</sup>GAO, *Standards for Internal Control in the Federal Government*, [GAO-14-704G](#).

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because SBA has not worked with participating agencies to ensure that agencies enter high-quality, accurate data into the database. SBA officials provided us guidance on how to enter data that they said is available to agencies, but the errors we found suggest that agencies are not fully utilizing this guidance. As a result, SBA cannot reasonably ensure the quality and reliability of its award data and therefore cannot reasonably ensure that it has correctly assessed small businesses against the Transition Rate Benchmark.

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### SBA and the Participating Agencies Assessed Small Businesses against the Commercialization Benchmark Only in 2014

The Small Business Act requires agencies to evaluate whether small businesses have met a minimum performance standard for commercializing their technology. SBA and participating agencies do not know the extent to which small businesses are meeting the Commercialization Benchmark because SBA and the agencies have assessed businesses against the benchmark only once, in 2014, when SBA determined that 12 businesses did not meet the benchmark. This is in part because, according to officials from SBA and several agencies, they cannot collect and verify the accuracy of the data needed to implement the benchmark as written.

For SBA and participating agencies to assess whether small businesses meet the Commercialization Benchmark, these small businesses must provide data on sales, investments, or patents resulting from the awards. However, agency officials told us about challenges related to obtaining the data they need to implement this benchmark. For example, agency officials told us that the needed data are not consistently applicable across agencies or projects. Specifically, these officials said that an agency may purchase the technology developed as a result of the SBIR or STTR award, while another agency may focus on funding technologies that will be sold on the commercial market, leading to different kinds of data on “sales.” Additionally, officials from SBA and several of the participating agencies told us they have been unable to collect and verify the accuracy of the information from small businesses to assess them against the Commercialization Benchmark. In addition, officials from 2 agencies told us that small businesses can easily circumvent the benchmark by submitting incorrect data.

The Small Business Act and the policy directives provide agencies flexibility in how they can implement the Commercialization Benchmark. Officials from participating agencies said that they thought the Commercialization Benchmark should be revised, but they provided differing views on how to do it. Officials from SBA and 2 agencies told us that they would consider having individual agencies develop a benchmark or metric tailored to their agency, in part because the definition of successful commercialization could vary across the agencies. However, officials acknowledged that collecting and verifying the accuracy of the data would still be a concern with this approach. Officials from 2 participating agencies told us that collecting and verifying the accuracy of the data is a significant amount of work, and officials from a third agency added that implementing the benchmark independently is impractical because they do not have the capability to track small businesses' commercialization efforts. Officials from 1 agency said they preferred to keep a uniform benchmark across the agencies, in part because having varying benchmarks could lead to a small business being eligible to participate in the programs with one agency but not with another. Although views differed across agencies, working together to find a way to implement the benchmark as designed or revising it so that it can be implemented could allow the agencies to fulfill the requirement in the Small Business Act.

Officials from 3 agencies told us they would prefer to consider businesses' prior commercialization experience as part of their overall evaluation of businesses' proposals, rather than implement the current Commercialization Benchmark. The SBIR and STTR policy directives currently allow agencies to define the benchmark in terms other than revenue or investment, such as using a commercialization scoring system that rates awardees on their past commercialization success. Defining the benchmark in these terms could help agencies to implement the statutory requirement. Officials from SBA said they see the value of allowing reviewers to use professional judgment in determining the commercialization success of applicants, rather than assessing small businesses against standard criteria. Officials from 1 agency said that such a change could help achieve the goal of the benchmark without the challenges of collecting data from all small businesses participating in the programs.

Nine of the 11 participating agencies currently consider prior commercialization experience as part of their evaluation when making award selections (see table 2), which shows that evaluating commercialization experience at individual agencies can be feasible. For

example, project solicitations from the Department of Agriculture, the Department of Defense, and the National Science Foundation state that these agencies require applicants to provide sales or revenue information for products resulting from SBIR or STTR awards, and the Department of Homeland Security’s solicitation requires applicants to provide a history of previous federal and nonfederal funding and subsequent commercialization of their products. All agencies consider commercialization potential when selecting these awards.

**Table 2: Federal Agencies’ Use of Prior Commercialization Experience in Selecting Awards for the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Programs**

| Agency                                  | Agency’s use of prior commercialization experience in selecting awards   |
|---|--|
| Department of Agriculture               | The Department of Agriculture requires small businesses applying for phase I awards that previously received phase II awards under the Department of Agriculture’s SBIR program in the preceding 5 fiscal years to document the extent to which they were able to secure phase III funding and commercialize the technology, product, or service funded by the department’s SBIR program.  |
| Department of Commerce                  | The Department of Commerce’s National Institute of Standards and Technology and National Oceanic and Atmospheric Administration consider information about applicants’ past performance of SBIR awards, which applicants submit with their proposal, as part of their evaluative criteria to select awards.  |
| Department of Defense                   | The Department of Defense requires applicants for phase I awards to submit a Company Commercialization Report as part of their proposal, even if the small business has not previously received SBIR or STTR awards. This report is to include sales revenue from new products and non-research and development services resulting from phase II technology, the number of patents resulting from the small business’s participation in the SBIR or STTR program, and growth in the number of employees, among other things. The Department of Defense then compares these results to the historical averages for its SBIR or STTR program to calculate a Commercialization Achievement Index that it uses to rate applicants. |
| Department of Education                 | The Department of Education considers the record of research and development, research results, and peer-reviewed publications resulting from prior research and commercialization of past SBIR-funded education-related products by the applicant, which is included in the proposal.   |
| Department of Energy                    | The Department of Energy requires applicants for phase I awards who have received SBIR or STTR phase II grants from any federal agency to provide a history of commercialization activity, including sales to private industry and to federal entities, resulting from SBIR and STTR awards. Officials from the Advanced Research Projects Agency-Energy, within the Department of Energy, told us they require that small businesses certify that they have met the Transition Rate Benchmark and Commercialization Benchmark, as applicable.   |
| Department of Health and Human Services | The Department of Health and Human Services does not consider prior commercialization experience in its evaluation and selection of all SBIR and STTR awards, but officials stated they do consider it for small businesses that have received more than 15 phase II awards.   |
| Department of Homeland Security         | The Department of Homeland Security requires that applicants provide a history of previous federal and nonfederal funding and subsequent commercialization of products as part of their phase II proposals and includes this information as part of evaluation criteria for selecting awards.  |
| Department of Transportation            | The Department of Transportation considers an applicant’s past record of successful commercialization of SBIR or other research included in the proposal as part of its evaluation process.  |
| Environmental Protection Agency         | The Environmental Protection Agency requires that applicants provide their commercialization history for phase II SBIR awards from any federal agency, and specifies the template applicants are to use in providing this information.   |

| Agency  | Agency's use of prior commercialization experience in selecting awards  |
|---|---|
| National Aeronautics and Space Administration | The National Aeronautics and Space Administration uses a survey specific to SBIR/STTR awards, called the Commercialization Metrics Survey, to track small businesses' commercial success with prior SBIR/STTR awards from the agency. As part of the survey, the applicant submits the small business's sales and ownership information, as well as any commercialization success the small business has had as a result of phase II SBIR or STTR awards. |
| National Science Foundation                   | The National Science Foundation requires phase II applicants who have received prior phase II awards from any federal agency to submit a commercialization history, which must include percentage of company revenues for each of the past 3 fiscal years from federal SBIR/STTR funding, including phase I and phase II awards.  |

Source: GAO analysis of agency information. | GAO-18-207

## SBA and Participating Agencies Have Provided Inconsistent Information to Small Businesses on the Consequence of Not Meeting the Benchmarks

The consequence for small businesses not meeting the benchmarks is ineligibility to participate in phase I of the SBIR or STTR program for a year, according to the Small Business Act.<sup>15</sup> SBA officials stated that they and the agencies initially interpreted this to mean that small businesses could not receive awards during the ineligibility period of June 1 through May 31 of the following year, and this is how the consequence is described in the SBIR and STTR policy directives. SBA officials told us that they and the participating agencies sought to change how to implement the consequence of businesses not meeting the benchmarks because of SBA's and agencies' difficulties in implementing the benchmarks.<sup>16</sup> Officials from 4 agencies said that they generally evaluate and select awards shortly before SBA releases the list of ineligible companies, leading them to potentially select projects from small businesses that will be on the ineligible list by the time the award period begins. Based on our review of award data from October 2014 to May 2017, we identified 13 phase I awards across 5 small businesses with award start dates during the period that the business was ineligible to receive such awards. According to agency officials, each of these awards was selected before the small business became ineligible to receive the

<sup>15</sup>Per the Small Business Act, small businesses receiving direct-to-phase II awards would also not be able to receive those awards for a year.

<sup>16</sup>Participating agencies do not have to use a uniform benchmark or implement a benchmark on the same timeline. SBA officials told us they coordinated with the participating agencies to develop a single, uniform benchmark for implementation on one timeline because they thought that it would be easier than having different metrics across agencies.

award. SBA and the participating agencies agreed to change how the consequence would be implemented, starting in 2017, so that small businesses that do not meet the benchmarks are ineligible to submit proposals, according to SBA officials.<sup>17</sup>

As of November 2017, however, the information available about this new way to implement the consequence was inconsistent because some of the agencies had not updated their project solicitations. Specifically, information in the most recent project solicitations available at that time for 2 agencies and one subunit of an agency stated that businesses that do not meet the benchmarks are ineligible to submit certain proposals, consistent with the revised approach for how to implement the consequence. However, the most recent project solicitations available at that time for 7 other agencies and the other subunit of the agency mentioned above instead stated that those businesses that do not meet the benchmarks are ineligible to receive certain awards, consistent with the prior approach for how to implement the consequence.<sup>18</sup> One other agency directed users to SBA’s website in its solicitation. Table 3 shows the information about the consequence of not meeting the benchmarks that each agency included in its most recent project solicitations as of November 2017.

**Table 3: Information from Agencies’ Project Solicitations on the Consequence of Not Meeting the Benchmarks for the Small Business Innovation Research and Small Business Technology Transfer Programs (as of November 2017)**

| Agency  | Business is ineligible to receive certain awards | Business is ineligible to submit certain proposals | Directs users to Small Business Administration’s website |
|---|--|--|--|
| Department of Agriculture   | No   | Yes  | No   |
| Department of Commerce<br>(National Institute of Standards and Technology)  | No   | Yes  | No   |
| Department of Commerce<br>(National Oceanic and Atmospheric Administration) | Yes  | No   | No   |

<sup>17</sup>SBA officials told us that this change is consistent with the consequence mandated in the Small Business Act—that small businesses that do not meet the benchmarks be ineligible to participate in the programs for a year—because they interpret that consequence as meaning that new participation is not allowed.

<sup>18</sup>After we provided a draft of this report to the agencies for comment, the Departments of Education and Homeland Security updated their project solicitations to reflect the revised approach for how to implement the consequence of not meeting the benchmarks.

| Agency  | Business is ineligible to receive certain awards | Business is ineligible to submit certain proposals | Directs users to Small Business Administration's website |
|---|--|--|--|
| Department of Defense                         | Yes  | No   | No   |
| Department of Education <sup>a</sup>          | Yes  | No   | No   |
| Department of Energy                          | Yes  | No   | No   |
| Department of Health and Human Services       | Yes  | No   | No   |
| Department of Homeland Security <sup>a</sup>  | Yes  | No   | No   |
| Department of Transportation                  | No   | Yes  | No   |
| Environmental Protection Agency               | Yes  | No   | No   |
| National Aeronautics and Space Administration | No   | No   | Yes  |
| National Science Foundation                   | Yes  | No   | No   |

Source: GAO analysis of agency information. | GAO-18-207

<sup>a</sup>After we provided a draft of this report to the agencies for comment, the Departments of Education and Homeland Security updated their project solicitations to reflect the revised approach for how to implement the consequence of not meeting the benchmarks. Specifically, these updated solicitations state that businesses that do not meet the benchmarks are ineligible to submit certain proposals.

As of November 2017, the SBIR and STTR policy directives stated that the consequence for not meeting these benchmarks is ineligibility to receive certain awards. SBA officials told us they are in the process of updating the policy directives to reflect this change in how the consequence is implemented, but these officials said that it is a long process and they could not provide a timeframe for when the update would be complete. As mentioned earlier in this report, SBA's Information Quality Guidelines state that SBA seeks to ensure the quality, utility, and integrity of the information it shares with the public, among other things. Until participating agencies update their project solicitations and SBA updates its policy directives to accurately reflect agreed-upon practices about the consequence for small businesses that do not meet the benchmarks, small businesses may be confused about their eligibility to submit proposals and could invest time developing and submitting proposals when they are not eligible to do so.

## Conclusions

Under the SBIR and STTR programs, federal agencies have awarded billions of dollars to small businesses to help these businesses develop and commercialize innovative technologies. SBA and the participating agencies have assessed these small businesses against the Transition Rate Benchmark, but those assessments have been based on inaccurate or incomplete data. Without ensuring the reliability of its data, SBA cannot

reasonably ensure that it has correctly assessed small businesses against the Transition Rate Benchmark.

SBA and the participating agencies developed a Commercialization Benchmark across all the participating agencies but have not fully implemented it, in part because they have been unable to collect information from the small businesses and verify the accuracy of that information. Working together to implement the benchmark as written or revise it so that it can be implemented could allow the agencies to fulfill the requirement in the Small Business Act to evaluate whether small businesses have met a minimum performance standard for commercializing their technology.

Lastly, SBA and the participating agencies have provided inconsistent information to small businesses about the consequence of not meeting the benchmarks. Officials from SBA and the participating agencies had agreed to change how the consequence would be implemented, starting in 2017, because of difficulties implementing the benchmarks. However, as of November 2017, seven agencies, and a subunit of one agency, had not updated their project solicitations and SBA had not updated its policy directives. Without consistent information on the benchmarks, small businesses may be confused about their eligibility to submit proposals and could invest time developing proposals that they are not eligible to submit.

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## Recommendations for Executive Action

We are making a total of 11 recommendations, including 3 to SBA and 1 each to the Department of Commerce's National Oceanic and Atmospheric Administration; the Departments of Defense, Education, Energy, Health and Human Services, and Homeland Security; the Environmental Protection Agency; and the National Science Foundation. Specifically:

The Director of the Office of Investment and Innovation within SBA should work with participating agencies to improve the reliability of its SBIR and STTR award data (Recommendation 1).

The Director of the Office of Investment and Innovation within SBA should work with participating agencies to implement the Commercialization Benchmark or, if that is not feasible, revise the benchmark so that it can be implemented (Recommendation 2).

The Director of the Office of Investment and Innovation within SBA should update the SBIR and STTR policy directives to accurately reflect how the consequence of the benchmarks is to be implemented (Recommendation 3).

The SBIR Program Manager of the Department of Commerce's National Oceanic and Atmospheric Administration should update the agency's SBIR project solicitation to accurately reflect how the consequence of not meeting the benchmarks is to be implemented (Recommendation 4).

The SBIR Program Administrator within the Department of Defense should update the agency's SBIR and STTR project solicitations to accurately reflect how the consequence of not meeting the benchmarks is to be implemented (Recommendation 5).

The SBIR Program Manager within the Department of Education should update the agency's SBIR project solicitation to accurately reflect how the consequence of not meeting the benchmarks is to be implemented (Recommendation 6).

The SBIR Program Manager within the Department of Energy should update the agency's combined SBIR and STTR project solicitation to accurately reflect how the consequence of not meeting the benchmarks is to be implemented (Recommendation 7).

The SBIR/STTR Program Coordinator within the Department of Health and Human Services should update the agency's SBIR and STTR project solicitations to accurately reflect how the consequence of not meeting the benchmarks is to be implemented (Recommendation 8).

The SBIR Program Director within the Department of Homeland Security should update the agency's SBIR project solicitation to accurately reflect how the consequence of not meeting the benchmarks is to be implemented (Recommendation 9).

The SBIR Program Manager within the Environmental Protection Agency should update the agency's SBIR project solicitation to accurately reflect how the consequence of not meeting the benchmarks is to be implemented (Recommendation 10).

The SBIR and STTR Program Manager within the National Science Foundation should update the agency's SBIR and STTR project

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solicitations to accurately reflect how the consequence of not meeting the benchmarks is to be implemented (Recommendation 11).

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## Agency Comments and Our Evaluation

We provided a draft of this report to SBA and the 11 participating agencies for review and comment. In written comments, the Department of Commerce's National Oceanic and Atmospheric Administration; the Departments of Defense, Education, Energy, Health and Human Services, and Homeland Security; the Environmental Protection Agency; and SBA agreed with the respective recommendations directed to their agencies. Agencies' written comments are reproduced in appendixes I through VIII. An official from one agency—the National Science Foundation—stated in an email that the agency concurred with the recommendation and did not have any further comments. Two agencies—the Department of Homeland Security and SBA—also provided technical comments, which we incorporated as appropriate. Three agencies—the Departments of Agriculture and Transportation, and the National Aeronautics and Space Administration—as well as the Department of Commerce's National Institute of Standards and Technology stated via email that they had no technical or written comments.

In its comments, SBA stated that it disagreed with a statement in our draft report that SBA had not worked with agencies to enter high-quality and accurate data into the database and provided us documentation of an instruction guide on entering data that SBA officials said was available to agencies. Based on our review of this information, we clarified the text of the report and modified the draft report's recommendation by removing the suggested example that SBA provide guidance to the agencies to improve SBIR and STTR award data reliability. SBA agreed with the revised recommendation.

After we provided a draft of the report to the agencies for comment, the Departments of Education and Homeland Security took action on their respective recommendations. Specifically, in December 2017, the agencies issued new project solicitations that reflected the updated consequence of not meeting the benchmarks. We agree that these agencies fully implemented the recommendations we made to them in this report.

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We are sending copies of this report to the appropriate congressional committees; the Secretaries of Agriculture, Commerce, Defense, Education, Energy, Health and Human Services, Homeland Security, and Transportation; the Administrators of the Small Business Administration, the Environmental Protection Agency, and the National Aeronautics and Space Administration; the Director of the National Science Foundation; and other interested parties. In addition, the report is available at no charge on the GAO website at <http://www.gao.gov>.

If you or your staff members have any questions about this report, please contact me at (202) 512-3841 or [neumannj@gao.gov](mailto:neumannj@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix IX.

A handwritten signature in black ink, appearing to read "John Neumann", with a long horizontal flourish extending to the right.

John Neumann  
Director, Natural Resources and Environment

## Appendix I: Comments from the Small Business Administration



U.S. SMALL BUSINESS ADMINISTRATION  
WASHINGTON, DC 20416

January 5, 2018

Mr. John Neumann  
Director  
Natural Resources and Environment  
U.S. Government Accountability Office  
Washington, D.C. 20548

Dear Mr. Neumann:

Thank you for providing the U.S. Small Business Administration (SBA) with a copy of the Government Accountability Office (GAO) draft report titled, "*Small Business Research Programs: Agencies Need to Take Steps to Assess Progress Toward Commercializing Technologies.*"

The draft report analyzes SBA and participating agency efforts related to the development of benchmarks to measure Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) awardee progress in commercializing technologies. SBA has the following comments on the draft report:

The draft report touches on the costly, time-consuming, and intensive efforts required to correct award data or collect and verify the accuracy of commercialization data. SBA confirms this and agrees that it is important to have consistent and high-quality data. Data to support the Transition Rate Benchmark can be validated and corrected as part of the ongoing effort to ensure data integrity. Data to support the Commercialization Benchmark poses greater challenges, as identified in the draft report on page 9.

The Small Business Act at 15 USC §638 (qq) directs the head of each Federal agency to establish "a minimum performance standard" or "minimum commercialization rate" to demonstrate progress to Phase II success and Phase III success. Establishing a fixed minimum performance standard to be applied across all project and technology types may not be the most effective way to assess commercial progress. It may be more effective for each project evaluation to include consideration of commercialization progress as part of the overall evaluation for an award. GAO indicates that 9 of the 11 participating agencies consider prior commercialization experience as part of their evaluation and that this can be done in an effective way. SBA has convened a working group of participating agency officials to explore the challenges associated with implementing a commercialization rate benchmark and continues to work collaboratively with the agencies on this issue. However, consideration of prior commercialization experience is not typically done by comparing against a single benchmark standard that is administratively determined, but rather incorporated into the technical review performed on a project-by-project basis.

On page 8, the draft report states that, "SBA officials told us that there are errors in the database, in part, because SBA has not worked with participating agencies to ensure that agencies enter high-quality, accurate data into the database." SBA disagrees with the statement that SBA has not worked with participating agencies to ensure that agencies enter high-quality and accurate data into the database. SBA developed and has continuously improved data reporting systems for agencies to submit award information, and provides an instruction guide for the data fields and their attributes, including type of expected data and whether the field is mandatory or optional. The instruction guide is accessible by the agencies when they are logged in to the SBIR.gov system. The award upload instruction guide has been updated multiple times since August 2015 to address data quality issues. In addition, data validation tools have been used to ensure that award data cannot be submitted unless it complies with certain rules. While there continues to be room for improvement in data quality assurance, SBA is actively working with the agencies to improve data integrity.

On page 11, footnote 15 indicates that the single, uniform benchmark was created by participating agencies "because they thought that it would be easier than having different metrics across agencies," and SBA would like to note that the single program-wide benchmark was established to make application of the benchmark easier for small businesses.

SBA generally agrees with the recommendations to SBA. SBA has the following comments related to GAO's recommendations to SBA:

- (1) The Director of the Office of Investment and Innovation within the Small Business Administration should work with participating agencies to improve the reliability of its SBIR and STTR award data.*

The Director of the Office of Innovation and Technology within the Office of Investment and Innovation of the SBA has been and will continue to provide guidance to participating agencies, and will work with participating agencies to improve the reliability of SBIR and STTR award data.

- (2) The Director of the Office of Investment and Innovation within the Small Business Administration should work with participating agencies to implement the Commercialization Benchmark or, if that is not feasible, revise the benchmark so that it can be implemented.*

The Director of the Office of Innovation and Technology within the Office of Investment and Innovation of the SBA has convened a working group of participating agency program managers to discuss how best to address the challenges with implementing the Commercialization Benchmark, or revising the benchmark so that it can be implemented.

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**Appendix I: Comments from the Small  
Business Administration**

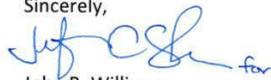
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*(3) The Director of the Office of Investment and Innovation within the Small Business Administration should update the SBIR and STTR policy directives to accurately reflect how the consequences of the benchmarks are to be implemented.*

The Director of the Office of Innovation and Technology within the Office of Investment and Innovation of the SBA has updated the SBIR.gov website description of the performance benchmarks at <https://www.sbir.gov/performance-benchmarks> and communicated the consequences of the benchmarks to participating agency program managers. SBA intends to update the policy directives to reflect these policy clarifications.

Thank you for allowing SBA the opportunity to comment on GAO's draft report, "Small Business Research Programs: Agencies Need to Take Steps to Assess Progress Toward Commercializing Technologies", and for taking SBA's views into consideration.

Sincerely,

A handwritten signature in blue ink, appearing to read "J.R. Williams", with a small "for" written to the right.

John R. Williams  
Director  
Office of Innovation and Technology

## Appendix II: Comments from the Department of Commerce



UNITED STATES DEPARTMENT OF COMMERCE  
The Secretary of Commerce  
Washington, D.C. 20230

January 8, 2018

Mr. John Neumann  
Director, Natural Resources and Environment  
U.S. Government Accountability Office  
441 G Street, NW  
Washington, DC 20548

Dear Mr. Neumann:

Thank you for the opportunity to review and comment on the Government Accountability Office's (GAO) draft report titled *Small Business Research Programs: Agencies Need to Take Steps to Assess Progress Toward Commercializing Technologies* (GAO-18-207). Enclosed is the National Oceanic and Atmospheric Administration's response to a GAO recommendation in the draft report.

If you have any questions, please contact MaryAnn Mausser, GAO Liaison, at (202) 482-8120 or [MMAusser@doc.gov](mailto:MMAusser@doc.gov).

Sincerely,

A handwritten signature in blue ink that reads "Wilbur Ross".

Wilbur Ross

Enclosure

Department of Commerce  
National Oceanic and Atmospheric Administration  
Response to the GAO Draft Report Titled  
*Small Business Research Programs: Agencies Need to Take  
Steps to Assess Progress Toward Commercializing Technologies*  
(GAO-18-207)

General Comments

The Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) appreciates the opportunity to review the Government Accountability Office's (GAO) draft report. Overall, it is informative, thorough, and balanced. Also, it provides a fair illustration of the existing lack of clarity regarding Small Business Innovation Research (SBIR) benchmarks requirements, including how consequences are implemented when benchmark requirements are not met.

NOAA Response to GAO Recommendations

The draft report states, "We are making a total of 11 recommendations," of which one applies to NOAA:

Recommendation 4: "The SBIR Program Manager of Commerce's National Oceanic and Atmospheric Administration should update the agency's SBIR project solicitation to accurately reflect how the consequences of not meeting the benchmarks are to be implemented."

NOAA Response: NOAA agrees with this recommendation. As evident in the draft report, there was previously a lack of clarity and consistency regarding language in solicitations to explain consequences of not meeting SBIR benchmarks. In order to be consistent with other SBIR agencies, NOAA will seek clarification from the Small Business Administration to ensure that the correct language is included in the next solicitation. NOAA will include updated language to accurately reflect the consequences of not meeting the SBIR benchmark qualifications and requirements for the FY 2019 solicitation, which is planned for release in October 2018, since the current (FY 2018) solicitation is already published.

## Appendix III: Comments from the Department of Defense



ACQUISITION,  
TECHNOLOGY  
AND LOGISTICS

OFFICE OF THE UNDER SECRETARY OF DEFENSE

3000 DEFENSE PENTAGON  
WASHINGTON, DC 20301-3000

Mr. John Neumann  
Director, Natural Resources and Environment  
U.S. Government Accountability Office  
441 G Street, N.W.  
Washington, DC 20548

Dear Mr. Neumann:

This is the Department of Defense (DoD) response to the Government Accountability Office (GAO) Draft Report, GAO-18-207, "SMALL BUSINESS RESEARCH PROGRAMS: Agencies Need to Take Steps to Assess Progress Toward Commercializing Technologies" dated December 7, 2017 (GAO Code 101978).

The Department is providing official written comments for inclusion in the report.

Sincerely,

A handwritten signature in black ink, appearing to read "James J. Galvin, Jr.", written in a cursive style.

James J. Galvin, Jr.  
Acting Director, Office of  
Small Business Programs

Enclosure:  
As stated



ACQUISITION,  
TECHNOLOGY  
AND LOGISTICS

OFFICE OF THE UNDER SECRETARY OF DEFENSE

3000 DEFENSE PENTAGON  
WASHINGTON, DC 20301-3000

GAO Draft Report Dated December 7, 2017  
GAO-18-207 (GAO CODE 101978)

**“SMALL BUSINESS RESEARCH PROGRAMS: Agencies Need to Take Steps to Assess  
Progress Toward Commercializing Technologies”**

**DEPARTMENT OF DEFENSE COMMENTS  
TO THE GAO RECOMMENDATION**

**RECOMMENDATION:** The SBIR Program Administrator within the Department of Defense should update the agency’s SBIR and STTR project solicitations to accurately reflect how the consequences of not meeting the benchmarks are to be implemented.

**DOD RESPONSE:** The DoD position is to concur without comment.

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## Appendix IV: Comments from the Department of Education



UNITED STATES DEPARTMENT OF EDUCATION  
INSTITUTE OF EDUCATION SCIENCES  
WASHINGTON, D.C. 20202

Mr. John Neumann  
Director  
Natural Resources and Environment  
U.S. Government Accountability Office  
441 G Street, NW  
Washington, DC 20548

Dear Mr. Neumann:

I am writing in response to the recommendation made in the U.S. Government Accountability Office (GAO) draft report, "Small Business Research Programs: Agencies Need to Take Steps to Assess Progress Toward Commercializing Technologies" (GAO-18-207). I appreciate the opportunity to comment on the draft report on behalf of the U.S. Department of Education (Department).

We appreciate GAO's review of how participating Federal agencies assess businesses against two benchmarks related to commercialization of the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs. The Department only participates in the SBIR program, which is administered by the Institute of Education Sciences. We provide our response to the recommendation in the report from GAO below:

**Recommendation:** The SBIR Program Manager within the Department of Education should update the agency's SBIR project solicitation to accurately reflect how the consequences of not meeting the benchmarks are to be implemented.

**Response:** In response to the recommendation, we have added language to the SBIR program solicitation to clarify that small businesses that do not meet the Department's Transition Benchmark are ineligible to submit a proposal to our SBIR program. On Monday, December 11, 2017, the Department posted the SBIR Phase I solicitation to the Federal Business Opportunities website (Solicitation Number: 91990018R0006, [www.fbo.gov](http://www.fbo.gov)).

We appreciate the opportunity to review the draft report and comment on the recommendation. We do not have any technical comments.

Sincerely,

A handwritten signature in black ink, appearing to read "Thomas Brock".

Thomas Brock  
Commissioner of the National Center for Education  
Research, Delegated the Duties of the Director of  
the Institute of Education Sciences

# Appendix V: Comments from the Department of Energy



Department of Energy  
Washington, DC 20585

January 12, 2018

Mr. John Neumann  
Director  
Natural Resources and Environment  
U.S. Government Accountability Office  
441 G Street N.W.  
Washington, DC 20548

Dear Mr. Neumann:

We appreciate the opportunity to comment on the draft Government Accountability Office (GAO) report: Small Business Research Programs: Agencies Need to Take Steps to Assess Progress Toward Commercializing Technologies (GAO-18-207).

**Recommendation 7:** The SBIR Program Manager within the Department of Energy should update the agency's SBIR project solicitation to accurately reflect how the consequences of not meeting the benchmarks are to be implemented.

**DOE Response:** DOE concurs with the recommendation.

The DOE Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) Programs Office issues two Phase I Funding Opportunity Announcements (FOAs) annually, which are referred to as Release 1 and Release 2. For FY 2018, the Release 1 FOA has already closed. The Release 2 FOA closes on February 26, 2018. DOE will modify the language in this and future Phase I FOAs as shown below.

*Current language refers to eligibility for award:*

For these companies, the benchmark establishes a minimum number of Phase II awards the company must have received for a given number of Phase I awards received during the five-year time period in order to be eligible to receive a new Phase I award.

*Revised language refers to eligibility to submit an application:*

For these companies, the benchmark establishes a minimum number of Phase II awards the company must have received for a given number of Phase I awards received during the five-year time period in order to be eligible to submit a Phase I application.

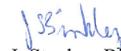
On June 1 of each year, SBIR/STTR awardees registered on SBIR.gov are assessed to determine if they meet the benchmark requirements. Companies that fail to meet the transition rate benchmark on June 1, 2017 are not eligible to submit a Phase I application during the period June 1, 2017 through May 31, 2018.



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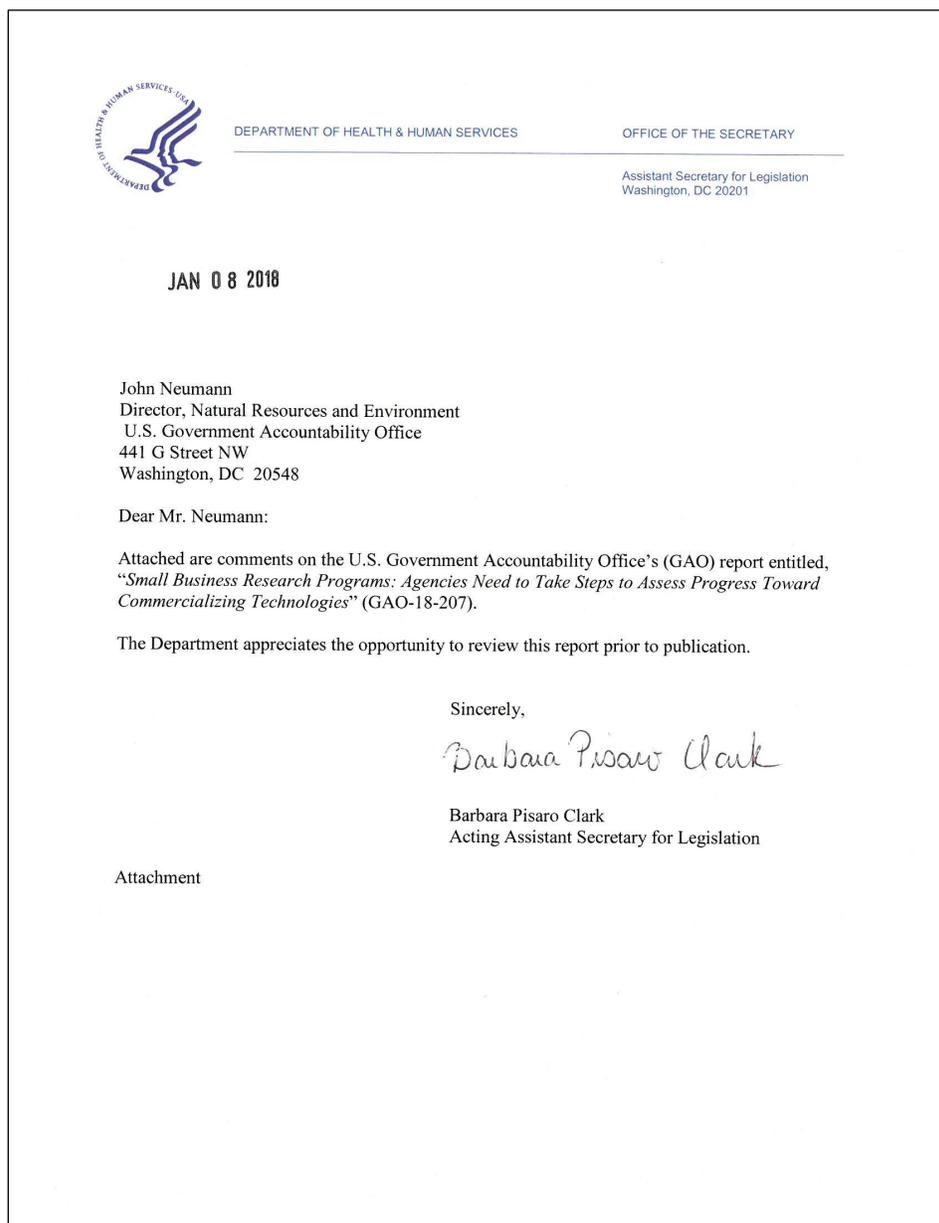
If you have any questions, regarding this response, please contact Dr. Manny Oliver, Director, DOE SBIR/STTR Programs Office at (301) 903-0309.

Sincerely,



J. Stephen Binkley  
Deputy Director for Science Programs  
Office of Science

## Appendix VI: Comments from the Department of Health and Human Services



**GENERAL COMMENTS OF THE DEPARTMENT OF HEALTH AND HUMAN SERVICES (HHS) ON THE GOVERNMENT ACCOUNTABILITY OFFICE'S DRAFT REPORT ENTITLED - SMALL BUSINESS RESEARCH PROGRAMS: AGENCIES NEED TO TAKE STEPS TO ASSESS PROGRESS TOWARD COMMERCIALIZING TECHNOLOGIES (GAO-18-207)**

The U.S. Department of Health and Human Services (HHS) appreciates the opportunity from the Government Accountability Office (GAO) to review and comment on this draft report.

**Recommendation 8**

The Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) Program Coordinator within HHS should update the agency's SBIR and STTR project solicitations to accurately reflect how the consequences of not meeting the benchmarks are to be implemented.

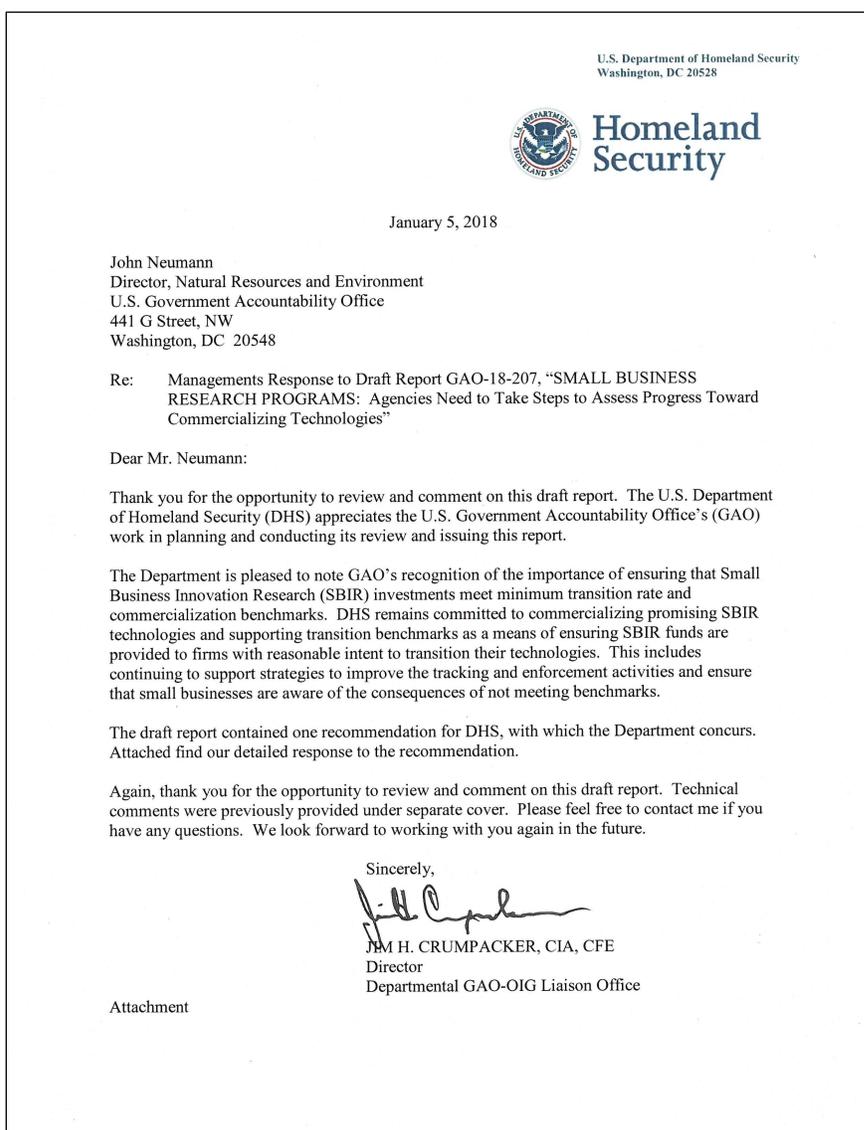
**HHS Response**

HHS concurs with GAO's recommendation.

HHS will update solicitations to include language to adequately reflect how the consequences of not meeting the benchmarks are to be implemented for all new SBIR/STTR solicitations. HHS will include the updated language on new solicitations published after January 1, 2018.

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## Appendix VII: Comments from the Department of Homeland Security



## Appendix VIII: Comments from the Environmental Protection Agency



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

JAN 3 - 2010

OFFICE OF  
RESEARCH AND DEVELOPMENT

Mr. John Neumann  
Director  
Natural Resources and Environment  
U.S. Government Accountability Office  
Washington, DC 20548

Dear Mr. Neumann:

Thank you for the opportunity to review and comment on GAO's draft report GAO-18-207, "*Small Business Research Programs: Agencies Need to Take Steps to Assess Progress Toward Commercializing Technologies*."

The purpose of this letter is to provide the EPA's response to the report recommendation.

**Recommendation:** The Small Business Innovation Research (SBIR) Program Manager within the EPA should update the agency's SBIR project solicitation to accurately reflect how the consequences of not meeting the benchmarks are to be implemented.

**Response:** EPA concurs with this recommendation. EPA will update the next SBIR solicitation (which will be released in 2018) to provide information to small businesses on the consequences of not meeting the benchmarks (i.e., from ineligibility to receive certain awards to ineligibility to submit certain proposals). EPA will also plan on referencing the SBA website on performance benchmarks (<https://www.sbir.gov/performance-benchmarks>) to ensure consistency with SBA guidance.

Additionally, and as mentioned during interviews with GAO, EPA would like to emphasize our preference to consider businesses' prior commercialization experience as part of our overall evaluation of proposals (allowing reviewers to use professional judgment on commercialization success) rather than implement the current commercialization benchmark which, as noted in the draft report, can be complicated.

Thank you again for the opportunity to review and respond to the draft GAO report. We request that you include the entirety of this response as an appendix to the GAO final report. If you have any questions, please contact Maureen Hingeley at (202) 564-1306.

Sincerely,



Jennifer Orme-Zavaleta, PhD  
Principal Deputy Assistant Administrator

cc: EPA GAO Liaison Team  
Mary Ellen Radzikowski, Acting Director, National Center for Environmental Research  
James Gentry, Deputy Director, National Center for Environmental Research  
April Richards, Program Manager, Small Business Innovation Research (SBIR) Program

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## Appendix IX: GAO Contact and Staff Acknowledgments

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### GAO Contacts

John Neumann, (202) 512-3841 or [neumannj@gao.gov](mailto:neumannj@gao.gov)

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### Staff Acknowledgments

In addition to the contact named above, Hilary Benedict (Assistant Director), John Barrett, Natalie Block, Antoinette Capaccio, Tanya Doriss, Justin Fisher, Ellen Fried, Juan Garay, Cindy Gilbert, Perry Lusk, William Shear, and Elaine Vaurio made key contributions to this report.

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## Appendix X: Accessible Data

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### Agency Comment Letters

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Text of Appendix I: Comments from the Small Business Administration

Page 1

January 5, 2018

Mr. John Neumann Director

Natural Resources and Environment

U.S. Government Accountability Office Washington, D.C. 20548

Dear Mr. Neumann :

Thank you for providing the U.S. Small Business Administration (SBA) with a copy of the Government Accountability Office (GAO) draft report titled, " Small Business Research Programs : Agencies Need to Take Steps to Assess Progress Toward Commercializing Technologies."

The draft report analyzes SBA and participating agency efforts related to the development of benchmarks to measure Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) awardee progress in commercializing technologies. SBA has the following comments on the draft report :

The draft report touches on the costly, time-consuming , and intensive efforts required to correct award data or collect and verify the accuracy of commercialization data. SBA confirms this and agrees that it is important to have consistent and high-quality data. Data to support the Transition Rate Benchmark can be validated and corrected as part of the ongoing effort to ensure data integrity. Data to support the Commercialization Benchmark poses greater challenges, as identified in the draft report on page 9.

The Small Business Act at 15 USC §638 (qq) directs the head of each Federal agency to establish " a minimum performance standard " or " minimum commercialization rate" to demonstrate progress to Phase II success and Phase III success . Establishing a fixed minimum performance standard to be applied across all project and technology types may not be the most effective way to assess commercial progress. It may be more effective for each project evaluation to include consideration of commercialization progress as part of the overall evaluation for an award. GAO indicates that 9 of the 11 participating agencies consider prior commercialization experience as part of their evaluation and that t his can be done in an effective way. SBA has convened a work ing group of participating agency officials to explore the challenges associated with implementing a commercialization rate benchmark and continues to work collaboratively with the agencies on this issue. However, consideration of prior commercialization experience

is not typically done by comparing against a single benchmark standard that is administratively determined, but rather incorporated into the technical review performed on a project -by - project basis.

## Page 2

On page 8, the draft report states that , "SBA officials told us that there are errors in the database, in part, because SBA has not worked with participating agencies to ensure that agencies enter high-quality, accurate data into the database." SBA disagrees with the statement that SBA has not worked with participating agencies to ensure that agencies enter high-quality and accurate data into the database. SBA developed and has continuously improved data reporting systems for agencies to submit award information, and provides an instruction guide for the data fields and their attributes, including type of expected data and whether the field is mandatory or optional. The instruct ion guide is accessible by the agencies when they are logged in to the SBIR.gov system. The award upload instruction guide has been updated multiple times since August 2015 to address data quality issues. In addition , data validation tools have been used to ensure that award data cannot be submitted unless it complies with certain rules. While there continues to be room for improvement in data quality assurance, SBA is actively working with the agencies to improve data integrity.

On page 11, footnote 15 indicates that the single, uniform benchmark was created by participating agencies "because they thought that it would be easier than having different metrics across agencies," and SBA would like

to note that the single program-wide benchmark was established to make application of the benchmark easier for small businesses.

SBA generally agrees with the recommendations to SBA. SBA has the following comments related to GAO's recommendations to SBA :

1. The Director of the Office of Investment and Innovation within the Small Business

Administration should work with participating agencies to improve the reliability of its SBIR and STTR award data .

The Director of the Office of Innovation and Technology within the Office of Investment and Innovation of the SBA has been and will continue to provide guidance to participating agencies, and will work with participating agencies to improve the reliability of SBIR and STTR award data.

2. The Director of the Office of Investment and Innovation within the Small Business Administration should work with participating agencies to implement the Commercialization Benchmark or, if that is not feasible, revise the benchmark so that it can be implemented.

The Director of the Office of Innovation and Technology within the Office of Investment and Innovation of the SBA has convened a working group of participating agency program managers to discuss how best to address the challenges with implementing the Commercialization Benchmark, or revising the benchmark so that it can be implemented.

### Page 3

- (1) The Director of the Office of Investment and Innovation within the Small Business Administration should update the SBIR and STTR policy directives to accurately reflect how the consequences of the benchmarks are to be implemented.

The Director of the Office of Innovation and Technology within the Office of Investment and Innovation of the SBA has updated the SBIR.gov website description of the performance benchmarks at <https://www.sbir.gov/performance-benchmarks> and communicated the consequences of the benchmarks to participating agency program managers. SBA intends to update the policy directives to reflect these policy clarifications.

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Thank you for allowing SBA the opportunity to comment on GAO's draft report, "Small Business Research Programs: Agencies Need to Take Steps to Assess Progress Toward Commercializing Technologies", and for taking SBA's views into consideration.

Sincerely,

John R. Williams

Director

Office of Innovation and Technology

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## Text of Appendix II: Comments from the Department of Commerce

### Page 1

January 8, 2018

Mr. John Neumann

Director, Natural Resources and Environment

U.S. Government Accountability Office 441 G Street, NW

Washington, DC 20548

Dear Mr. Neumann:

Thank you for the opportunity to review and comment on the Government Accountability Office's (GAO) draft report titled Small Business Research Programs: Agencies Need to Take Steps to Assess Progress Toward Commercializing Technologies (GAO-18-207). Enclosed is the National Oceanic and Atmospheric Administration's response to a GAO recommendation in the draft report.

If you have any questions, please contact MaryAnn Mausser, GAO Liaison, at

(202) 482-8120 or [MMAusser@doc.gov](mailto:MMAusser@doc.gov).

Sincerely,

Wilbur Ross

Enclosure

Page 2

Department of Commerce

National Oceanic and Atmospheric Administration Response to the GAO Draft Report Titled

Small Business Research Programs: Agencies Need to Take Steps to Assess Progress Toward Commercializing Technologies (GAO-18-207)

#### **General Comments**

The Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) appreciates the opportunity to review the Government Accountability Office's (GAO) draft report. Overall, it is informative, thorough, and balanced. Also, it provides a fair illustration of the existing lack of clarity regarding Small Business Innovation Research (SBIR) benchmarks requirements, including how consequences are implemented when benchmark requirements are not met.

#### **NOAA Response to GAO Recommendations**

The draft report states, "We are making a total of 11 recommendations," of which one applies to AA.:

#### **Recommendation 4:**

"The SBIR Program Manager of Commerce's National Oceanic and Atmospheric Administration should update the agency's SBIR project solicitation to accurately reflect how the consequences of not meeting the benchmarks are to be implemented."

#### **NOAA Response:**

NOAA agrees with this recommendation. As evident in the draft report, there was previously a lack of clarity and consistency regarding language in solicitations to explain consequences of not meeting SBIR

benchmarks. In order to be consistent with other SBIR agencies, NOAA will seek clarification from the Small Business Administration to ensure that the correct language is included in the next solicitation. NOAA will include updated language to accurately reflect the consequences of not meeting the SBIR benchmark qualifications and requirements for the FY 2019 solicitation, which is planned for release in October 2018, since the current (FY 2018) solicitation is already published.

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## Text of Appendix III: Comments from the Department of Defense

### Page 1

Mr. John Neumann

Director, Natural Resources and Environment

U.S. Government Accountability Office 441 G Street, N.W.

Washington, DC 20548 Dear Mr. Neumann:

This is the Department of Defense (DoD) response to the Government Accountability Office (GAO) Draft Report, GA0-18-207, "SMALL BUSINESS RESEARCH PROGRAMS:

Agencies Need to Take Steps to Assess Progress Toward Commercializing Technologies" dated December 7, 2017 (GAO Code 101978).

The Department is providing official written comments for inclusion in the report.

Sincerely,

James Galvin

Acting Director, Office of Small Business Programs

Enclosure:

As stated

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Page 2

GAO Draft Report Dated December 7, 2017 GAO-18-207 (GAO CODE 101978)

"SMALL BUSINESS RESEARCH PROGRAMS: Agencies Need to Take Steps to Assess Progress Toward Commercializing Technologies"

DEPARTMENT OF DEFENSE COMMENTS TO THE GAO RECOMMENDATION

**RECOMMENDATION: The SBIR Program Administrator within the Department of Defense should update the agency's SBIR and STTR project solicitations to accurately reflect how the consequences of not meeting the benchmarks are to be implemented.**

**DOD RESPONSE: The DoD position is to concur without comment.**

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Text of Appendix IV: Comments from the Department of Education

Mr. John Neumann Director

Natural Resources and Environment

U.S. Government Accountability Office 441 G Street, NW

Washington, DC 20548 Dear Mr. Neumann:

I am writing in response to the recommendation made in the U.S. Government Accountability Office (GAO) draft report, "Small Business Research Programs: Agencies Need to Take Steps to Assess Progress Toward Commercializing Technologies" (GAO-18-207). I appreciate the opportunity to comment on the draft report on behalf of the U.S. Department of Education (Department).

We appreciate GAO's review of how participating Federal agencies assess businesses against two benchmarks related to commercialization of the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STIR) programs. The Department only participates in the SBIR program, which is administered by the Institute of

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Education Sciences. We provide our response to the recommendation in the report from GAO below:

Recommendation: The SBIR Program Manager within the Department of Education should update the agency's SBIR project solicitation to accurately reflect how the consequences of not meeting the benchmarks are to be implemented.

Response: In response to the recommendation, we have added language to the SBIR program solicitation to clarify that small businesses that do not meet the Department's Transition Benchmark are ineligible to submit a proposal to our SBIR program. On Monday, December 11, 2017, the Department posted the SBIR Phase I solicitation to the Federal Business Opportunities website (Solicitation Number: 91990018R0006, [www.fbo.gov](http://www.fbo.gov)).

We appreciate the opportunity to review the draft report and comment on the recommendation. We do not have any technical comments.

Sincerely,

Thomas Brock

Commissioner of the National Center for Education Research, Delegated the Duties of the Director of the Institute of Education Sciences

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## Text of Appendix V: Comments from the Department of Energy

### Page 1

January 12, 2018

Mr. John Neumann Director

Natural Resources and Environment

U.S. Government Accountability Office 441 G Street N.W.

Washington, DC 20548 Dear Mr. Neumann:

We appreciate the opportunity to comment on the draft Government Accountability Office (GAO) report: Small Business Research Programs: Agencies Need to Take Steps to Assess Progress Toward Commercializing Technologies (GAO-18-207).

Recommendation 7: The SBIR Program Manager within the Department of Energy should update the agency's SBIR project solicitation to accurately reflect how the consequences of not meeting the benchmarks are to be implemented.

DOE Response: DOE concurs with the recommendation.

The DOE Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) Programs Office issues two Phase I Funding Opportunity Announcements (FOAs) annually, which are referred to as Release 1 and Release 2. For FY 2018, the Release 1 FOA has already closed. The Release 2 FOA closes on February 26, 2018. DOE will modify the language in this and future Phase I FOAs as shown below.

Current language refers to eligibility for award:

For these companies, the benchmark establishes a minimum number of Phase II awards the company must have received for a given number of Phase I awards received during the five-year time period in order to be eligible to receive a new Phase I award.

Revised language refers to eligibility to submit an application:

For these companies, the benchmark establishes a minimum number of Phase II awards the company must have received for a given number of Phase I awards received during the five-year time period in order to be eligible to submit a Phase I application.

On June 1 of each year, SBIR/STTR awardees registered on SBIR.gov are assessed to determine if they meet the benchmark requirements. Companies that fail to meet the transition rate benchmark on June 1, 2017 are not eligible to submit a Phase I application during the period June 1, 2017 through May 31, 2018.

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Page 2

If you have any questions, regarding this response, please contact Dr. Manny Oliver, Director, DOE SBIR/STTR Programs Office at (301) 903-0309.

Sincerely,

J. Stephen Bmkley

Deputy Director for Science Programs Office of Science

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Text of Appendix VI: Comments from the Department of Health and Human Services

Page 1

John Neumann

Director, Natural Resources and Environment

U.S. Government Accountability Office

441 G Street NW Washington, DC 20548

Dear Mr. Neumann:

Attached are comments on the U.S. Government Accountability Office's (GAO) report entitled, "Small Business Research Programs: Agencies Need to Take Steps to Assess Progress Toward Commercializing Technologies" (GAO-18-207).

The Department appreciates the opportunity to review this report prior to publication.

Sincerely,

Barbara Pisaro Clark

Acting Assistant Secretary for Legislation

Attachment

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Page 2

GENERAL COMMENTS OF THE DEPARTMENT OF HEALTH AND HUMAN SERVICES (HHS) ON THE GOVERNMENT ACCOUNTABILITY OFFICE'S DRAFT REPORT ENTITLED - SMALL BUSINESS RESEARCH PROGRAMS: AGENCIES NEED TO TAKE STEPS TO ASSESS PROGRESS TOWARD COMMERCIALIZING TECHNOLOGIES (GAO-18-207)

The U.S. Department of Health and Human Services (HHS) appreciates the opportunity from the Government Accountability Office (GAO) to review and comment on this draft report.

**Recommendation 8**

The Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) Program Coordinator within HHS should update the agency's SBIR and STTR project solicitations to accurately reflect how the consequences of not meeting the benchmarks are to be implemented.

**HHS Response - HHS concurs with GAO's recommendation.**

HHS will update solicitations to include language to adequately reflect how the consequences of not meeting the benchmarks are to be implemented for all new SBIR/STTR solicitations. HHS will include the updated language on new solicitations published after January 1, 2018.

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**Text of Appendix VII: Comments from the Department of Homeland Security**

Page 1

January 5, 2018

John Neumann

Director, Natural Resources and Environment

U.S. Government Accountability Office 441 G Street, NW

Washington, DC 20548

Re: Managements Response to Draft Report GAO-18-207, "SMALL BUSINESS RESEARCH PROGRAMS: Agencies Need to Take Steps to Assess Progress Toward Commercializing Technologies"

Dear Mr. Neumann:

Thank you for the opportunity to review and comment on this draft report. The U.S. Department of Homeland Security (DHS) appreciates the U.S. Government Accountability Office' s (GAO) work in planning and conducting its review and issuing this report.

The Department is pleased to note GAO' s recognition of the importance of ensuring that Small Business Innovation Research (SBIR) investments meet minimum transition rate and commercialization benchmarks. DHS remains committed to commercializing promising SBIR technologies and supporting transition benchmarks as a means of ensuring SBIR funds are provided to firms with reasonable intent to transition their technologies. This includes continuing to support strategies to improve the tracking and enforcement activities and ensure that small businesses are aware of the consequences of not meeting benchm arks.

The draft report contained one recommendation for DHS, with which the Department concurs. Attached find our detailed response to the recommendation .

Again, thank you for the opportunity to review and comment on this draft report. Technical comments were previously provided under separate cover. Please feel free to contact me if you have any questions. We look forward to working with you again in the future.

Sincerely,

Attachment

Jim H CRUMPACKER, CIA, CFE

Director

Departmental GAO-OIG Liaison Office

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Page 2

Attachment: Management Response to Recommendation Contained in GAO-18-207

GAO recommended that the SBIR Program Director within the Department of Homeland Security:

Recommendation 1: Update the agency's SBIR project solicitation to accurately reflect how the consequences of not meeting the benchmarks are to be implemented.

Response: Concur. The Department's SBIR Program Office has included the consequences of not meeting the benchmarks in its Fiscal Year 18.1 SBIR Solicitation, posted to the FEDBIZOpps.gov (www.FBO.gov ) website on December 15, 2017. A copy of the updated 18.1 SBIR Solicitation was provided to GAO under separate cover. We request that GAO consider this recommendation closed as implemented.

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**Text of Appendix VIII: Comments from the Environmental Protection Agency**

Page 1

Mr. John Neumann Director

Natural Resources and Environment

U.S. Government Accountability Office Washington, DC 20548

Dear Mr. Neumann:

Thank you for the opportunity to review and comment on GAO's draft report GA0-18-207,

" Small Business Research Programs: Agencies Need to Take Steps to Assess Progress Toward Commercializing Technologies.

The purpose of this letter is to provide the EPA' s response to the report recommendation.

Recommendation: The Small Business Innovation Research (SBIR) Program. Manager within the EPA should update the agency's SBIR project solicitation to accurately reflect how the consequences of not meeting the benchmarks are to be implemented.

Response: EPA concurs with this recommendation. EPA will update the next SBIR solicitation (which will be released in 2018) to provide information to small businesses on the consequences of not meeting the benchmarks (i.e., from ineligibility to receive certain awards to ineligibility to submit certain proposals). EPA will also plan on referencing the SBA website on performance benchmarks (<https://www.sbir.gov/performance-benchmarks>) to ensure consistency with SBA guidance.

Additionally, and as mentioned during interviews with GAO, EPA would like to emphasize our preference to consider businesses' prior commercialization experience as part of our overall evaluation of proposals (allowing reviewers to use professional judgment on commercialization success) rather than implement the current commercialization benchmark which, as noted in the draft report, can be complicated.

## Page 2

Thank you again for the opportunity to review and respond to the draft GAO report. We request that you include the entirety of this response as an appendix to the GAO final report. If you have any questions, please contact Maureen Hingeley at (202) 564-1306.

Sincerely,

Orme-Zavaleta, PhD

Principal Deputy Assistant Administrator

cc: EPA GAO Liaison Team

Mary Ellen Radzikowski, Acting Director, National Center for Environmental Research  
James Gentry, Deputy Director, National Center for Environmental Research

April Richards, Program Manager, Small Business Innovation Research (SBIR) Program

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