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OFFICE OF AUDITS

REVIEW OF NASA'S MANAGEMENT OF ITS SMALL
BUSINESS INNOVATION RESEARCH PROGRAM

OFFICE OF INSPECTOR GENERAL



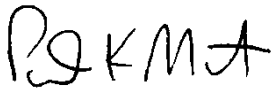
National Aeronautics and
Space Administration

REPORT. NO. IG-11-010-R

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THE FULL VERSION OF APPENDICES B AND E TO THIS REPORT INCLUDED INFORMATION THAT MAY BE CONSIDERED CONTRACTOR PROPOSAL INFORMATION. WE HAVE REDACTED FROM THE APPENDICES INFORMATION THAT WOULD IDENTIFY THE SPECIFIC PROPOSERS. WHERE SUCH INFORMATION HAS BEEN REDACTED IS NOTED.

Final report released by:



Paul K. Martin
Inspector General

Acronyms

DCAA	Defense Contract Audit Agency
FAR	Federal Acquisition Regulation
GSA	General Services Administration
NRC	National Research Council
OIG	Office of Inspector General
OMB	Office of Management and Budget
SBA	Small Business Administration
SBIR	Small Business Innovation Research Program

JANUARY 12, 2011

OVERVIEW

REVIEW OF NASA'S MANAGEMENT OF ITS SMALL BUSINESS
INNOVATION RESEARCH PROGRAM

The Issue

Congress created the Small Business Innovation Research (SBIR) program in 1982 to stimulate technological innovation, increase participation by small businesses and disadvantaged persons in federally funded research and development, and increase private-sector commercialization of innovations derived from federally funded research and development efforts. NASA's SBIR Program is the third largest of the 11 Federal agencies that are required to participate in the program, awarding an average of \$112 million annually to small businesses from 2004 through 2008.¹

The NASA Office of Inspector General (OIG) initiated this audit because recent investigations by the OIG's Office of Investigations identified cases of fraud, waste, and abuse in NASA's SBIR Program that raised questions about the overall effectiveness of the Program's internal controls. The objective of our audit was to examine these internal controls and determine whether NASA effectively managed the SBIR Program. To accomplish that objective, we examined whether:

- management had established internal controls to ensure evaluations of SBIR technical proposals were merit-based and objective;
- the Agency performed adequate due diligence to identify unallowable and unsupported costs;
- management had established adequate criteria and procedures for selecting SBIR awards based on best value; and
- internal controls were adequate to prevent and detect fraud and abuse in the SBIR Program.

The scope of our audit included all SBIR technical proposals submitted to and contracts awarded by NASA for program year 2008.² To meet our audit objectives, we selected a statistical sample of 67 SBIR awards for review. Details of the audit's scope and methodology are in Appendix A.

¹ The 11 agencies participating in the Federal SBIR program are the Departments of Agriculture, Commerce, Defense, Education, Energy, Health and Human Services, Homeland Security, Transportation, the Environmental Protection Agency, NASA, and the National Science Foundation.

² SBIR program year 2008 encompassed proposals submitted and contracts awarded in response to the 2008 NASA SBIR Program Solicitation, which included 2008 Phase 1 awards and 2007 Phase 2 awards.

Results

Our review found that while NASA's initial choice of SBIR award recipients appeared objective and merit-based, its oversight and monitoring of awards was deficient. Specifically, SBIR awards in 2008 contained an estimated \$2.7 million in unallowable and unsupported costs, including travel and equipment expenses. In addition, we found that NASA officials lacked adequate procedures to ensure SBIR applicants' past performance had been considered when selecting recipients of approximately \$85.7 million in "Phase 2" SBIR funds. Federal acquisition rules require consideration of past performance. Finally, NASA has not implemented appropriate internal controls to prevent fraud and abuse in contract awards. Consequently, some SBIR award recipients may have received multiple SBIR awards from different Federal agencies for the same research or NASA may have received highly questionable research products for its contract money.

Technical Proposals Were Appropriately Evaluated. SBIR Program officials established effective internal controls to ensure that evaluations of SBIR technical proposals were merit-based and objective. Program officials established a clear scoring methodology for evaluating technical proposals and procedures for ensuring evaluations were objective. In addition, Program officials engaged Mission Directorate and Center personnel in SBIR activities to ensure the infusion of SBIR research into NASA projects.

NASA Needs Better Controls to Prevent Unallowable and Unsupported Costs. A significant percentage of SBIR contracts awarded by NASA in 2008 contained unallowable and unsupported costs. We reviewed a randomly selected sample of 67 SBIR contracts and found that 17 (25 percent) included unallowable or unsupported costs. Specifically, we found unallowable travel and equipment costs, unallocable costs, and unsupported costs in the sample of SBIR contracts we examined to include:

- **Unallowable travel costs.** NASA awarded contracts with unallowable travel costs totaling \$9,255 on 4 of the 36 (11.1 percent) Phase 1 SBIR awards we reviewed.
- **Unallowable equipment costs.** NASA awarded contracts with unallowable equipment costs totaling \$234,354 on 6 of the 67 (8.9 percent) awards we reviewed.
- **Unallocable costs.**³ NASA awarded \$167,014 in unallocable direct costs on 7 of the 67 (10.4 percent) awards we reviewed.

³ FAR 31.201-4, "Determining allocability," states that a "cost is allocable if it is assignable or chargeable to one or more cost objectives on the basis of relative benefits received or other equitable relationship" – i.e., a cost is allocable to a Government contract if it (a) is incurred specifically for the contract; (b) benefits both the contract and other work, and can be distributed to them in reasonable proportion to the benefits received; or (c) is necessary to the overall operation of the business, although a direct relationship to any particular cost objective cannot be shown.

- **Unsupported costs.** NASA awarded contracts containing \$117,932 in unsupported costs in 2 of the 67 (3 percent) awards we reviewed.

Based on our statistical projections, we estimate that NASA awarded contracts with \$2.7 million in unallowable and unsupported costs during program year 2008 alone.

We determined that NASA awarded these SBIR contracts with unallowable and unsupported costs primarily because contracting officers and technical evaluators did not perform adequate due diligence in reviewing applicants' proposed costs. If NASA took the corrective actions outlined in this report to address these unallowable and unsupported costs, we estimated that the Agency could put \$13.3 million in SBIR funds to better use during program years 2010 through 2014.

NASA Needs to Consider Past Performance When Considering SBIR Proposals.

Our analysis of randomly selected contracts also found that SBIR Program managers did not appropriately consider past performance information in evaluating and selecting the Phase 2 awards. The Office of Federal Procurement Policy states that "the use of past performance as a major evaluation factor in the contract award process is instrumental in making best value selections." In addition, Federal Acquisition Regulations require agencies to use past performance information in awards of more than \$100,000 to ensure the selected proposal represents the best value (Phase 2 SBIR awards have a maximum value of \$750,000). However, NASA policies and procedures do not require consideration of past performance information in proposal evaluations and award selections. Evaluating this factor in future SBIR award selections will enable the Agency to better predict the quality of future work and help achieve Program goals.

NASA Needs to Improve Its Ability to Prevent and Detect Fraud in the SBIR Program. In analyzing investigations conducted by NASA OIG and others, we found that SBIR award recipients received multiple SBIR contracts for essentially the same research and provided duplicate deliverables or questionable research products. Some recipients also violated Small Business Administration (SBA) rules, such as when actual effort and costs differed materially from proposed effort and costs, contractors used SBIR funds for noncontract purposes, and technical personnel violated conflict of interest policies.

During our review, we identified 24 internal controls that, if implemented correctly, would help prevent and detect SBIR fraud and abuse. Under the Federal Managers Financial Integrity Act and Office of Management and Budget requirements, agency managers are required to establish effective internal controls. When we examined NASA's SBIR Program, we found Agency managers had not established 14 of the 24 controls (58 percent). In particular, we found that NASA had not implemented 9 of 19 controls we identified as critical in preventing and detecting fraud. Consequently, the SBIR Program remains vulnerable to fraud and abuse. For example, we performed two data mining tests to identify firms that might have received duplicate awards or might have submitted duplicate deliverables and we identified potential instances of duplicate awards and duplicate deliverables that have a combined value of approximately \$28.6 million.

Management Action

We recommended that the Director, Innovative Partnerships Program Office, in consultation with the Assistant Administrator for Procurement, provide NASA technical evaluators with additional training to ensure that they know how to perform a preliminary assessment of cost allowability during the selection and evaluation stage. In addition, we recommended that the Assistant Administrator for Procurement improve the cost review procedures used during the contract award stage to ensure that contracting officers take appropriate action when unallowable and/or unsupported costs are identified.

We also recommended that the Director, Innovative Partnerships Program Office, develop policies and procedures for using past performance information in the selection of Phase 2 awards. In addition, the Director should require that the annual solicitation for SBIR proposals outline the performance assessment methodology; designate responsibility for collecting past performance information; include past performance information in the scoring methodology and scores for Phase 2 proposals; and require technical officers to assess a firm's past performance on Phase 2 awards and to document the assessment. Further, we recommend that the Director implement critical internal controls that are not currently being utilized by NASA in its SBIR program. In addition, the Director should assess implementation costs and benefits to NASA for the remaining controls we identified as noncritical.

Finally, we recommended that NASA's Program Executive for the SBIR Program contact the SBA and the General Services Administration to discuss implementing automated controls in databases operated by those agencies to enhance cross-agency fraud detection.

Because of the recent merger of NASA's Innovative Partnership Office with the Office of the Chief Technologist, the Chief Technologist provided comments in response to the draft of this report (see Appendix E). Consequently, the applicable recommendations in this final report are addressed to the Chief Technologist.

Although the Chief Technologist did not agree with the findings on unallowable and unallocable costs (a detailed evaluation of the Agency's response begins on page 10), he stated that the report accurately highlights "very important issues and weaknesses in the integration of the Nation's SBIR Program," generally concurred with our recommendations, and set forth a series of planned actions the Agency agreed to take in response. We consider these planned actions to be responsive to our recommendations, and accordingly we consider the recommendations to be resolved. We will close the recommendations upon completion and verification of the proposed corrective actions.

The Chief Technologist stated that NASA will develop a training module for technical evaluators to improve the quality of cost reviews and completeness of the technical evaluation forms; revise templates, checklists, and file documentation to ensure costs are appropriately analyzed, supported, dispositioned, and documented; and provide all employees assigned to the SBIR Program additional training on the analysis of direct and

indirect costs. He also stated that NASA modified the 2010 SBIR solicitation to emphasize that past performance would be evaluated, made contracting officers responsible for collecting and reviewing past performance information, and required contracting officer technical representatives to assess past performance when the SBIR contract is completed. Additionally, technical evaluators will be provided access to past performance information.

With respect to our recommendations regarding implementation of additional internal controls, Chief Technologist stated that 9 critical controls we recommended will be implemented or partially implemented and one noncritical control we recommended will be evaluated for implementation. In addition, he said NASA will meet with the SBA and the General Service Administration to discuss implementing the recommended controls that require coordination with those agencies.

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INTRODUCTION

Background

Authorization and Scope of the Federal SBIR Program. Congress created the Small Business Innovation Research (SBIR) program in 1982 to stimulate technological innovation, increase participation by small and disadvantaged businesses in federally funded research and development, and increase private-sector commercialization of innovations derived from federally funded research and development efforts.⁴ NASA's SBIR Program is the third largest of the 11 Federal agencies that are required to participate in the SBIR program.⁵ For program years 2004 through 2008, NASA annually awarded, on average, \$112 million through the Agency's SBIR Program to 422 participants.

Pursuant to Executive Order, the Small Business Administration (SBA) is responsible for monitoring and coordinating the SBIR activities of participating Federal agencies.⁶

SBIR Eligibility Criteria. To participate in the SBIR Program, small businesses must meet the following criteria:

- **American-owned.** Businesses must be at least 51 percent owned and controlled by one or more individuals who are citizens of, or permanent resident aliens in, the United States.
- **Operated for profit.** Businesses must be organized for profit with a place of business located in the United States that operates primarily within the United States or makes a significant contribution to the United States economy through payment of taxes or use of American products, materials, or labor.
- **Principal investigator employed by the small business.** The principal investigator must be primarily employed (at least 51 percent in a calendar year) by the business at the time of an award and during the period of performance.
- **Limited in size.** Businesses are limited to 500 or fewer employees, including affiliates.

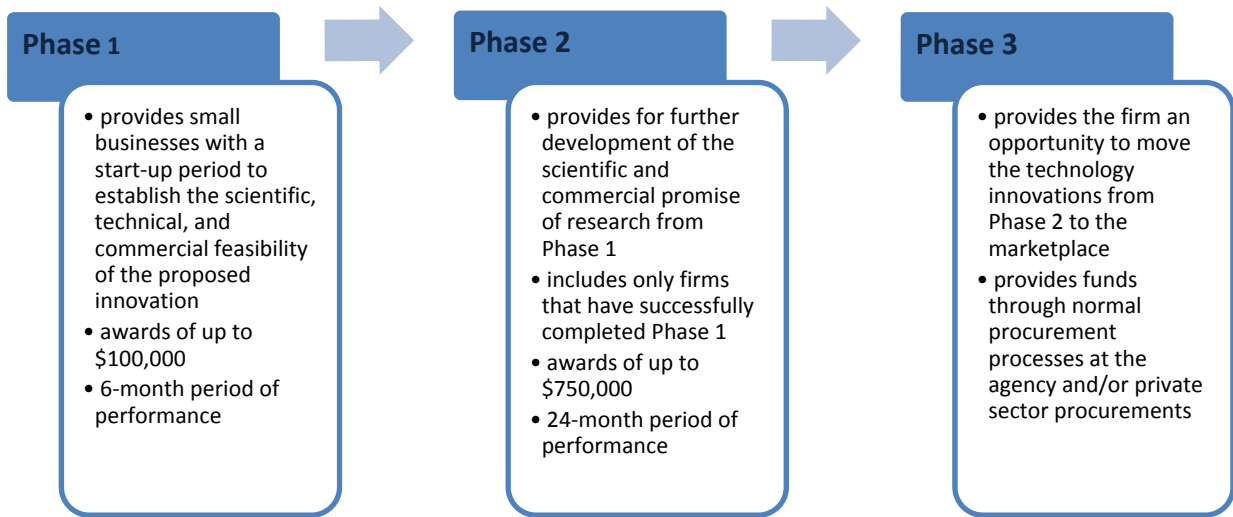
⁴ Public Law 97-219 (1982), Small Business Innovation Development Act of 1982. Small Business Reauthorization Act of 2000.

⁵ The 11 agencies participating in the Federal SBIR program are the Departments of Agriculture, Commerce, Defense, Education, Energy, Health and Human Services, Homeland Security, Transportation, the Environmental Protection Agency, NASA, and the National Science Foundation. Each year the 11 agencies award a total of approximately \$1.8 billion in SBIR funds to approximately 5,800 recipients.

⁶ Executive Order 13329, February 26, 2004, "Encouraging Innovation in Manufacturing."

SBIR Award Phases. The SBIR Program is divided into three phases as shown in Figure 1.

Figure 1. SBIR Program Phases



NASA’s Implementation of the Federal SBIR Program. During program year 2008, NASA awarded 350 SBIR Phase 1 purchase orders valued at \$34.7 million and 143 Phase 2 contracts valued at \$85.7 million. We could not determine the number of Phase 3 contracts during the program year because the Agency did not maintain reliable records identifying Phase 3 activity. Therefore, we limited our review to Phase 1 and Phase 2 SBIR awards.

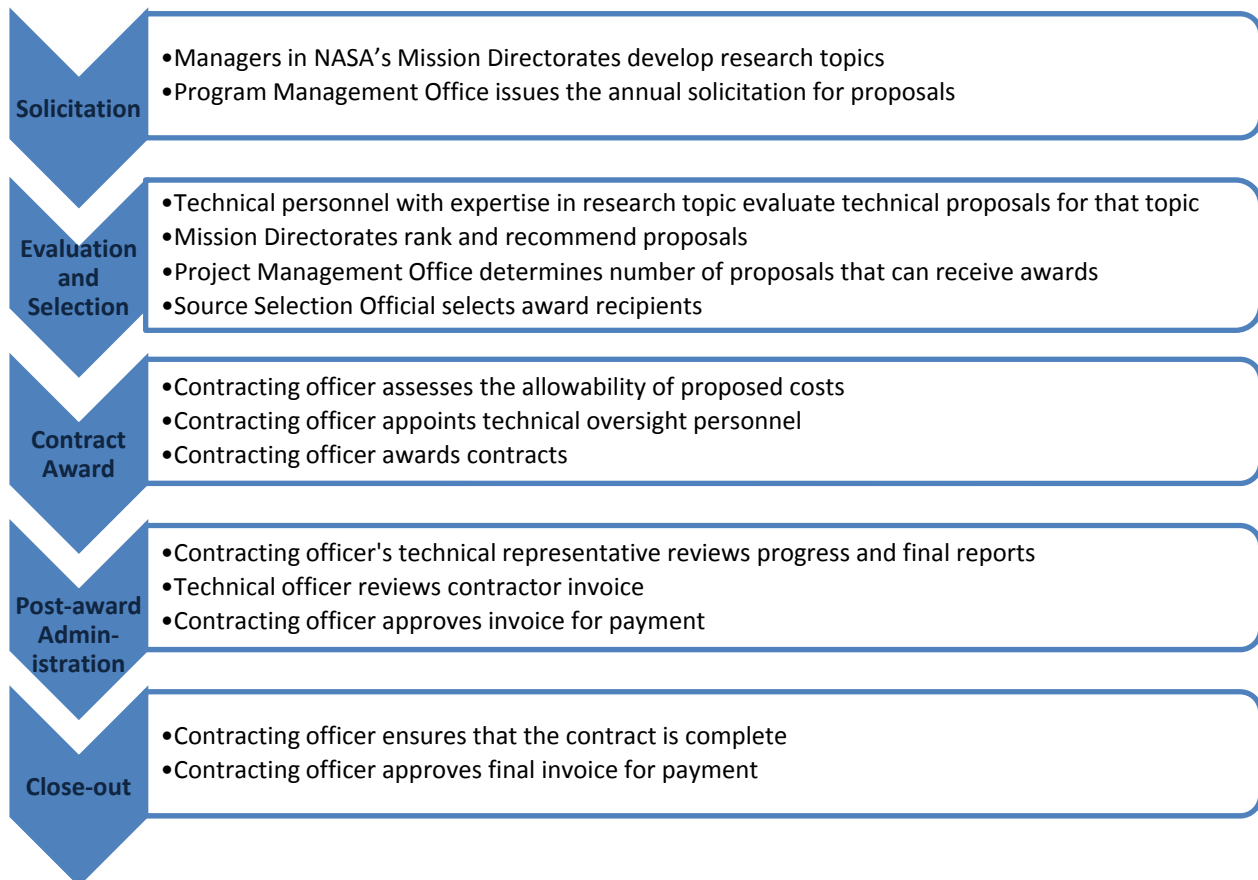
According to NASA’s 2008 SBIR Solicitation, the Agency’s objective for its SBIR Program is to take the technological innovations developed by the program and infuse them into various Mission Directorates’ programs and projects. NASA’s SBIR Program is managed by the Innovative Partnerships Program Office (SBIR Program Office) at NASA Headquarters and the Program Management Office at Ames Research Center (Ames Program Management Office).⁷ The SBIR Program Office and the Program Executive provide overall policy direction and make the final selection of award recipients. The Ames Program Management Office is responsible for developing annual SBIR solicitations and associated guidelines and establishing procedures to evaluate and select proposals.

At NASA, the SBIR process is divided into five stages: solicitation, evaluation and selection; contract award, post-award administration, and close-out. The solicitation stage involves issuing an annual SBIR request for research proposals. The evaluation and selection stage includes ranking research proposals and selecting award recipients. The contract award stage includes reviewing proposed costs and making contract awards.

⁷ The NASA SBIR program operates in partnership with NASA’s four Mission Directorates: Aeronautics Research, Exploration Systems, Science, and Space Operations.

The post-award administration stage includes oversight of the SBIR contract during its period of performance. The contract close-out stage assesses whether all contract terms and conditions have been met. The activities performed during each of these stages are illustrated in Figure 2.

Figure 2. NASA's SBIR Process



Since 1997, the NASA OIG Office of Investigations has investigated 51 cases of alleged SBIR fraud at NASA. We conducted a risk analysis of these 51 cases to determine whether particular stages of the NASA SBIR award process were more vulnerable to fraud, waste, and abuse than others. Based on this analysis, we limited the scope of this audit to three stages of the process: evaluation and selection, contract award, and post-award administration.

OIG Oversight of the SBIR Program. As noted above, since 1997 the OIG has investigated 51 allegations of potential fraud, waste, or abuse in NASA's SBIR Program. Eight of these allegations resulted in criminal convictions, civil judgments, or administrative corrective action and five additional cases were under investigation as of September 2010.

In April 2004, the OIG issued a Management Alert Memorandum to NASA's Associate Administrator for the Office of Procurement containing a series of recommendations to

improve the SBIR Program, including that SBIR contractors be required to recertify compliance with program eligibility criteria before receiving final payment and that contracting officer technical representatives receive training regarding post-award administration of SBIR contracts. In response to our recommendations, NASA required SBIR contractors to recertify compliance with requirements of the SBIR Program Policy Directive before receiving final payment. In addition, the Ames Program Management Office collaborated with the Office of Procurement to include post-award administration of SBIR contracts in training for contracting officer's technical representatives.

In August 2009, NASA's Acting Inspector General testified before the Senate Committee on Commerce, Science, and Transportation regarding NASA's SBIR Program.⁸ Following this testimony, the OIG issued a memorandum recommending that NASA consider whether the SBIR Program represents a weakness in internal controls that warrants monitoring as part of the Agency's implementation of Office of Management and Budget (OMB) Circular A-123.⁹ The Agency concurred with the OIG recommendation. In October 2009, March 2010, and October 2010, the SBIR Program Office briefed the Agency on internal controls within the SBIR Program. According to Agency officials, they are monitoring the SBIR Program to determine whether internal controls within the Program represent a weakness that warrants corrective action.

SBIR Program's Contribution to NASA's Mission

This OIG review examined NASA's management of its SBIR program and did not assess the value of the research produced under its SBIR contracts. However, in order to provide context for our findings, we reviewed assessments by the National Research Council (NRC) and the OMB regarding the effectiveness of NASA's SBIR Program. In addition, we asked Mission Directorates for their assessments of whether SBIR contracts had contributed to NASA programs and projects.

NRC. Congress directed the NRC to evaluate the quality of SBIR research and evaluate the SBIR Program's value to the Agency's mission. In 2009, the NRC issued "An Assessment of the Small Business Innovation Research Program at the National Aeronautics and Space Administration." The NRC reported that the "NASA SBIR program is making significant progress in achieving the congressional goals for the program." Additionally, the NRC reported that:

⁸ NASA OIG, "Hearing of the Senate Committee on Commerce, Science, and Transportation on the National Aeronautics and Space Administration's Small Business Innovation Research (SBIR) Program." Statement by Thomas J. Howard, Acting Inspector General, August 6, 2009. Available at http://commerce.senate.gov/public/?a=Files.Serve&File_id=b9d8b888-8bb8-4d0a-8d79-d55ad95a4978 (last accessed January 5, 2011).

⁹ NASA OIG, "NASA's Small Business Innovation Research (SBIR) Program" (Report No. IG-09-023, August 13, 2009). Available at <http://oig.nasa.gov/audits/reports/FY09/IG-09-023.pdf> (last accessed January 5, 2011).

- The NASA SBIR Program helps its award recipients achieve significant levels of commercialization. For example, the NRC surveyed Phase 2 SBIR contractors and found that nearly half of NASA Phase 2 projects reached the marketplace.
- The NASA SBIR Program stimulates collaboration and technological innovation and generates new knowledge. For example, about 25 percent of the NRC Phase 2 survey respondents reported filing at least one related patent, and about 20 percent reported having received at least one patent.
- NASA’s technology transfer program has shifted since 2006 from a focus on commercialization (“spin-out”) to a focus on supplying mission needs (“spin-in” or “infusion”).
- NASA needs to improve tracking of Phase 3 awards to better evaluate the Program’s success.

OMB. In 2008, OMB rated NASA’s SBIR Program as “moderately effective.”¹⁰ OMB concluded that the Program is promoting technology flow into and out of NASA and is focusing SBIR awards on projects expected to provide the greatest possible technological benefit to the Agency.

NASA Mission Directorates. According to Program liaisons from NASA’s four Mission Directorates that participate in the SBIR Program, Directorate personnel were satisfied with the final products received under the Program. The liaisons also stated that the SBIR Program had enhanced the scope and progress of the projects within their Directorates and had assisted programs with meeting their overall goals. Mission Directorates provided the following examples of SBIR contracts that successfully contributed to NASA programs and projects:

- Aeronautics Research Mission Directorate. An SBIR contractor developed technology leading to the design of a “real-time” monitoring system for control of dynamic aero-loads of aircraft structures.
- Exploration Systems Mission Directorate. An SBIR contractor provided NASA with expert engineering analysis and evaluation of aerospace vehicles and systems design.
- Science Mission Directorate. An SBIR contractor developed more reliable, powerful, and agile electrical sources that will allow scientists to study the chemistry and dynamics of the Earth’s atmosphere, molecular clouds in star-forming regions of the universe, and the atmospheres of other planets.

¹⁰ OMB documented NASA’s rating using its Program Assessment Rating Tool. OMB uses the tool to evaluate a program’s purpose, design, planning, management, and results, and to assess a program’s overall effectiveness.

- Space Operations Mission Directorate. An SBIR contractor developed and commercialized a processor that enables high-resolution imaging of launch gantries from a distance.¹¹

Objectives

Our overall objective was to determine whether NASA effectively managed its SBIR Program. To accomplish this objective, we examined whether NASA had:

- established internal controls to ensure that evaluations of technical proposals are merit-based and objective;
- established adequate criteria and procedures for selecting SBIR awards based on best value;
- performed adequate due diligence to identify unallowable and unsupported costs by SBIR recipients; and
- established internal controls to prevent and detect fraud and abuse in the SBIR Program.

¹¹ A launch gantry is a movable structure with platforms at different levels used for erecting and servicing rockets before launching.

SBIR PROGRAM OFFICIALS APPROPRIATELY MANAGED EVALUATIONS AND SELECTIONS OF TECHNICAL PROPOSALS

We found that NASA followed detailed criteria for selecting SBIR award recipients and its decision-making process appeared objective and merit-based.

Program Officials Established Policy to Select Proposals that Stimulate Innovation

As required by the Small Business Innovation Development Act of 1982, NASA established an SBIR policy that considers, among other criteria, whether proposals for Phase 1 and Phase 2 awards will stimulate innovation. To identify proposals that are both innovative and viable, the policy uses four scoring factors: (1) scientific and technical merit and feasibility; (2) experience, qualifications, and facilities; (3) effectiveness of the proposed work plan; and (4) commercial potential and feasibility.¹² Evaluators calculate a technical merit score for each proposal by assigning numerical values to the first three scoring factors (scoring factor 1, 50 percent; scoring factor 2, 25 percent; and scoring factor 3, 25 percent) and a subjective rating (excellent, very good, average, below average, and poor) to factor 4.

NASA's policy includes procedures to ensure that evaluations of proposals are objective, assigning two evaluators with technical knowledge in the topic area to evaluate each proposal. The evaluators document their findings on standardized forms that the SBIR Program electronically maintains in the Electronic Handbook.¹³ If there is a 15-point or greater difference in the initial evaluators' scores, a third evaluator is assigned to review the proposal. Managers review and average the evaluator's ratings and assign a final score to the proposal.

In addition to the evaluation process described above, proposals are also reviewed by Mission Directorate personnel who rate the proposal based on innovation and potential benefit to their specific Directorate and to NASA. Recommendations from the Mission Directorates are considered along with the overall score from the evaluators by the Source Selection Official, who makes the final selection decision. For 2008 awards, the

¹² Officials included criteria for evaluating Phase 1 proposals in the 2008 Phase 1 "Proposal Evaluation Guidelines," September 2008. Criteria for evaluating Phase 2 proposals were included in the 2007 Phase 2 "Proposal Evaluation Guidelines," July 2008.

¹³ The Electronic Handbook is the primary data collection, processing, and reporting tool for the SBIR program and is used to develop the topic and subtopic descriptions and for evaluating and ranking the proposal.

Source Selection Official considered only proposals that had an overall score of 85 or higher and had been recommended by a Mission Directorate.

For program year 2008, NASA received 1,662 SBIR proposals and selected 493 for award, with a total value of \$120.4 million. We randomly selected nine Phase 1 and eight Phase 2 proposals for review to determine whether NASA evaluators followed the procedures outlined in NASA policy. We found that evaluators in almost all of the cases followed the procedures outlined in the policy. For example, evaluators assessed each of the four scoring factors and documented scoring factors and scores on the standardized technical evaluation forms. In addition, we found that managers assigned a third evaluator when there was at least a 15-point difference in the scores assigned by the initial evaluators.

NASA NEEDS BETTER CONTROLS TO PREVENT UNALLOWABLE AND UNSUPPORTABLE COSTS

NASA awarded SBIR contracts in 2008 that contained an estimated \$2.7 million in unallowable and unsupported costs such as travel and equipment. We found that this occurred primarily because NASA contracting officers and technical evaluators did not perform adequate due diligence when reviewing costs proposed by SBIR awardees.

Federal Acquisition Regulation (FAR) and NASA Requirements for the Allowability of Costs

FAR 31.201-2, "Determining allowability," provides that a cost is allowable only when it is reasonable, allocable, and complies with the terms of the contract. A cost is reasonable if it does not exceed the amount that a prudent person would pay under similar circumstances in the conduct of competitive business. A cost is allocable to an SBIR award if the cost provided benefits or bears an equitable relationship to the award. A cost complies with the terms of the contract if it is consistent with the requirements and express prohibitions established in the contract.

FAR 1.602, "Contracting officers," provides that "no contract shall be entered into unless the contracting officer ensures that all requirements of law, executive orders, regulations, and all other applicable procedures . . . have been met." To ensure compliance with acquisition regulations, contracting officers must review proposed costs for allowability.

The 2008 NASA SBIR Solicitation established the Agency's policy regarding the allowability of individual cost elements proposed in SBIR program year 2008. Solicitation sections 3.2, "Phase 1 Proposal Requirements," and 3.3, "Phase 2 Proposal Requirements," established specific prohibitions on travel and equipment costs.

NASA Awarded Contracts with Unallowable and Unsupported Costs

Approximately one quarter of the SBIR contracts NASA awarded in 2008 contained unallowable and unsupported costs. We reviewed a random sample of 67 SBIR contracts and found that 17 (25 percent) included unallowable or unsupported costs. Specifically, based on our review of the sampled contracts, the Agency awarded:

- unallowable travel costs;
- unallowable equipment costs;
- unallocable costs; and
- unsupported costs.

Projecting these findings from the 67 sampled awards onto the universe of the Agency’s 493 SBIR program awards, we estimate that NASA awarded contracts with \$2.7 million in unallowable and unsupported costs in 2008. Because the indirect costs and profit associated with each contract are calculated based on direct costs, the inclusion of unallowable direct costs caused indirect costs and profits to be overstated for many of these awards. Accordingly, our calculation accounts for these overstated indirect costs and profits as well.

Unallowable Travel Costs. NASA awarded contracts with unallowable travel costs totaling \$9,255 on 4 of the 36 (11.1 percent) Phase 1 awards we reviewed. Those costs were unallowable under NASA policy because the 2008 SBIR solicitation established the following prohibition on Phase 1 travel costs:

The NASA SBIR/STTR [Small Business Technology Transfer] program does not require or expect to incur travel expenses during the performance of a Phase 1 contract. For this reason, **travel expenses should not be included in the proposed budget for a Phase 1 proposal** [emphasis added]. If the Technical Monitor and Contracting Officer determine that travel is necessary, the budget can be altered during contract negotiations to allow for this.

Two examples of unallowable travel costs in our sample are as follows:

- A Phase 1 award included unallowable travel costs of \$585 as a line item within the “Other Direct Costs” section of the budget summary as well as travel costs of \$3,000 as part of a \$33,000 subcontract. During the budget review for this award, one of the two technical evaluators noted that “[t]ravel expenses are included in the company budget and in the subcontract budget, which is not allowed by SBIR policy.” However, the contract file contained no evidence that the contracting officer considered the technical evaluator’s comment or corresponded with the Technical Monitor to determine whether travel was necessary before awarding the total proposed travel costs of \$3,585.

\$3,585 unallowable travel costs + \$1,524 applicable indirect costs and profit
= \$5,109 total questioned costs

- A Phase 1 award included unallowable travel costs of \$1,496 as part of a \$30,000 subcontract. During the budget review for this award, neither of the technical evaluators commented in their technical evaluation forms about whether the subcontractor’s travel costs were necessary to accomplish the technical objectives of the award. In addition, the contract file contained no evidence that the contracting officer corresponded with the Technical Monitor to determine whether the subcontractor’s proposed travel was necessary.

\$1,496 unallowable travel costs + \$150 applicable indirect costs and profit
= \$1,646 total questioned costs

Management’s Comments and OIG Evaluation of Those Comments. In written comments to the draft of this report, the Chief Technologist asserted that all of the travel

costs we questioned were justified as exceptions to the general rule prohibiting Phase 1 travel because the technical evaluators had concluded that the proposed travel costs were appropriate in these particular instances. As evidence that the technical evaluators had reached this conclusion, the Chief Technologist pointed to the evaluators' affirmative responses to the question in the technical evaluation forms of whether "individual elements of the proposed budget appear to be appropriate?"

We disagree with the conclusion that the technical evaluators considered and approved travel costs in each of these cases based solely on an affirmative response to this general question. Under the applicable rules, travel costs were prohibited unless the technical monitor and the contracting officer determined they were necessary for a particular SBIR award. Yet, with one exception where the technical evaluator specifically objected to proposed travel costs as unallowable but the contracting officer nevertheless awarded them, there was no evidence in the files we reviewed that the evaluators actually reviewed proposed travel costs and made an affirmative determination that they were necessary. Moreover, without such evidence we cannot conclude that the contracting officer reviewed and made a determination regarding the necessity of these costs.

Unallowable Equipment Costs. NASA awarded contracts with unallowable equipment costs totaling \$234,354 on 6 of the 67 awards (8.9 percent) we reviewed. These costs were unallowable under NASA policy because the 2008 SBIR solicitation established the following prohibition on equipment costs:

NASA will not fund the purchase of equipment, instrumentation, or facilities under SBIR/STTR contracts as a direct cost

Examples of unallowable equipment costs in our sample included the following:

- A Phase 1 award included unallowable "Equipment installation" costs of \$12,986 as a line item under Other Direct Costs. During the budget review for this award, a technical evaluator commented that, "Offeror currently lacks the equipment to produce micro-sized particles However, this equipment will be identified and procured under this contract." Despite the technical evaluator's comment, the contractor's proposal did not request funds to acquire equipment or identify the equipment that was to be installed. Moreover, generally accepted accounting principles prescribe that installation costs be capitalized as part of the total cost of an equipment item. Therefore, the installation costs should have been treated as equipment and disallowed as a direct charge.

\$12,986 unallowable installation costs + \$0 applicable indirect costs and profit¹⁴
= \$12,986 total questioned costs

- A Phase 2 award included unallowable equipment costs of \$43,000 as a line item under Other Direct Costs. During the budget review, none of the three technical evaluators commented on the proposed equipment costs and the contract file

¹⁴The contractor did not include indirect costs associated with the questioned equipment installation costs and similarly did not include a profit percentage in their SBIR Phase 1 proposal.

contained no information identifying the equipment that was to be acquired. Regardless of whether the equipment was properly identified and supported, the contracting officer should not have allowed it as a direct charge.

\$43,000 unallowable equipment costs + \$13,618 applicable indirect costs and profit
= \$56,618 total questioned costs

Management’s Comments and OIG Evaluation of Those Comments. In written comments to the draft of this report, the Chief Technologist asserted that all of the questioned equipment costs were allowable because (1) “[T]echnical evaluators did not object to proposed equipment costs as unnecessary or inappropriate” and (2) “the authority to allow equipment purchases . . . was within the discretion of the Contracting Officer.” However, we believe NASA’s policy for 2008 SBIR awards unambiguously prohibited all equipment purchases as direct costs. In addition, the Chief Technologist acknowledged that the NASA 2008 Solicitation may not have accurately reflected the Agency’s intent regarding the allowability of equipment costs.

The Chief Technologist also stated that the \$12,986 equipment installation cost identified above was deleted by the contractor in a January 15, 2009, revised proposal and therefore was not included in the final award. We disagree. The contract file we obtained from NASA does not include this revised proposal. Moreover, the file includes a “Price Memorandum” containing the stamped signature of the contracting officer that identifies the \$12,986 equipment installation charge. This memorandum is the contractor officer’s support for the amount awarded in the contract signed on January 22, 2009. In addition, the Chief Technologist asserted that, in another contract in which we questioned costs, computer service charges totaling \$1,096 should not be considered an equipment purchase. However, the contractor’s cost proposal described these charges as including “the support and acquisition of our corporate computer equipment and software . . .”

Unallocable Costs. NASA awarded \$167,014 in unallocable direct costs on 7 of the 67 awards (10.4 percent) we reviewed. FAR 31.201-4, “Determining Allocability,” states that a cost is allocable if it is assignable or chargeable to one or more cost objectives on the basis of relative benefits received or other equitable relationship. Accordingly, allocable SBIR costs are those that are incurred solely to advance the work for which the SBIR contract is awarded. In contrast, costs that benefit work performed both on a NASA SBIR contract and other Government contracts should be included in an indirect cost pool and allocated to all benefiting contracts through an indirect cost rate. Examples of costs typically included in an indirect cost pool are corporate officers’ salaries, administrative wages, recruiting and hiring, public relations, professional development, office supplies, rent, utilities, taxes, and depreciation.

Examples of unallocable costs in our sample included the following:

- A Phase 1 award included unallocable Other Direct Costs of \$9,370. The direct costs included rent and utilities, Internet access, cell phones, accounting and tax services, public relations, office supplies, and licenses. These costs should have

been included in the contractor's indirect cost pool and recovered through an indirect cost rate.

$$\begin{aligned} & \$9,370 \text{ unallocable costs} + \$960 \text{ applicable indirect costs and profit} \\ & = \$10,330 \text{ total questioned costs} \end{aligned}$$

- A Phase 2 award included unallocable overhead costs of \$89,032. The unallocable costs resulted from the contractor misclassifying subcontracted labor costs of \$296,774 as direct labor and then applying the prime contractor's overhead rate to all direct labor. In effect, the prime contractor's overhead rate was applied to subcontracted labor.

$$\begin{aligned} & \$89,032 \text{ unallocable costs} + \$891 \text{ applicable indirect costs and profit} \\ & = \$89,923 \text{ total questioned costs} \end{aligned}$$

Management's Comments and OIG Evaluation of Those Comments. In written comments to the draft of this report, the Chief Technologist disagreed that unallocable costs necessarily result in overstated total costs. He stated that the only way to definitely determine whether total costs are overstated is to request that the Defense Contract Audit Agency perform field pricing audits. He further stated that it is impractical for contracting officers to request these types of audits during the normal business cycle of reviewing and awarding SBIRs.

We disagree that field pricing audits are needed to identify contractors' inappropriate accounting practices. Rather, we believe NASA contracting officers should exercise a higher degree of professional skepticism when reviewing proposed costs. When contracting officers identify direct costs that are typically included in indirect cost pools, they should notify the offerors that the costs are unallowable as direct charges unless the offeror can provide adequate documentation to justify an alternative accounting treatment.

Unsupported Costs. The FAR and the 2008 SBIR Solicitation provide that contracting officers should not enter into contracts if proposed costs are inadequately supported. Specifically, the 2008 SBIR solicitation required that proposals include budget information "to explain the offeror's plans for use of the requested funds to enable NASA to determine whether the proposed budget is fair and reasonable." However, we found that NASA awarded unsupported costs totaling \$117,932 on 2 of the 67 awards (3 percent) we reviewed.

- The budget proposal for a Phase 2 award included \$85,000 for "Special Testing" as a line item under Other Direct Costs and provided a cost breakdown to support the line item. However, the contractor's cost breakdown totaled only \$62,000 and left the remaining \$23,000 undefined and unsupported. NASA contracting personnel corresponded with the contractor to inquire about the unsupported costs. The contractor explained that the funds were intended for "solar wind exposure" testing, but it was uncertain whether the testing would be needed. Further, the contractor described a high level of uncertainty about where testing

would be performed. The contractor then offered to eliminate the costs from their proposal. Despite these uncertainties, the contracting officer awarded the proposed costs in-full.

\$23,000 unsupported costs + \$19,182 applicable indirect costs and profit
= \$42,182 total questioned costs

- The budget proposal for a Phase 2 award included \$75,000 of materials as a line item under Other Direct Costs. The contractor’s explanatory footnote stated, “Other Direct Cost will predominantly represent materials such as polymers, electronic [sic], sensors, electrodes, chemicals, fabrication costs, and lab supplies.” We concluded that this explanatory footnote did not provide sufficient information to allow NASA to determine that the budgeted amount, which equaled 12.6 percent of the total award, was fair and reasonable.

\$75,000 unsupported costs + \$750 applicable indirect costs and profit
= \$75,750 total questioned costs

Management’s Comments. In written comments to the draft of this report, the Chief Technologist disagreed that \$42,181 for “Special Testing” in the Phase 2 award described above was unsupported. We stand by our finding as previously described. In the other Phase 2 award described above, NASA management agreed that the \$75,000 for materials “should have been more adequately supported by the contractor.”

Contracting Officers Did Not Adequately Review Proposed Costs

NASA awarded contracts with unallowable and unsupported costs because contracting officers and technical evaluators did not consistently exercise adequate due diligence when reviewing proposed costs. Due diligence refers to the care that a reasonable person should take before entering into a contract on behalf of the Government. Adequate due diligence requires contracting officers to obtain and evaluate a sufficient amount of appropriate evidence to provide a reasonable basis for assessing the allowability of costs and to take appropriate action when they identify unallowable and/or unsupported costs. Similarly, adequate due diligence requires technical evaluators to review proposed costs and make a preliminary assessment of allowability and to properly document their review and make appropriate comments for consideration by the contracting officer.

Contracting Officers’ Inadequate Due Diligence. Contracting officers did not consistently exercise adequate due diligence in that they did not consistently:

- give adequate consideration to technical evaluators’ comments about proposed costs;
- correspond with technical monitors to determine whether Phase 1 travel costs were necessary;

- notify offerors that equipment costs and unallocable costs were unallowable as direct charges; or
- correspond with offerors to request additional information about unsupported costs.

Technical Evaluators' Inadequate Due Diligence. Technical evaluators did not consistently exercise adequate due diligence in that they did not always make appropriate comments in the technical evaluation forms about unallowable and/or unsupported costs. In addition, when evaluators noted unallowable or unsupported costs, they sometimes incorrectly answered "Yes" in the technical evaluation forms to the question of whether "individual elements of the proposed budget appear to be appropriate?"

Technical evaluators should be able to complete the evaluation forms properly and understand basic cost principles regarding allowability and any prohibitions on specific cost categories.

Conclusion

We projected the results of our review of 67 sampled SBIR awards onto the universe of 493 program year 2008 awards. We estimate that NASA awarded contracts with \$2.7 million in unallowable and unsupported costs in 2008. More specifically, we estimate that NASA awarded contracts with:

- unallowable travel costs of \$89,979;
- unallowable equipment costs of \$1,159,140;
- unallocable costs of \$870,852; and
- unsupported costs of \$544,007.

Based on these findings, we believe the Agency should improve its cost review procedures by:

- ensuring that during the selection and evaluation stage technical evaluators adequately review proposed costs, perform a preliminary assessment of allowability, and make appropriate comments in the technical evaluation forms about any unallowable and/or unsupported costs, and
- ensuring that in the contract award stage contracting officers give due consideration to technical evaluators' comments about proposed costs and take appropriate action when they identify unallowable and/or unsupported costs.

We estimated that NASA could put \$13.3 million in SBIR funds to better use during program years 2010 through 2014 if it takes steps to ensure that unallowable and

unsupported costs are excluded from SBIR awards. We calculated this figure by projecting the results of our program year 2008 sample to future years.¹⁵

Details about questioned costs in our sample are in Appendix B. Details about our sampling methodology and projection of results are in Appendix C.

Recommendations, Management's Response, and OIG Evaluation of Management's Response

Recommendation 1. The Chief Technologist, in consultation with the Assistant Administrator for Procurement, should provide technical evaluators with training to ensure that they know how to perform a preliminary assessment of cost allowability and properly complete technical evaluation forms.

Management's Response. The Chief Technologist concurred with the recommendation, stating that technical evaluators play a crucial role in assessing the technical capability of firms seeking SBIR awards. However, he considers the budget review performed by technical reviewers to be "a very preliminary assessment of the budget." Nevertheless, he agreed to improve the quality of the budget review process by developing a training module for technical evaluators and implementing it by July 30, 2011.

Evaluation of Management's Response. The proposed action is responsive to our recommendation. Accordingly, the recommendation is resolved and will be closed upon completion and verification of the proposed corrective action.

Recommendation 2. The Chief Technologist, in consultation with the Assistant Administrator for Procurement, should improve cost review procedures in the selection and evaluation stage to ensure that technical evaluators properly review proposed costs, perform a preliminary assessment of allowability, and make appropriate comments in evaluation forms about any unallowable and/or unsupported costs.

Management's Response. The Chief Technologist concurred with the recommendation, stating that the Agency can improve its SBIR budget review process by providing technical evaluators with cost review training and by modifying the technical evaluation form to better identify specific elements of cost. The training program will be developed and implemented by July 30, 2011.

Evaluation of Management's Response. The proposed action is responsive to our recommendation. Accordingly, the recommendation is resolved and will be closed upon completion and verification of the proposed corrective action.

Recommendation 3. The Assistant Administrator for Procurement should improve cost review procedures in the contract award stage to ensure that contracting officers document that they have given due consideration to technical evaluators' comments about proposed

¹⁵ Our calculation assumed that SBIR funding levels would remain constant over the 5-year period of our projection.

costs and have taken appropriate action when unallowable and/or unsupported costs are identified.

Management's Response. The Chief Technologist disagreed with our finding that contracting officers did not consistently exercise adequate due diligence when reviewing proposed costs. Nevertheless, he agreed to review and revise existing price negotiation memorandum templates, checklists, and associated file documentation for SBIRs by February 28, 2011, to ensure that negotiated costs are adequately analyzed, supported, dispositioned, and documented. In addition, NASA agreed to provide contracting personnel with additional training on the analysis of direct and indirect costs.

Evaluation of Management's Response. The proposed action is responsive to our recommendation. Accordingly, the recommendation is resolved and will be closed upon completion and verification of the proposed corrective action.

NASA NEEDS TO CONSIDER PAST PERFORMANCE WHEN CONSIDERING SBIR PROPOSALS

FAR requires agencies to use past performance information in competitive awards of more than \$100,000 to ensure the selected proposal represents the best value to the Government.¹⁶ According to the Office of Federal Procurement Policy, “the use of past performance as a major evaluation factor in the contract award process is instrumental in making best value selection.” However, we found that SBIR Program management had not developed policies to collect or consider past performance information in Phase 2 contract selections and, as a result, past performance information was not used in evaluating any of the 31 Phase 2 contracts we randomly sampled even though all of these awards exceeded the \$100,000 threshold.

FAR Requires that Performance Information Be Used to Help Identify Best Value for the Government

FAR 2.1, “Definitions,” defines best value as the acquisition that is expected to provide the greatest overall benefit to the Government. All Federal acquisitions must be selected based on best value. The FAR explains that technical and past performance considerations may play a dominant role in award selections when requirements are less defined, more development work is needed, or performance risk is greater, such as with Phase 2 SBIR awards.

FAR Subpart 15.3, “Source Selection,” requires agencies to use past performance information as an evaluation factor in selecting negotiated competitive awards of more than \$100,000, along with price, management capability, and technical excellence. FAR defines past performance information as the contractor’s (1) record of meeting contract requirements and standards of good workmanship, (2) record of forecasting and controlling costs, (3) conformance to contract schedules, and (4) history of customer satisfaction. In “Best Practices for Collecting and Using Current & Past Performance Information,” the Office of Federal Procurement Policy states that the use of past performance as a major evaluation factor in the contract award process is instrumental in making best value selections. The guidance stated that “. . . assessing past performance information enables agencies to better predict the quality of, and customer satisfaction with future work” and to achieve their program mission.

¹⁶ Phase 1 contracts are valued at a maximum value of \$100,000. Therefore, NASA is not required to use past performance information in evaluating Phase 1 SBIR proposals.

NASA Infrequently Considered Past Performance in Evaluating Phase 2 Proposals

During our review of 31 Phase 2 awards, we found that 84 percent of Phase 2 proposal evaluations did not include past performance information. For example, only 5 (16 percent) of the 31 Phase 2 awards we sampled contained past performance assessments and 1 of the 5 contained an unsatisfactory assessment but still received an SBIR award. Past performance information was not part of the scoring factors or the scoring methodology for the SBIR program's evaluation of Phase 2 technical proposals.¹⁷

The Program's Source Selection Official and the SBIR Program Manager stated that current proposal evaluation procedures meet FAR requirements because evaluation factor 1 considers past performance information from prior NASA SBIR awards. Proposal evaluation factor 1 states:

The proposed R/R&D [research/research and development] effort will be evaluated on its innovativeness, originality, and potential technical value, including the degree to which Phase 1 objectives were met, the feasibility of the innovation, and whether the Phase 1 results indicate a Phase 2 project is appropriate.

In our opinion, factor 1 does not fully meet the requirements of FAR. Although factor 1 identifies the technical requirements for prior Phase 1 contracts, it does not consider information about contractors' past performance as required by FAR Subpart 42.15. Specifically, factor 1 does not provide information about a contractors' record of good workmanship, record of forecasting and controlling costs, conformance to contract schedules, and history of customer satisfaction on all prior contracts beyond SBIR.

Deficient Controls Prevented Program from Using Past Performance in Award Selections

The NASA SBIR Program lacks evaluation and selection policies for collecting past performance information on firms that compete for Phase 2 awards and for using the information in Phase 2 award selections. For example, the Program does not give adequate consideration to information about contractors' past performance as required by FAR. Specifically, the SBIR Program failed to include the following policies required by FAR 15.3:

- Require the annual solicitation to outline the performance assessment methodology or to describe procedures for firms to provide past performance information.
- Incorporate past performance information in scoring factors and the final scores for Phase 2 proposals.

¹⁷ Proposals are scored using a quantitative and qualitative scoring methodology. The methodology uses four evaluation factors: (1) scientific/technical merit and feasibility; (2) experience, qualifications, and facilities; (3) effectiveness of the proposed work plan; and (4) commercial potential and feasibility.

- Require technical officers to assess past performance on Phase 2 awards or document the past performance assessment score.

Without considering past performance, the SBIR Program cannot provide assurance that Phase 2 SBIR contract selections were in the best interest of the Government. Failing to consider past performance information increases the risk that NASA will select poorly performing firms. To reduce that risk, the FAR requires that agencies use past performance information in selecting negotiated competitive awards.

Recommendations, Management’s Response, and OIG Evaluation of Management’s Response

Recommendation 4. The Chief Technologist should require consideration of a contractor’s past performance before awarding an SBIR contract, in compliance with the FAR. These policies and procedures should:

- a. require that the annual solicitation for SBIR proposals outline the performance assessment methodology;
- b. designate responsibility for collecting past performance information;
- c. include past performance information in the scoring methodology and scores for Phase 2 proposals; and
- d. require technical officers to assess a firm’s past performance on Phase 2 awards and to document the assessment.

Management’s Response. The Chief Technologist concurred with recommendations 4 a, b, and, d and partially concurred with recommendation 4c. Additional comments on the recommendation’s subparts follows:

- 4a. The Chief Technologist stated that past performance is an important factor in NASA’s selection process and that NASA modified its selection criteria in the 2010 SBIR solicitation to provide that “Each proposal selected for negotiation will be evaluated for cost/price reasonableness, past performance and award will be made to those contractors determined to be responsible. The past performance evaluation will consider the contractor’s past performance under the Phase 1 effort.”

Regarding corrective action, the Chief Technologist stated that the Program will review language based upon audit recommendations and additional revisions will be incorporated in the 2011 solicitation.

- 4b. The Chief Technologist stated that contracting officers are responsible for collecting past performance information and that they collect past performance information from the NASA Acquisition Internet Service and place a copy of the results in the file.

Regarding corrective action, the Chief Technologist stated that the action was complete.

- 4c. The Chief Technologist stated that prior to selection for negotiation, technical evaluators review and evaluate performance of the firm during the Phase I performance period as part of the Phase II evaluation, which NASA considers a valuable indicator of the potential Phase II performance. After firms are reviewed and selected for negotiation, contracting officers query the NASA Acquisition Internet Service database to review past performance history.

Regarding corrective action, the Chief Technologist stated that management plans to initiate the collection of past performance information on both Phase I and Phase II contracts and make past performance information available to reviewers during the review process. In addition, management will evaluate the feasibility of conducting the preliminary review of the Past Performance Database, Excluded Parties List System, and Central Contractor Registration before making a formal notice of selection for negotiation to the public, rather than during the negotiation process as is current practice. Management expects to complete the proposed actions by July 2011.

- 4d. The Chief Technologist stated that the collection of past performance information is an important element of contract administration, and that NASA requires contracting officer technical representatives to perform a past performance assessment at the completion of the SBIR contract. This evaluation is done through the NASA Past Performance Database system.

Regarding corrective action, the Chief Technologist stated that beginning with 2008 Phase 1 contracts, contracting officer technical representatives have been required to file past performance evaluation forms for Phase 1 and Phase 2 contracts.

In subsequent discussions, Program officials stated that management partially concurred on recommendation 4.c because of difficulties making past performance information available for use in the final selection of SBIR awards. Officials explained that to implement recommendation 4.c fully, the Program Office and Office of Procurement are working out security and access issues related to the Past Performance Database maintained by the Office of Procurement. Officials stated that the Program Office and Office of Procurement have tentatively decided to make information from the Past Performance Database available to the Source Selection Official who will review information in the database and determine whether the Agency will consider a contractor with negative past performance information for an SBIR contract.

Evaluation of Management's Response. Management's planned actions are responsive to our recommendation. We consider the recommendation resolved and will close it upon completion and verification of management's corrective action.

NASA NEEDS TO IMPROVE ITS ABILITY TO PREVENT AND DETECT FRAUD IN THE SBIR PROGRAM

SBIR Program managers are responsible for establishing controls that prevent and detect fraud and abuse. As part of this review, we identified 24 controls that could help prevent or detect fraud and abuse and found that more than half have not been implemented by NASA. For example, NASA requires contractors to certify that the proposed research was not previously funded by another agency, to provide a list of its federally funded awards, and to certify that the firm meets SBA eligibility criteria. However, NASA does not require contractors to identify personnel who worked on SBIR research, describe the role of contract personnel in their proposed research, or itemize costs on contract invoices. Consequently, NASA's SBIR Program remains vulnerable to fraud and abuse involving duplicate awards, duplicate deliverables, violations of SBA requirements, significant differences between actual and proposed costs, and misuse of SBIR funds.

Types of Fraud and Abuse Found in SBIR Programs

Fraud is a type of illegal act that involves obtaining something of value through willful misrepresentation. Abuse involves behavior that is deficient or improper when compared with behavior that a prudent person would consider a reasonable and necessary business practice given the facts and circumstances.¹⁸ We reviewed SBIR-related investigations at NASA and other agencies dating back to 1997 and identified 6 categories of fraud and abuse that are prevalent in SBIR programs Government-wide:

- 1. Firms or principal investigators received duplicate awards for the same research.** Firms or principal investigators submitted research proposals to NASA for research that had previously been funded by another agency.
- 2. Contractors submitted duplicate deliverables or questionable research products.** Contractors submitted duplicate deliverables to multiple agencies, false research data, or plagiarized deliverables.
- 3. Firms and principal investigators violated SBA eligibility criteria.** Principal investigators were not primarily employed by the contractor or did not perform a substantial portion of the research work. In addition, firms falsely certified that they (1) were American-owned; (2) had performed the research in-house; (3) met subcontracting restrictions; or (4) met requirements for being classified as a small business or woman-owned entity. Investigations also uncovered firms that provided nonexistent addresses for their place of business.

¹⁸ Government Accountability Office "Performance Audit Tool."

4. **Actual effort and costs differed materially from what was negotiated.** Firms used a different principal investigator than the investigator identified in the proposal, did not provide current or accurate labor rates in the cost proposal, or performed research that was materially inferior to the research described in the proposal. Investigations also found firms that had materially lower costs (e.g., labor or equipment) during contract performance than stated in their cost proposals.
5. **Contractors misused SBIR funds.** Firms willfully diverted, concealed, or illegally used SBIR funds. For example, firms applied cost overruns on SBIR fixed-priced contracts to a NASA cost-plus contract, diverted SBIR funds to non-contract activities, charged cost overruns on SBIR contracts to research and development or other indirect accounts, or used SBIR funds to support commercial work. In addition, investigations found firms that charged unallowable costs such as nonexistent employees to SBIR contracts or overcharged labor hours. In one investigation, the firm owner diverted SBIR funds to the owner's personal use by billing individuals not employed by the business to the SBIR contract and submitting falsified research reports to the funding agency.
6. **Technical personnel were involved in procurement integrity issues.** Technical evaluators had conflicts of interest with the proposing entity or disclosed proprietary information to an unauthorized party.

Management Is Responsible for Internal Controls

According to the Federal Managers' Financial Integrity Act (FMFIA) of 1982 and OMB Circular A-123, "Management's Responsibility for Internal Control," December 21, 2004, management is responsible for developing effective internal controls. Internal controls includes the plans, methods, and procedures that management uses to meet missions, goals, and objectives. Effective internal controls provide reasonable assurance that operations are effective, financial reports are reliable, the organization complies with laws and regulations, and the organization safeguards assets.

FMFIA and Circular A-123 require managers to meet standards established by the Government Accountability Office (GAO). Circular A-123 and GAO's "Standards for Internal Control in the Federal Government" (Standards) describe the methodology management can use for evaluation of its internal controls.¹⁹ First, management identifies specific risks that could jeopardize financial reports, assets, and compliance with laws and regulations. The identification should be comprehensive and include both external and internal risks. Second, management completes a risk analysis and control assessment. For each risk, management estimates the impact from the risk, identifies controls that prevent or manage the risk, determines whether controls are in place or missing, and decides whether additional controls are needed.

¹⁹ GAO, "Standards for Internal Control in the Federal Government" (GAO/AIMD-00-21.3.1, November 1999).

Actions by SBIR Program Office to Strengthen Internal Controls

SBIR Program officials developed a paperless web-based system, the Electronic Handbook, to document transactions for all stages of the SBIR process. The Handbook contains documentation of solicitation development and dissemination, proposal evaluations and selections, contract negotiations and awards, post-award administration, and contract close out. The Electronic Handbook also contains program points of contact, policy directives and guidelines, and SBIR Program milestones. Using the Handbook, Program officials can access and evaluate transactions by NASA and firm personnel who have a part in the SBIR process. For example, Program officials can determine whether NASA personnel who serve as proposers and evaluators followed procedures consistently and used the appropriate documentation. For example, Program officials can determine whether proposers and evaluators followed procedures consistently and used the appropriate documentation.

In addition to the Electronic Handbook, Program officials voiced strong support for internal control and established an effective organizational structure that designated specific personnel responsible for policy, program management, evaluations, selections, and contract oversight. For example, Program officials implemented procedures to accomplish 21 of 23 program management requirements from statutes, regulations, policies, and guidelines. From October 2009 to March 2010, SBIR Program Officials briefed the NASA Senior Assessment Team on the adequacy of the Program's controls and identified possible improvements. Those improvements were again presented to the Senior Assessment Team in October 2010 but are not fully implemented into NASA's processes and procedures. (See discussion later in the report.)

SBIR Process Lacks Adequate Controls to Prevent and Detect Fraud and Abuse

We analyzed SBIR fraud risks according to the methodology described in OMB's Circular A-123, GAO's Standards, and GAO's "Auditing and Investigating the Internal Control of Government Purchase Card Programs" (Purchase Card Audit Guide).²⁰ We identified specific points in NASA's SBIR process where fraud or abuse were most likely to occur, identified procedures that would help prevent or detect the fraud or abuse, and determined whether NASA had implemented the procedures.

In consultation with OIG fraud investigators, we identified 24 internal controls that we believe would assist NASA in preventing or detecting SBIR fraud and abuse. Of these 24 controls, 10 (42 percent) are already part of NASA's processes and procedures while the other 14 controls (58 percent) are not currently used by NASA. See Appendix D for descriptions of the 24 controls and their status within NASA.

²⁰ GAO, "Audit Guide: Auditing and Investigating the Internal Control of Government Purchase Card Programs" (GAO-04-87G, November 2003).

We classified 19 of the 24 controls as critical in fraud prevention and detection.²¹ For these 19 critical controls, approximately half (10) were already part of NASA's processes and procedures. For example, NASA requires firms to certify that the SBIR research proposal has not been funded by another Federal agency. However, NASA does not perform automated word searches of SBIR research proposals submitted to NASA or automated word searches of research proposals funded by other Federal agencies, which could identify duplicate funding. Both of those controls are critical to preventing duplicate awards for the same research. While the remaining 5 of the 24 controls (none of which are currently employed by NASA) would be helpful in fraud prevention and detection, their implementation is not critical.

As noted above, we identified specific controls for each of the six most common categories of fraud and abuse we identified. Table 1 shows the number of controls we identified for each category and whether those controls are in place at NASA. As shown in the table, the only risk for which NASA had adopted the full complement of controls was that of technical personnel being involved in procurement integrity issues, such as conflicts of interests with proposing entities.

Table 1. Summary of NASA's Internal Controls for Six Categories of Fraud and Abuse Found in SBIR Programs			
<u>Category of Fraud or Abuse</u>	<u>Controls</u>		
	<u>Implemented</u>	<u>Not Implemented</u>	<u>Total</u>
Firms or principal investigators received duplicate awards for the same research.	3	2	5
Contractors submitted duplicate deliverables or questionable research products.	1	1	2
Firms and principal investigators violated SBA eligibility criteria.	3	1	4
Actual effort and costs differed materially from what had been negotiated.	1	2	3
Contractors misused SBIR funds.	0	8	8
Technical personnel are involved in procurement integrity issues.	<u>2</u>	<u>0</u>	<u>2</u>
Totals	10	14	24

With the adoption of the additional controls we identified, NASA officials would be better positioned to prevent and detect fraud and abuse in the SBIR Program. For example:

- NASA OIG investigations identified multiple firms that attempted to defraud NASA and other Federal agencies by submitting duplicate research proposals or research reports from previous contracts. SBIR Program officials could detect

²¹ We defined a critical control as a control for which the related fraud has (1) a high probability of occurring, (2) a high impact to NASA should it occur, or (3) a medium to high probability of occurring, a medium to high impact to NASA, and a low implementation cost. See Appendix D for additional details.

duplicate proposals or reports by performing automated word searches of (1) SBIR research proposals submitted to NASA, which are electronically stored in the Electronic Handbook; (2) research proposals funded by a NASA grant or contract, which are electronically stored in the General Services Administration (GSA) Federal Procurement Data System database²²; and (3) research proposals funded by another Federal agency under an SBIR award, grant, or contract. GSA's database contains data on Government contracts with an estimated value of \$3,000 or more and modifications to Government contracts regardless of dollar value. The SBA TECH-Net database is a publically accessible database that contains data on SBIR and Small Business Technology Transfer awards including the firm's name and address, SBIR award phase, agency granting the award, award amount, award year, and a synopsis of award technical proposals.

- Investigations by NASA OIG identified multiple firms that, rather than perform the research in-house, subcontracted the work to other firms or individuals. Program officials could help detect this type of abuse by performing automated searches of the SBA TECH-Net database to identify principal investigators that held more than two awards for the year and use this information to assess a firm's compliance with limitations on principal investigator employment.
- Six of the 14 controls we are recommending to NASA are controls that the contracting officer or designee performs or that the contracting officer adds to the contract requirements.²³ Adoption of these controls by NASA could help prevent or detect fraud and abuse such as violations of SBA eligibility criteria, material differences between actual and negotiated costs, and misuse of SBIR funds. Two of the controls specifically target contractors that bill NASA for nonexistent employees and divert SBIR funds to personal or non-contract purposes.²⁴
- Four of the 14 controls we are recommending relate to the use of automated tools or electronic processes to identify potentially improper transactions.²⁵ These four controls involve data mining to find patterns by comparing, for example, data in a group of NASA SBIR research proposals with data in a group of non-NASA contracts. Such a comparison could assist management in detecting duplicate SBIR awards, duplicate deliverables, and violations of SBIR Program rules.

Agency Did Not Develop Information that Would Have Shown the Need for Additional Controls

In response to previous OIG audits and management referrals, NASA's Office of Internal Controls and Management Systems completed an internal control assessment of NASA's

²² See the Federal Procurement Data System – Next Generation Web site at https://www.fpds.gov/fpdsng_cms/ (accessed January 5, 2011).

²³ See controls, 12, 15, 16, 22, 23, and 26 in Appendix D.

²⁴ See controls 19, 22, and 23 on Appendix D.

²⁵ See controls 4, 5, 6, and 8 on Appendix D.

SBIR policies and procedures on December 9, 2009. The assessment stated, “. . . it appears that the [SBIR Program Office] is taking or is planning appropriate steps to address the OIG’s concerns regarding program/process controls”

A March 2010 presentation by SBIR Program management to the Senior Assessment Team²⁶ described risks from duplicate awards, duplicate deliverables, and misrepresenting the role of the principal investigator who was to perform the research. The presentation stated that the SBIR Program had “very effective internal controls currently in place; but, could apply additional internal controls at an additional cost if funding were made available.” The presentation identified improvements as possible additional internal controls with estimated annual costs of nearly \$4 million. For example:

- **Increase SBIR Program awareness.** The SBIR Program Office would increase awareness by including responsibilities for evaluators and technical officers in their annual performance plans and by issuing policy that emphasizes the importance of their roles in the SBIR Program.
- **Train personnel on fraud awareness.** The SBIR Program Office would add a fraud awareness module to technical officer training, establish a liaison with NASA’s Acquisition Integrity Program, and provide fraud awareness training to NASA personnel who are involved in the SBIR Program.
- **Enhancements to the Electronic Handbook.** Enhancements include the purchase of software that permits the SBIR Program Office to electronically compare key words and phrases in SBIR technical proposals and reports.
- **Increase administrative oversight.** The contracting officer would request Defense Contract Audit Agency (DCAA) audits for a sample of SBIR proposals. In addition, the SBIR Program Office would lead an internal and external effort to heighten fraud awareness.
- **Increase support by NASA Shared Services Center.** The Center would develop contract surveillance plans, validate contractor references, and increase the use of DCAA rate analysis for evaluating Phase 2 proposals. The SBIR Program Office would develop guidelines for virtual site visits of SBIR contractors, recertify firms quarterly, and develop improved checklists for evaluating firms and analyzing proposed costs.
- **Increase Center management activities.** Centers would be required to support program administration and ensure that technical oversight personnel follow contract surveillance plans.

²⁶ The Senior Assessment Team provides oversight for NASA’s internal control over financial reporting. The Team determines the scope of the internal control assessment, determines the assessment design and methodology, analyzes the results of internal control testing, and reports on the results of the assessment.

Generally, the controls recommended by the SBIR Program Office will strengthen the general control environment, which we believe is an important first step in reducing the Program's vulnerability to fraud and abuse. However, the Office recommended only 4 controls to prevent and detect specific SBIR fraud risks.²⁷ The presentation did not identify specific SBIR fraud risks from all categories or analyze existing and planned controls against specific SBIR fraud risks. We believe such an analysis would have underscored the need for the additional controls.

Internal control guidance recommends a methodology similar to that described in OMB's Circular A-123 and GAO's Standards. GAO's Purchase Card Audit Guide recommends that auditors identify the specific risks of fraudulent, improper, and abusive purchases, identify the related control activities, and conclude whether the control activities adequately manage the specific risks. In addition, the Practitioners Publishing Company's guide, "Internal Control and Fraud Prevention," outlines a targeted approach that recommends auditors consider their organization's vulnerability to specific fraud schemes and assess the controls that prevent and detect those specific schemes. For the 24 controls we identified, we used such an analysis to classify controls as critical or noncritical.

In addition, internal control guidance requires management to evaluate the cost and benefit of additional procedures. For the 24 controls we identified, we used estimates of outside purchases to assess implementation costs but lacked insight into all staff, contract support, and administrative costs needed to implement the controls. We believe management should implement the additional 9 controls we classified as critical. For the remaining 5 controls we identified as noncritical, as well as additional controls that the SBIR Program Office is considering, management should evaluate implementation costs and benefits to NASA and implement those controls for which benefits exceed costs.

SBIR Program Office Lacks Authority to Implement Controls

Although NASA manages the SBIR Program through SBIR Program Office, the office does not have the authority to implement controls to address all risks to the SBIR Program. Because the contracting officer is responsible for implementing controls over procurement actions, the Office of Procurement must approve any internal controls related to procurement actions. Accordingly, the Office of Procurement and SBIR Program Office would have to coordinate to ensure effective implementation of control procedures.

For example, we identified the following control to detect firms that attempt to charge the Government for nonexistent employees:

²⁷ The controls are (1) electronically compare key words and phrases in SBIR technical proposals and reports software, (2) request DCAA audits for a sample of SBIR proposal, (3) validate contractor references, and (4) increase the use of DCAA rate analysis for evaluating Phase 2 proposals.

The contracting officer should require SBIR firms to identify, by name, phone number, and e-mail address, the personnel who worked on the research project during the reporting period in progress reports.

The Office of Procurement would have to approve the above control procedure because the contracting officer would have to add the requirement to the SBIR contract. For the control procedure to operate properly, technical officers would have to review progress reports and enter the reports in the Electronic Handbook.

Neither SBA nor GSA has implemented automated controls in their databases, thus users such as NASA technical evaluators cannot perform automated searches to identify potential instances of duplicate SBIR awards, duplicate deliverables, or violations of SBIR Program requirements. All Federal agencies participating in the SBIR Program would benefit from being able to use the SBA and GSA databases for data mining.

However, the SBIR Program Office lacks authority to implement automated controls in external databases. Until SBA and GSA make automated controls available for all users of their databases, the SBIR Program Office can obtain access from SBA and GSA and apply data mining procedures to data contained in the Electronic Handbook, *Tech-Net*, and the Federal Procurement Data System.

For example, as part of our fieldwork, we obtained access to NASA's Electronic Handbook, SBA's *TECH-Net*, and GSA's Federal Procurement Data System databases and applied data mining procedures. Our data mining uncovered potential instances of duplicate SBIR awards, duplicate deliverables to multiple agencies, and violation of SBIR Program requirements. We performed two data mining tests that identified potential instances of duplicate awards and duplicate deliverables with a combined value of approximately \$28.6 million.

- The first test searched the Electronic Handbook and SBA *Tech-Net* databases for research summaries from program years 2004 to 2008 that contained the terms "lithium batteries." We grouped proposal summaries by firm. For each firm, we compared proposal summaries from the two databases and associated proposal summaries that contained the same or similar content. The test identified 31 firms that received 98 contracts worth approximately \$26.8 million for what appeared to be the same or similar research.
- The second test searched the SBA *Tech-Net* and the GSA Federal Procurement Data Systems databases for research summaries from program years 2004 to 2008 that contained the terms "nuclear fusion." We grouped proposal summaries by firm. For each firm, we compared proposal summaries from the two databases and associated proposal summaries with the same or similar content. The test identified two firms with five awards worth approximately \$1.8 million for what appeared to be the same or similar research.

Program Remains Vulnerable to Fraud and Abuse

Unless NASA adopts additional internal controls, the NASA SBIR Program will remain vulnerable to fraud and abuse such as duplicate awards, duplicate deliverables, violations of SBA requirements, significant differences between actual and proposed costs, and misuse of SBIR funds. We identified 24 internal controls that could help address the SBIR Program's vulnerabilities. However, as discussed above, NASA has implemented only 10 of these 24 controls. We believe that NASA should consider adopting the other 14 controls we identified to further reduce the level of fraud and abuse in NASA's SBIR Program.

Recommendations, Management's Response, and OIG Evaluation of Management's Response

Recommendation 5. The Chief Technologist should implement the 11 internal controls we identified as critical for preventing and detecting fraud and abuse in the SBIR Program.

Management's Response. The Chief Technologist partially concurred and agreed to implement 9 of the 11 critical controls. He stated that NASA does not plan to implement the remaining 2 controls (requiring contracting officers to search online records or business databases to verify that the firm is American-owned and requiring contracting officers to request firms break out costs on invoices and certify the costs as accurate and allocable). The Chief Technologist stated that the first of these controls duplicates procedures already in place in the Central Contractor Registration database. He stated that the procedure suggested in the second control cannot be implemented on fixed-price contracts.

Additionally, the Chief Technologist noted that 3 of the 11 controls involve other agencies and that he will initiate discussions with those agencies to develop a plan for partial implementation of the controls at NASA. The Chief Technologist expects to implement the 9 critical controls by September 30, 2011, and promised to initiate discussions with SBA by March 2011.

Evaluation of Management's Response. The proposed action is responsive to our recommendation. We agree that the first control duplicates procedures already in place and that the second control cannot be implemented on fixed-price contracts. Accordingly, the recommendation is resolved and will be closed upon completion and verification of the proposed corrective action.

Recommendation 6. The Chief Technologist should evaluate implementation costs and benefits to NASA for the remaining 7 controls we identified, and for any additional controls being considered by management, and implement those controls where benefits exceed costs.

Management's Response. The Chief Technologist partially concurred with this recommendation and agreed to evaluate 1 of the 7 noncritical controls (control 6) but

deemed the other 6 noncritical controls not feasible. The Chief Technologist stated that the evaluation of control 6 is dependent on successful implementation of a central repository of research reports and did not estimate a completion date. He deemed the other 6 controls as not feasible because the procedures either duplicate procedures already in place (controls 11 and 13) or said they cannot be implemented on fixed-price contracts (controls 20, 21, 24, and 25). In discussions held after receiving the Agency's response, management officials stated that the Chief Technologist deemed controls 20, 21, 24, and 25 as not feasible because the controls required officials to apply procedures to all SBIR contracts. Officials stated that procedures for these controls should be applied only to SBIR contracts that have been identified as at risk for fraud, waste, and abuse.

Evaluation of Management's Response. The proposed action is responsive to our recommendation. We agree that controls 11 and 13 duplicate procedures already in place and that officials could apply procedures for controls 20, 21, 24, and 25 only to SBIR contracts they have identified as at risk of fraud, waste, and abuse. Therefore, the recommendation is resolved and will be closed upon completion and verification of the proposed action.

Recommendation 7. The Chief Technologist should contact the SBA and GSA to discuss implementing automated controls in databases owned by those agencies.

Management's Response. The Chief Technologist concurred, stating that NASA will meet with the SBA and GSA to discuss implementing automated controls in their databases. Management expects to complete the proposed action by June 30, 2011.

Evaluation of Management's Response. The proposed action is responsive. The recommendation is resolved and will be closed upon completion and verification of the proposed corrective action.

APPENDIX A

Scope and Methodology

We performed this audit from September 2009 through November 2010 in accordance with generally accepted government auditing standards. 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 the objectives. We believe that the evidence obtained during this audit provides a reasonable basis for our findings and conclusions based on our objectives.

We limited the scope of our review to the evaluation and selection, contract award, and the post-award administration stages because we assessed them as most vulnerable to fraud, waste, and abuse. We did not review the solicitation and contract close-out stages.

To meet our audit objectives, we selected a statistical sample of 67 program year 2008 SBIR awards for review. The sample consisted of 36 Phase 1 awards and 31 Phase 2 awards. We did not review Phase 3 awards because the Agency does not maintain reliable records identifying Phase 3 activity. Details of the audit's sampling methodology are provided in Appendix C.

To assess whether NASA performed adequate due diligence to identify unallowable and unsupported costs, we:

- reviewed regulations governing the allowability of costs including the FAR and 2008 NASA SBIR Solicitation;
- interviewed SBIR Program officials, procurement officials, technical evaluators, contracting officer technical representatives, and contracting support personnel to identify procedures for reviewing and awarding costs; and
- reviewed procurement files for a randomly selected sample of 67 program year 2008 SBIR awards to assess whether costs were allowable and properly supported.

To assess whether management had established adequate criteria and procedures for selecting SBIR awards based on best value, we:

- reviewed FAR Part 15, "Contracting by Negotiation," and FAR Subpart 42.15, "Contractor Performance Information," July 2008, the NASA, "SBIR Proposal Evaluation Guidelines," and 2008 NASA SBIR Solicitation;

- interviewed SBIR Program officials to obtain an understanding of how past performance information is used in the evaluation and selection process; and
- analyzed procurement files for a randomly selected sample of 31 program year 2008 SBIR Phase 2 awards to determine whether management had applied controls for selecting SBIR contracts.

To assess whether internal controls were adequate to prevent and detect fraud, waste, and abuse in the SBIR Program, we:

- analyzed SBIR-related investigations to identify SBIR frauds and abuses;
- reviewed internal control statutes, regulations, policies, and guidance to determine requirements and methodologies for evaluating controls; Agency control assessments and presentations to determine the Agency's plans for additional controls; and guides on data mining to define data mining;
- identified and analyzed SBIR fraud risks to determine whether existing controls prevent and detect SBIR frauds and abuses; and
- performed beta tests of automated controls that involve data mining to identify potential instances of duplicate SBIR awards, duplicate deliverables, and violations of SBIR Program requirements.

We performed this review at NASA Headquarters, Ames Research Center, Langley Research Center, and Stennis Space Center.

Use of Computer-Processed Data. The audit used data from three databases: (1) the NASA Electronic Handbook is accessible by NASA personnel and SBIR proposers. The Electronic Handbook is used for all SBIR transactions, such as proposal submissions, proposal evaluations, and documentation. We used Electronic Handbook data from 2004 through 2008 (<https://ehb8.gsfc.nasa.gov/sbir/logon.jsp>); (2) the SBA TECH-Net database contains data on SBIR awards that was submitted by participating Federal agencies. We used data from 2004 through 2008 (<http://www.sba.gov/aboutsba/sbaprograms/sbir/technet/index.html>); (3) the GSA Federal Procurement Data System database contains data on federally funded awards and grants. We used data from 2004 through 2008 (https://www.fpds.gov/fpdsng_cms/).

We used the NASA Electronic Handbook to obtain statistical random samples. We established data reliability for our statistical random samples by comparing data we obtained from the Electronic Handbook to source documents. We used the Handbook, TECH-Net, and Federal Procurement Data System databases to perform data mining. We did not evaluate the general and application controls of each database. To establish data reliability for data mining, we compared data we obtained from the Handbook to data we obtained from the SBA TECH-Net database. We concluded that data from the three databases was sufficiently reliable to support our audit conclusions.

Review of Internal Controls

For our review of internal controls, we used guidance from OMB Circular A-123, “Management’s Responsibility for Internal Control,” December 21, 2004, and the “Circular A-123 Implementation Guide,” Chief Financial Officers’ Council, July 2005. We also used Government Accountability Office’s “Standards for Internal Control in the Federal Government,” November 1999; “Internal Control Management and Evaluation Tool,” August 2001; and Audit Guide to Auditing and Investigating the Internal Control of Government Purchase Card Programs,” November 2003. Specifically:

- We assessed whether the control environment indicated management’s support for internal control. We found senior Program officials voiced strong support for internal control and established an effective organizational structure that designated specific personnel responsible for policy, program management, evaluations, selections, and contract oversight. Program officials required firms to submit certifications as a means to prevent duplicate awards and violations of SBIR Program requirements.
- We determined whether internal controls in the evaluation and selection, contract award, and post-award administration sub processes provided reasonable assurance that management would achieve program management requirements. For the evaluation, we identified 23 program management requirements from statutes, regulations, policies, and guidelines. We found that internal controls provided reasonable assurance that management would achieve 21 of 23 requirements (91.3 percent). Internal controls were deficient in pricing analysis of SBIR awards and the use of past performance information in selecting proposals for award.
- We determined whether internal controls provided reasonable assurance that management would prevent and detect SBIR frauds and abuses. To identify specific SBIR frauds and abuses, we analyzed Government-wide investigations since 1997. To identify controls that would prevent and detect specific SBIR frauds and abuses, we found points in NASA’s SBIR process where a specific fraud or abuse were most likely to occur, identified procedures that would have prevented or detected the fraud or abuse, confirmed procedures with OIG fraud investigators, and determined whether the procedures were in place or missing from the SBIR process. We found 14 of 24 controls (58 percent) to prevent and detect types of fraud and abuse prevalent in SBIR Programs were missing from the SBIR process.
- We completed a control risk assessment to distinguish controls that are critical from controls that are not critical but helpful in fraud prevention and detection. The control risk assessment evaluated the probability that the related fraud would occur, the impact to NASA’s SBIR Program should the fraud occur, and the control’s implementation costs.

- We tested compliance with existing controls in the evaluation and selection, contract award, and post-award administration sub processes. Our tests found that personnel followed 356 of the 358 existing controls (99.4 percent) in the sub processes.

Prior Coverage

During the past 6 years, the NASA Office of Inspector General, Government Accountability Office, National Research Council, and Department of Energy issued four reports of particular relevance to the subject of this report. Unrestricted reports can be accessed over the Internet at <http://www.gao.gov>, <http://www.nap.edu/catalog>, and <http://www.ig.energy.gov>.

NASA Office of Inspector General

“Management Alert – Concerns Relating to NASA Small Business Innovation Research (SBIR) Contracts” (April 28, 2004)

Government Accountability Office

“Small Business Innovation Research: Observations on Agencies' Data Collection and Eligibility Determination Efforts” (GAO-09-956T, August 2009)

National Research Council

“An Assessment of the Small Business Innovation Research Program at the National Aeronautics and Space Administration” (2009)

Department of Energy

“Management Controls over Monitoring and Closeout of Small Business Innovation Research Phase II Grants” (OAS-M-08-09, July 2008)

QUESTIONED COSTS

Questioned Costs in the Sample of Phase 1 Awards (All amounts rounded to the nearest dollar)						
Sample Number	Award Number	Award Value	Unallowable Travel	Unallowable Equipment	Unallocable Costs	Total Questioned Costs
1	NNX09C [REDACTED]	\$99,978				
2	NNX09C [REDACTED]	99,962		\$1,195		\$1,195
3	NNX09C [REDACTED]	99,886	\$5,109*			5,109
4	NNX09C [REDACTED]	100,000			\$352	352
5	NNX09C [REDACTED]	99,999				
6	NNX09C [REDACTED]	99,838				
7	NNX09C [REDACTED]	100,000				
8	NNX09C [REDACTED]	100,000				
9	NNX09C [REDACTED]	99,964		1,103	10,330*	11,433
10	NNX09C [REDACTED]	100,000		12,986*		12,986
11	NNX09C [REDACTED]	100,000				
12	NNX09C [REDACTED]	99,995				
13	NNX09C [REDACTED]	97,316				
14	NNX09C [REDACTED]	99,994	1,646*			1,646
15	NNX09C [REDACTED]	99,908				
16	NNX09C [REDACTED]	99,918				
17	NNX09C [REDACTED]	99,972				
18	NNX09C [REDACTED]	100,000				
19	NNX09C [REDACTED]	99,225				
20	NNX09C [REDACTED]	99,985				
21	NNX09C [REDACTED]	100,000				
22	NNX09C [REDACTED]	99,678				
23	NNX09C [REDACTED]	100,000	597			597
24	NNX09C [REDACTED]	99,989				
25	NNX09C [REDACTED]	99,695				
26	NNX09C [REDACTED]	100,000				
27	NNX09C [REDACTED]	99,968				
28	NNX09C [REDACTED]	99,915				
29	NNX09C [REDACTED]	99,288				
30	NNX09C [REDACTED]	99,995			8,974	8,974
31	NNX09C [REDACTED]	100,000				
32	NNX09C [REDACTED]	99,998				
33	NNX09C [REDACTED]	99,833				
34	NNX09C [REDACTED]	99,681				
35	NNX09C [REDACTED]	100,000	1,903			1,903
36	NNX09C [REDACTED]	100,000				
Totals		\$3,593,980	\$9,255	\$15,283	\$19,656	\$44,195

* The nature of the questioned cost is described in the section beginning on page 9.

Questioned Costs in the Sample of Phase 2 Awards (All amounts rounded to the nearest dollar)						
Sample Number	Award Number	Award Value	Unallowable Equipment	Unallocable Costs	Unsupported Costs	Total Questioned Costs
1	NNX09C [REDACTED]	\$599,988			\$42,182*	\$42,182
2	NNX09C [REDACTED]	599,982				
3	NNX09C [REDACTED]	600,000				
4	NNX09C [REDACTED]	596,505		\$89,923*	75,750*	165,673
5	NNX09C [REDACTED]	599,993				
6	NNX09C [REDACTED]	600,000	\$76,620			76,620
7	NNX09C [REDACTED]	597,295				
8	NNX09C [REDACTED]	600,000	56,618*			56,618
9	NNX09C [REDACTED]	599,995				
10	NNX09C [REDACTED]	600,000		38,637		38,637
11	NNX09C [REDACTED]	600,000				
12	NNX09C [REDACTED]	599,899				
13	NNX09C [REDACTED]	599,999				
14	NNX09C [REDACTED]	599,946				
15	NNX09C [REDACTED]	599,939				
16	NNX09C [REDACTED]	599,941				
17	NNX09C [REDACTED]	599,842				
18	NNX09C [REDACTED]	599,993				
19	NNX09C [REDACTED]	599,994		15,070		15,070
20	NNX09C [REDACTED]	599,955				
21	NNX09C [REDACTED]	600,000				
22	NNX09C [REDACTED]	599,315		3,729		3,729
23	NNX09C [REDACTED]	599,962				
24	NNX09C [REDACTED]	599,977				
25	NNX09C [REDACTED]	599,418				
26	NNX09C [REDACTED]	599,952				
27	NNX09C [REDACTED]	599,950				
28	NNX09C [REDACTED]	599,945				
29	NNX09C [REDACTED]	600,000				
30	NNX09C [REDACTED]	599,999				
31	NNX09C [REDACTED]	600,000	85,833			85,833
Totals		\$18,591,784	\$219,071	\$147,358	\$117,932	\$484,361

* The nature of the questioned cost is described in the section beginning on page 9.

SAMPLING METHODOLOGY AND PROJECTION OF RESULTS

For our audit, we used the stratified sample design with the method of selection being simple random sample. We evaluated simple random samples for attributes based on sample award (either passes or fails, depending on the audit substantive tests) and evaluated our variable data based on the dollar amount of the award that failed the substantive tests. We used a Normal distribution because it is the only distribution that allows combining stratified samples, and we wanted to combine our variable data from program year 2008 SBIR Phase 1 and 2 to project a total of questionable costs for the program year 2008 SBIR process. In addition, the Normal distribution works well for simple random samples of at least 30 if the error count in the sample is at least 5 but not more than the sample less 5, and if the variability in the data is not excessive. For example, if the sample is 36, the error count should be between 6 and 31.

We are 85 percent confident that the dollar value of errors is between \$1.4 million and \$3.9 million. This is equivalent to being 92.5 percent confident that the dollar value of errors is at least \$1.4 million. We are 85 percent confident that the error count is between 86 and 162. This is equivalent to being 92.5 percent confident that the error count is at least 86.

Based on documentary evidence and an analysis of 67 of 493 statistically selected SBIR contract awards, we found that 17 of the program year 2008 SBIR contract awards had unallowable and unsupported costs of \$528,555.²⁸ Based on statistical analysis, we are 85 percent confident that between 17 and 33 percent of the total program year 2008 SBIR contract awards had questionable costs projected between 1 and 3 percent of the total program year 2008 SBIR contract dollars.^{29,30} Properly validating contractor performance prior to and during the program year 2008 SBIR process could result in potential cost avoidance of at least \$13.32 million over the next 5 years.

Based on documentary evidence and an analysis of 36 of 350 statistically selected SBIR contract awards for the program year 2008 Phase 1 SBIR process, we found that 9 SBIR contract awards had unallowable costs of \$44,195. Based on statistical analysis, we are 85 percent confident that between 15 and 35 percent of the program year 2008 Phase 1 SBIR contract awards had questionable costs projected between 1 and 2 percent of the

²⁸ The methodology used for sample selection was random; the sampled items were stratified by phase for precision, the extent of substantive testing conducted, and or the type of evidence obtained/examined in the course of the validation.

²⁹ Statistical attribute projection, lower bound 86 of 493 contract awards, upper bound 162 of 493 contract awards.

³⁰ Statistical variable projection, lower bound \$1,444,670.92 of \$120,392,389.12 contract dollars, upper bound \$3,883,284.62 of \$120,392,389.12 contract dollars.

program year 2008 Phase 1 SBIR contract dollars.^{31, 32} Properly validating contractor performance prior to and during the program year 2008 Phase 1 SBIR process could result in potential cost avoidance of at least \$2.15 million over the next 5 years.

Based on documentary evidence and an analysis of 31 of 143 statistically selected SBIR contract awards for the program year 2008 Phase 2 SBIR process, we found that 8 SBIR contract awards had unallowable and unsupported costs of \$484,361. Based on statistical analysis, we are 85 percent confident that between 15 and 36 percent of the program year 2008 Phase 2 SBIR contract awards had questionable costs projected between 1 and 4 percent of the program year 2008 Phase 2 SBIR contract dollars.^{33, 34} Properly validating contractor performance prior to and during the program year 2008 Phase 2 SBIR process could result in potential cost avoidance of at least \$11.17 million over the next 5 years.

Attribute Projections in 1 Year, Based on 85 Percent Confidence Level						
Program Year 2008	Universe	Sample	Errors	Lower Bound	Mean	Upper Bound
Phase 1	350	36	9	53	88	122
Phase 2	143	31	8	22	37	51
Totals	493	67	17	75	125	173

Attribute Error Projections Over a 5-Year Budget, Based on 85 Percent Confidence Level						
Program Years 2010-2014	Universe	Sample	Errors	Lower Bound	Mean	Upper Bound
Phase 1	1,750	180	45	265	440	610
Phase 2	715	155	40	110	185	255
Totals	2,465	335	85	375	625	865

Variable Projections in 1 Year, Based on 85 Percent Confidence Level						
Program Year 2008	Universe	Sample	Errors	Lower Bound	Mean	Upper Bound
Phase 1	\$34,742,214	\$3,593,980	\$44,192	\$174,508	\$429,669	\$684,830
Phase 2	85,650,176	18,591,784	484,361	1,041,594	2,234,309	3,427,024
Totals	\$120,392,390.00	\$22,185,764.00	\$528,553.00	\$1,216,102.00	\$2,663,978.00	\$4,111,854.00

All amounts rounded to the nearest dollar.

³¹ Statistical projection, lower bound 53 of 350 contract awards, upper bound 122 of 350 contract awards.

³² Statistical variable projection, lower bound \$174,507.72 of \$34,742,213.53 contract dollars, upper bound \$684,829.98 of \$34,742,213.53 contract dollars.

³³ Statistical projection, lower bound 22 of 143 contract awards, upper bound 51 of 143 contract awards.

³⁴ Statistical variable projection, lower bound \$1,041,593.53 of \$85,650,175.59 contract dollars, upper bound \$3,427,024.35 of \$85,650,175.59 contract dollars.

Variable Projections Over a 5-Year Budget, Based on 85 Percent Confidence Level						
Program Years 2010-2014	Universe	Sample	Errors	Lower Bound	Mean	Upper Bound
Phase 1	\$173,711,068	\$17,969,901	\$220,958	\$872,539	\$2,148,344	\$3,424,150
Phase 2	428,250,878	92,958,920	2,421,803	5,207,968	11,171,545	17,135,122
Totals	\$601,961,946.00	\$110,928,821.00	\$2,642,761.00	\$6,080,507.00	\$13,319,889.00	\$20,559,272.00

All amounts rounded to the nearest dollar.

CONTROLS TO PREVENT AND DETECT FRAUD AND ABUSE

We analyzed SBIR-related investigations conducted by NASA and other agencies since 1997 and identified instances of fraud and abuse that we divided into six categories of types of fraud and abuse prevalent in SBIR Programs (see page 22). To identify controls that would prevent and detect specific SBIR frauds and abuses, we found points in NASA's SBIR process where a specific fraud or abuse was most likely to occur, identified procedures that would prevent or detect the fraud or abuse, confirmed procedures with OIG fraud investigators. We then determined whether the procedures were in place or missing from NASA's SBIR process.

We identified 28 controls that could prevent or detect the types of fraud and abuse categorized. In response to management's comments on the draft of this report, we are withdrawing 3 of the 28 controls (Controls 10, 11, and 13) because they duplicated procedures already in place and 1 more control (Control 19) because procedures cannot be implemented on fixed-price contracts. We show the withdrawn controls as not applicable (NA) in the table.

For the 24 remaining controls, we classified 19 controls as critical and 5 controls as noncritical but helpful in fraud prevention and detection. We defined a critical control as a control for which the related fraud has a (1) high probability of occurring, (2) a high impact to NASA should it occur, or (3) a medium to high probability of occurring, a medium to high impact to NASA, and a low implementation cost. We found that 10 of 19 critical controls were already part of NASA's SBIR process, while 9 of 19 critical controls were not. In the following six tables we list, by fraud category, the 24 controls, we describe the control, identify it as critical or noncritical, and show whether the control was in place or missing from NASA's SBIR process using the following legend – critical: yes = **Y** or no = **N**; implemented = , not implemented = .

Fraud Category 1: Firms or Principal Investigators Received Duplicate Awards for Same Research		
Control	Critical	Imple- mented
1. Firm certifies that the SBIR research proposal was not funded by another Federal agency.	Y	<input checked="" type="checkbox"/>
2. Firm provides a list of Federally funded awards and certifies that the list is accurate and complete.	Y	<input checked="" type="checkbox"/>
3. SBIR Program Management Office performs automated word search of SBIR research proposals submitted to NASA that year. Program Management searches proposals by firm and by PI. Automated word search provides a report of duplicate SBIR proposals that the firm or PI submitted to NASA for a given solicitation. Program Management Office reviews proposals to verify whether firms submitted duplicate proposals. Program Management Office rejects duplicate proposals.	Y	<input checked="" type="checkbox"/>

Fraud Category 1: Firms or Principal Investigators Received Duplicate Awards for Same Research (continues)		
Control	Critical	Imple-mented
4. SBIR Program Management Office performs automated word search of (1) SBIR research proposals submitted to NASA and (2) research proposals funded by other SBIR awards. Program Management Office uses the NASA Electronic Handbook and the Small Business Administration databases. Automated word search produces a report of research proposals submitted to NASA that appear to duplicate research proposals funded through other SBIR awards. SBIR Program Management Office enlists technical personnel to compare research proposals. Technical personnel verify whether research proposal that firm submitted to NASA duplicated research proposal that firm received funding for from an SBIR award with another Federal agency.	Y	<input checked="" type="checkbox"/>
5. SBIR Program Management Office performs automated word search of (1) SBIR research proposals submitted to NASA, (2) research proposals funded by a NASA grant or contract, and (3) research proposals funded by another Federal agency under a grant or contract. Program Management Office uses the NASA Electronic Handbook database, NASA grant and contract databases, and the General Services Administration Federal Procurement Data Systems database. Automated word search produces a report of research proposals submitted to NASA that appear to duplicate research proposals funded through another Federal grant or contract. Program Management Office enlists technical personnel to compare research proposals. Technical personnel verify whether research proposal that firm submitted to NASA duplicated research proposal that firm received funding for from another Federal grant or contract.	Y	<input checked="" type="checkbox"/>

Fraud Category 2: Contractors Submitted Questionable Research Product		
Control	Critical	Imple-mented
6. SBIR Program Management Office performs automated word search of (1) SBIR research reports submitted to NASA that year, (2) research reports submitted to NASA under a grant or contract, and (3) research reports submitted to other Federal agencies under a grant or contract. Program Management Office uses the NASA Electronic Handbook database, NASA grant and contract databases, and the General Services Administration Federal Procurement Data Systems database. Automated word search produces a report of research reports submitted to NASA that appear to duplicate research reports submitted under another Federal grant or contract. SBIR Program enlists technical personnel to compare the research reports. Technical personnel verify whether research reports that firm submitted to NASA duplicated research reports that firm had submitted under another Federal grant or contract.	N	<input checked="" type="checkbox"/>
7. SBIR Program appoints technical officer with expertise in related or same subject area as SBIR research proposal. Technical officer assesses progress and research reports that firm submits under NASA SBIR contract.	Y	<input checked="" type="checkbox"/>

Fraud Category 3: Firms and Principal Investigators Violated SBIR Program Requirements		
Control	Critical	Implemented
8. For each PI being considered for contract award: <ul style="list-style-type: none"> • SBIR Program Management Office performs automated search of SBA Tech-Net database to obtain a report of SBIR awards during a period; • Program Management Office uses an automated procedure to group the report of SBIR awards into SBIR awards, by PI; • Program Management Office uses an automated procedure to identify PIs that have more than 2 SBIR awards during the period; • Contracting officer requests contractor to provide percentage of time that PI worked for firm during the period; • Program Management Office obtains percentages of time PI spent on SBIR awards that other Federal agencies funded during the period; • Program Management Office and technical officer determine whether percentages of time appear realistic for PI or indicate a potential abuse (mischarging, unreported use of subcontractor, or failure to perform research). SBIR Program Management Office refers questionable firms, PI, and contracts to the OIG. 	Y	<input checked="" type="checkbox"/>
9. SBIR Program Management Office requires firm to certify that the entity is American-owned.	Y	<input checked="" type="checkbox"/>
10. Prior to contract award, contracting officer searches online state incorporation records, online local business license records, or Dun & Bradstreet databases to verify that firm is American-owned. SBIR Program reviews Form A and certifications for those firms that the search identified as not American-owned. SBIR Program refers firms that submitted false certifications to the OIG.	Y	(NA)
11. For each firm being considered for an award, contracting officer searches databases of addresses and locations (Google Earth, Yahoo Maps; e.g.) to determine whether place of business actually exists. For firms identified as potential problem during search, contracting officer searches local business records, Dun & Bradstreet databases, or state records to confirm that business actually exists. Contracting officer refers problematic firms to the OIG.	N	(NA)
12. Contracting officer searches SBA database to verify that firm is a small business or woman-owned entity.	Y	<input checked="" type="checkbox"/>
13. Contracting officer searches Dun & Bradstreet database to verify that SBIR firm does not exceed small business limits.	N	(NA)
14. SBIR Program Management Office requires firm to certify that it met subcontracting limits for SBIR Phase 1 and Phase 2 contracts.	Y	<input checked="" type="checkbox"/>

Fraud Category 4: Actual Effort and Costs Differed Materially from What Was Negotiated		
Control	Critical	Implemented
15. Contracting officer should verify the firm's labor rates with the Defense Contract Audit Agency for firms that were audited; or with other funding agencies for firms that the Defense Contract Audit Agency has not audited.	Y	<input checked="" type="checkbox"/>
16. Technical officer assesses progress and final reports and reports indicators of substandard performance to the contracting officer.	Y	<input checked="" type="checkbox"/>
17. Technical officer prepares final performance file on Phase 2 contractor.	Y	<input checked="" type="checkbox"/>

Fraud Category 5: Contractors Misused SBIR Funds		
Control	Critical	Imple- mented
<p>18. SBIR Program Management Office and technical officers assess indicators that firm will have excess cash on a NASA SBIR contract. Excess cash occurs when firm’s actual expenses are materially less than proposed. Program Management Office refers problematic firms to the OIG. Also, Program Management Office assesses the following indicators:</p> <ul style="list-style-type: none"> • Firm demonstrated substandard performance. Substandard performance can indicate firm spent less on actual labor than it proposed. • Firm recycled or plagiarized reports. Recycled reports can indicate that firm had to submit report from prior research as the deliverable because the firm did not spend contract funds on researcher labor. • Firm submitted duplicate proposals. Duplicate proposals can indicate that firm did not use actually conduct research. • PI has an unreasonable number of awards for period of contract. An unreasonable number of awards can indicate that PI did not actually perform research, firm used subcontractor to perform research, or firm recycled old research. • Firm lacks a legitimate business facility. Lack of a business facility can indicate firm did little, if any, actual research. • Firm proposed higher labor rates than it actually paid. Higher proposed labor rates can indicate that firm knowingly proposed lower rates to provide firm excess cash. 	Y	<input checked="" type="checkbox"/>
<p>19. Contracting officer requires firms to break out costs on each invoice for the SBIR contract and to certify the costs. Break out should show direct labor, material, subcontract, and indirect costs. Direct labor costs should identify each employee and show their position, the hours the employee worked, and the related labor cost. The firm should certify that costs are accurate and allocable to the contract.</p>	Y	(NA)
<p>20. SBIR Program Management Office reviews indicators in Control No. 18, above, against the firm’s cost-type contracts. For each SBIR contract identified at risk for fraud, waste, or abuse, the SBIR Program Management Office will assess whether the firm may have applied overruns on a NASA SBIR contract to a cost-type contract. SBIR Program Management Office refers problematic firms to the OIG.</p>	N	<input checked="" type="checkbox"/>
<p>21. SBIR Program Management Office reviews indicators in Control No. 18, above, against the firm’s contracts that have large indirect accounts. For each SBIR contract identified at risk for fraud, waste, or abuse, the SBIR Program Management Office will assess whether the firm may have applied overruns on a NASA SBIR contract to indirect accounts. SBIR Program Management Office refers problematic firms to the OIG.</p>	N	<input checked="" type="checkbox"/>
<p>22. Contracting officer requires SBIR firms to describe researchers in progress reports. Firms should identify personnel who worked on the SBIR research during the reporting period and describe their role. Contracting officer requires SBIR firms to provide the names, phone numbers, and email addresses of the PI, researchers, and subcontract researchers.</p>	Y	<input checked="" type="checkbox"/>
<p>23. Contracting officer requires SBIR firms to submit evidence with the firm’s invoice that firm has not billed NASA for nonexistent employees. Evidence could include employee addresses or email, written employment agreement, or other support.</p>	Y	<input checked="" type="checkbox"/>
<p>24. SBIR Program Management Office reviews indicators in Control No. 18, above. For each SBIR contract identified at risk for fraud, waste, or abuse, the SBIR Program Management Office will assess whether the firm may have charged unallowable costs to a NASA SBIR contract. SBIR Program Management Office refers problematic firms to the OIG.</p>	N	<input checked="" type="checkbox"/>

Fraud Category 5: Contractors Misused SBIR Funds (continues)		
25. SBIR Program Management Office reviews indicators in Control No. 18. For each SBIR contract identified at risk for fraud, waste, or abuse, the SBIR Program Management Office will assess whether the firm may have used funds from a NASA SBIR contract to support a commercial contract. SBIR Program Management Office refers problematic firms to the OIG.	N	<input checked="" type="checkbox"/>
26. Technical officer compares actual labor rates reported on invoice with verified rates from Control No. 15, above.	Y	<input checked="" type="checkbox"/>

Fraud Category 6: Technical Personnel Were Involved in Procurement Integrity Issues		
Control	Critical	Imple- mented
27. External evaluators submit conflict of interest statements. SBIR Program Management Office reviews statements for conflicts.	Y	<input checked="" type="checkbox"/>
28. NASA technical personnel submit conflict of interest statements annually. Statements are reviewed for conflicts.	Y	<input checked="" type="checkbox"/>

MANAGEMENT'S COMMENTS

National Aeronautics and Space Administration
Headquarters
Washington, DC 20546-0001



December 17, 2010

Reply to Attn of: Office of the Chief Technologist

TO: Assistant Inspector General for Auditing
FROM: NASA Chief Technologist
SUBJECT: Response to OIG Draft Report, "Review of NASA's Management of Its Small Business Innovation Research Program" (Assignment No. A-09-015-00)

Enclosed please find the NASA response to your draft report entitled, "Review of NASA's Management of Its Small Business Innovation Research Program" (Assignment No. A-09-015-00) dated November 17, 2010. This response is being provided through the Office of the Chief Technologist (OCT) in which the Small Business Innovation Research (SBIR) and the Small Business Technology Transfer (STTR) have both been transitioned.

NASA attributes the success and effectiveness of its SBIR program and its flexibility and proactive administration to accommodate the changing nature of research, and our responsiveness to outside reviews has increased the efficiency and effectiveness of the program. As our goal is to aid and encourage the small businesses involved in the SBIR program, it is our concern that the substantial promise of the results that may be obtained could be compromised by excessive oversight. The comments provided by the NASA Shared Services Center and the SBIR Program Office are intended to convey our understanding of the matters reviewed during the subject audit, and to describe the evaluation process used by the Program Office to determine the basis for the divergence between the NASA internal check of the files and documentation, and that of the Office of Inspector General (OIG).

NASA comments are provided in this response, as instructed by the OIG, to indicate concurrence or non-concurrence with each applicable finding and recommendation. After careful deliberation of all facts discovered and mentioned during the review process, we contend that there are general assertions that were not based on facts directly confirmed during this audit. NASA does not agree with findings on "unallowable cost" and "unsupported cost" as these conclusions were based on the lack of documentation rather than on evidence indicating that the actual determination did not take place. We assert that the Contracting Officer (CO), having fiduciary responsibility in issuing these contracts did not, in some cases, document results of their determinations, but rather with concurrence of the Contracting Officer's Technical Representative (COTR) approved the expenses as needed to conduct the research, and hence award the contract with these allowable expenses. As a result, NASA does not agree with the inferred financial extrapolations of the statistical and observation based audited data.

This report does accurately highlight very important structural issues and weaknesses in the integration of the Nations SBIR program as managed by the 11 different Federal agencies and departments. Our hope is that this report will assist to catalyze an expedited solution. We are committed to working with the other agencies to address these important issues.

If you have any questions or need further clarification about the enclosed responses, please contact Carl G. Ray, Program Executive for SBIR/STTR Programs at (202) 358-4652 or Sandra Morris, Office of Procurement at (202) 358-0532.



Robert D. Braun, Ph.D.

Enclosures:

1. Review of NASA's Management of Its Small Business Innovation Research Program (Assignment No. A-09-015-00)
2. NASA Response to Office of Inspector General's Audit (No. A-09-015-00)

cc:

Ofc of the IG/Mr. Martin
/ Mr. Tolomeo
/ Ms. Thompson
Deputy Administrator for Mission Support/ Mr. Keegan
Associate Administrator for Small Business/Mr. Delgado
Office of Procurement/ Ms. Morris
/Ms.Thompson
Assistant Administrator for Internal Controls
and Management Systems/Mr. Becker
Audit Liaison Team Lead, Office of Internal Controls and
Management Systems/Mr. Roberts
Acquisition and Integrity Program/Ms. Nugent
Legislative and Intergovernmental Affairs/Mr. Forehand
SBIR/STTR Program Executive/Mr. Ray
SBIR/STTR Level II Program Manager/Dr. Jahns
Lead Agency Director for AARA/Ms. Pollitt

AGENCY RESPONSE TO OIG RECOMMENDATIONS

DRAFT AUDIT REPORT DATA SAFEGUARD TO PREVENT PUBLICATION OR
OTHER IMPROPER DISCLOSURE

The Office of the Chief Technologist (OCT) appreciates the Office of Inspector General's (OIG) review of the SBIR/STTR program. The Innovative Partnership Office (IPP) has merged with OCT, so all further correspondence should be directed to this office. Below are the OCT's response to the recommendations made by the OIG:

Recommendation 1. The Office of the Chief Technologist (OCT) in consultation with the Assistant Administrator for Procurement should: provide technical evaluators with the training to ensure that they know how to perform a preliminary assessment of cost allowability and properly complete technical evaluation forms.

NASA Management Response: Concur. NASA agrees that technical evaluators play a crucial role in assessing a firm's technical capability in our peer review process. We consider the budget review by our technical reviewers a very preliminary assessment of the budget. While we do not expect our technical evaluators to have comprehensive training in cost evaluation, we do agree that we can improve the quality of their responses to the budget review section of the technical review and will develop a training module for the next SBIR review cycle (July 2011). We will also ensure that our subtopic managers verify evaluators have completed this section technical review.

Management Corrective Action Date: NASA will develop and implement SBIR technical evaluation training by July 30, 2011.

Recommendation 2. The Office of the Chief Technologist (OCT) in consultation with the Assistant Administrator for Procurement should: improve cost review procedures in the selection and evaluation stage to ensure that technical evaluators properly review proposed costs, perform a preliminary assessment of allowability, and make appropriate comments in evaluation forms about any unallowable and/or unsupported costs.

NASA Management Response: Concur. At the conclusion of the technical evaluation firms are ranked and if appropriate, are recommended for negotiation by the Source Selection Authority (SSA). At that point in time, the CO at the NSSC will request a technical evaluation/price evaluation from the COTR. Once the technical/price evaluation is completed the CO formulates the price negotiation position utilizing the technical evaluation, technical/price evaluation and DCAA rates if available to formulate the price negotiation position. NASA will continue this process. NASA can improve by providing additional training to SBIR technical evaluators to increase awareness on the need to address skill mix and qualifications of the PI. NASA will ensure the COTR training provides for cost review training and will edit the technical evaluation form to assist the COTR in identifying elements of cost as appropriate.

Management Corrective Action Date: Provide training to SBIR technical evaluators by July 30, 2011.

Recommendation 3. The Assistant Administrator for Procurement should improve cost review procedures in the contract award stage to ensure that contracting officers document that they have given due consideration to technical evaluators' comments about proposed costs and have taken appropriate action when unallowable and/or unsupported costs are identified.

NASA Management Response: Partially Concur. NASA agrees that its contracting officers have a critical fiduciary responsibility to ensure that any contract entered into by NASA complies with all requirements of the law, executive orders, regulations, and all other applicable procedures. NASA also agrees that robust technical and cost/price analyses are essential for the Agency.

NASA does not agree with the OIG's findings that contracting officers do not consistently exercise adequate due diligence when evaluating proposed costs; the travel costs for phase I efforts and the proposed equipment costs are unallowable; the cost proposed were unallocable and all cost cited were unsupported (see discussion in Appendix A).

Management Corrective Action: NASA will review and revise existing price negotiation memorandum templates, checklists, and associated file documentation for SBIRs as appropriate to ensure that negotiated costs are adequately analyzed, supported, dispositioned, and documented. Additional training on the analysis of direct and indirect costs will be provided to all NSSC employees assigned to the SBIR program.

Management Corrective Action Date: Revisions to the price negotiation memorandum templates, checklist and associated file documentation will be completed by February 28, 2011. Additional training on the analysis of direct and indirect costs will be provided to all NSSC employees assigned to the SBIR program.

Recommendation 4. The Office of the Chief Technologist (OCT) should require consideration of contractors' past performance before awarding an SBIR contract, in compliance with the FAR. These policies and procedures should:

- a. require that the annual solicitation for SBIR proposals outline the performance assessment methodology;
- b. designate responsibility for collecting past performance information;
- c. include past performance information in the scoring methodology and scores for Phase 2 proposals; and,
- d. require technical officers to assess a firm's past performance on Phase 2 awards and to document the assessment.

NASA Management Response:

4. A. Concur. NASA believes past performance to be an important factor in our selection process. NASA has modified its selection criteria beginning in the 2010 solicitation. Specifically, it states in part, "Each proposal selected for negotiation will be evaluated for cost/price reasonableness, past performance and award will be made to those contractors determined to be responsible. The Past performance evaluation will consider the contractor's past performance under the Phase I effort..."

Management Corrective Action Date for 4. A.: Modifications were made to the language released in 2010 Solicitation (July 2010). The Program will review language based upon audit recommendations and additional revisions will be incorporated in 2011 solicitation (to be released in July 2011).

4. B. Concur. Contracting officers are responsible for collecting past performance information. The Contracting Officers (COs) collect past performance information from the NASA Acquisition Internet Service (NAIS) and a copy of the results is placed in the file. If a firm does not have past performance information posted in Past Performance Database (PPDB), a copy of the blank printout is placed in the file showing that the CO did search for past performance. The COs also checks the Excluded Parties List System (EPLS) database to determine whether or not firms are suspended or debarred from receiving a Government contract. The printout of the results is placed in the file under tab along with a printout from the Central Contractor Registration (CCR) reflecting the firm's eligibility and how long the firm has been in business. NASA also examines Online Representations and Certification Application (ORCA) that replaced the paper based Representations and Certifications, ORCA requires the firm to self-certify to FAR 52.209-5.

Management Corrective Action Date for 4. B.: Completed.

4. C. Partially Concur. Prior to selection for negotiation, technical evaluators review and evaluate performance of the firm during the Phase I performance period as part of the Phase II evaluation, which NASA considers a valuable indicator of a potential Phase II performance. Currently after firms are reviewed and selected for negotiation, contracting officers query the NAIS database to review past performance history. It should be noted that the PPDB is secure and only accessible by Procurement (Acquisition) personnel, which is not available to technical reviewers during the review process.

Management Corrective Action for 4. C.: To enhance the technical reviewer's ability to review past performance NASA has initiated the collection of past performance on both Phase I and Phase II contracts that will be made available to reviewers during the review process (July 2011). We will evaluate moving preliminary review of the past performance database, EPLS, and CCR to before making a formal notice of selection for negotiation to the public instead of occurring during the negotiation process (July 2011).

4.D. Concur. NASA believes the collection of past performance information to be an important element of contract administration. NASA requires COTR's to perform a past performance assessment at the completion of the SBIR contract. This evaluation is done via the NASA Past Performance Database system.

Management Corrective Action for 4. D.: Completed. COTR required to file in past performance forms for Phase 1 and Phase 2 contracts (initiated with 2008 Phase 1 contracts).

Recommendation 5. The Office of the Chief Technologist (OCT) should implement the 11 internal controls we identified as critical for preventing and detecting fraud and abuse in the SBIR Program.

NASA Management Response: Partially Concur. Of the 11 internal controls, in which the IG identified as critical and not implemented, we will implement or partially implement 9 of the 11 recommend internal controls. Controls 4, 5, 6, 8 cannot be implemented unilaterally. NASA is committed to continue our work with other agencies and SBA to develop a more complete implementation of this identified control. We agree to initiate discussion with the appropriate agency/programs to develop a plan for at least partial implementation of identified control. See Table 1 in Appendix B for discussion.

Management Corrective Action Date: Date of implementation varies with each control. See Table 1 in Appendix B.

Recommendation 6. The Office of the Chief Technologist (OCT) should: Evaluate implementation costs and benefits to NASA for the remaining seven controls we identified and for additional controls being considered by management, and implement those controls where benefits exceed costs.

NASA Management Response: Partially Concur of the 7 internal controls, in which the IG identified as non-critical and not implemented, we agree to evaluate one; the other 6 were deemed not feasible. See Table 2 in Appendix C.

Management Corrective Action Date: Date of implementation varies with each control. See Table 2 in Appendix C.

Recommendation 7. The Program Executive for the SBIR Program should contact the SBA and GSA to discuss implementing automated controls in databases owned by those agencies.

NASA Management Response: Concur.

Management Corrective Action Date: NASA agrees meet with SBA and GSA to discuss implementing automated controls in databases owned by those agencies. Date: Third Quarter FY 2011.

Appendix A: Technical Assessment of Findings

NASA attributes the success and effectiveness of its SBIR program to its flexibility and proactive administration to accommodate the changing nature of research. This and our responsiveness to outside reviews have increased the efficiency and effectiveness of the program. As our goal is to aid and encourage the small businesses involved in the SBIR program, it is our concern that the substantial promise of the results that may be obtained could be compromised by excessive oversight. The following comments by the NASA Shared Services Center and the SBIR Program Office are intended to convey our understanding of the matters reviewed during the subject audit, and describes the evaluation process used by the Program Office to determine the basis for the divergence between the NASA internal check of the files and documentation, and that of the OIG.

The management challenge is to ensure that the type and complexity of analyses utilized are appropriate for the type of contracting approach contemplated and associated inherent risks. Additional procedural requirements or corrective actions resulting from this report should not go beyond those prescribed in the Federal Acquisition Regulation (FAR) for contractual instruments or processes that are inherently more risky than those present in the SBIR program, duplicate existing requirements in the FAR, or be in conflict with those stated requirements. NASA does not want the unintended consequence of discouraging new and relatively unsophisticated (business acumen or familiarity with federal contracting) small businesses from doing business with NASA, which is one of the principal purposes of the SBIR program.

a) Unallowable Travel Costs. The OIG states that NASA awarded contracts with unallowable travel costs totaling \$9,255 on 4 of the 36 (11.1 percent) Phase I awards we reviewed. The OIG found that those costs were unallowable under FAR 31.201 because the 2008 SBIR solicitation established a prohibition on Phase I travel costs.

NASA Management Response: FAR 31.201-2 states that a cost is allowable only when the cost complies with all of the following requirements: 1) Reasonableness; 2) Allocability; 3) Generally accepted accounting principles and practices appropriate to the circumstances; 4) Terms of the contract; and 5) Any limitations set forth in this FAR Subpart 31.2. As the OIG did not find that the negotiated travel costs to be unreasonable, unallocable to the associated SBIR contracts, not in compliance with generally accepted accounting principle, or in violation FAR Subpart 31.2, our management response is limited to the cited provision in 2008 SBIR solicitation.

Provision 3.2.3.3 of the 2008 SBIR Solicitation stated that the “NASA SBIR/STTR program does not require or expect to incur travel expenses during the performance of a Phase I contract” and that “If the Technical Monitor and Contracting Officer determine that travel is necessary, the budget can be altered during contract negotiations to allow for this”.

The OIG questioned travel costs on four Phase I SBIR contracts, with the questioned costs ranging in value from \$597 to \$5,109 (fully burdened). The purpose of the travel was delineated in each contractor's proposal and included:

- NNX09C [REDACTED] – Travel for the subcontractor (Georgia Institute of Technology) to the SBIR contractor's facility to assist in the integration of FUN3D and VorTran-M into a single framework.
- NNX09C [REDACTED] – Travel by the SBIR contractor to a nanofabrication lab at the University of Maryland to fabricate RFID sensor-tags.
- NNX09C [REDACTED] – Travel by the SBIR contractor to LaRC in order to collaborate with the COTR on the design of test panels. Travel for the subcontractor (Princeton University) to the SBIR contractor's facility to assist with the design of test panels. Travel for the subcontractor (Princeton University) to an AIAA conference in order to present research findings.
- NNX09C [REDACTED] – Travel by the SBIR contractor to a test facility at Hills, Inc. to perform fiber spinning trials.

The technical evaluation sheets in use at the time of these selections required evaluators to review other direct costs. Specifically, the evaluation sheets asked evaluators whether "individual elements (i.e., labor hours or rates; materials; travel, etc.) of the proposed budget appear to be appropriate" and to provide an explanation if they did not. In all four cases, the technical evaluators indicated that the travel was appropriate for the research delineated in the research proposal.

Because the need for the travel was clearly delineated in each Contractor's research proposal, and the technical evaluator concurred that the travel was appropriate; the contracting officer allowed the associated travel costs during formulation of the contract. The contracting officer's actions were consistent with Provision 3.2.3.3 of the 2008 SBIR solicitation (which allows the budget to be altered during contract negotiations if the Technical Monitor and Contracting Officer determine that travel is necessary) and the "wide latitude to exercise business judgment" discussed at FAR 1.602-2. The authority to allow travel under Phase I SBIR contracts was within the discretion of the contracting officer and did not demonstrate a lack of due diligence.

It should also be noted that neither FAR Cost Principle 31.205-46, *Travel Costs* or the Small Business Administration's (SBA) SBIR Policy Directive prohibits the use of SBIR funds for travel under Phase I contracts.

Finally, it was never the intent of the individuals drafting the 2008 SBIR solicitation to completely prohibit travel under Phase I SBIR contracts. While Provision 3.2.3.3 could have been more clearly worded in 2008 to reflect this desire, it was revised in the 2010 SBIR solicitation to better reflect the true intent of the SBIR Program Office.

The NASA SBIR/STTR program does not anticipate travel will occur during the performance of a Phase I contract. If travel is required during Phase I the contractor must provide rationale for the trip as well as the duration, number of personnel traveling, and the cost associated with the travel must be included in the contractor budget (Form C). All travel must be approved by the technical monitor.

b) Equipment Costs. The OIG states that NASA awarded contracts with unallowable equipment costs totaling \$234,354 on 6 of the 67 awards (8.9 percent) they reviewed. The OIG found that these costs were unallowable under FAR 31.201 because the 2008 SBIR solicitation established a prohibition on equipment costs.

NASA Management Response: FAR 31.201-2 states that a cost is allowable only when the cost complies with all of the following requirements: 1) Reasonableness; 2) Allocability; 3) Generally accepted accounting principles and practices appropriate to the circumstances; 4) Terms of the contract; and 5) Any limitations set forth in this FAR Subpart 31.2. As the OIG did not find that the negotiated equipment costs to be unreasonable, unallocable to the associated SBIR contracts, not in compliance with generally accepted accounting principle, or in violation FAR Subpart 31.2, our management response is limited to the cited provision in 2008 SBIR solicitation.

Provision 3.2.3.3 of the 2008 SBIR Solicitation stated that “costs for materials may be included”. “Materials” means property that may be incorporated or attached to a deliverable end item or that may be consumed or expended in performing the contract. It includes assemblies, components, parts, raw materials, and small tools that may be consumed in normal use. NASA will not fund the purchase of equipment, instrumentation, or facilities under SBIR/STTR contracts as a direct cost (Section 5.15).

Provision 5.15 of the 2008 SBIR Solicitation stated “special tooling required for a project may be allowed as a direct cost”. “When an SBC cannot furnish its own facilities to perform required tasks, an SBC may propose to acquire the use of available non Government facilities. Rental or lease costs may be considered as direct costs as part of the total funding for the project. If unique requirements force an offeror to acquire facilities under a NASA contract, they will be purchased as Government furnished equipment and will be titled to the Government.”

The OIG questioned equipment costs on three Phase I SBIR contracts and three Phase II SBIR contracts, with the questioned costs ranging in value from \$1,103 to \$85,833 (fully burdened). The purpose of the “equipment” purchases were delineated in each Contractor’s proposal and included:

- NNX09C [REDACTED] – The original proposal included \$12,986 for equipment installation. This cost was deleted by the contractor in its revised proposal dated January 15, 2009 and was never included in the final negotiated contract. The revised proposal was possibly inadvertently overlooked by the OIG during their review.

- NNX09C [REDACTED] – Computer service charges for corporate computer assets and software including the maintenance of the equipment, establishing and maintaining internal network, internet services, firewall, and associated capabilities. The charges are allocated to each machine based on value and use. A log is kept for each machine and projects are charged only for the hours used on that specific project. This was not an equipment purchase.
- NNX09C [REDACTED] – Computer hardware upgrade to increase scientific computing capabilities, and to assist in GUI development and data analysis algorithms development.
- NNX09C [REDACTED] – FA-10 environmental chamber which simulates altitudes up to 100,000 feet for full-flight envelope calibration. WMS sensors required the use of a specialized environmental chamber to calibrate for altitudes to 30 km.
- NNX09C [REDACTED] – Laboratory spray dryer used to acquire test data which will guide designs. The test data was unable to be obtained using simulated brine whose drying behavior behaves differently during actual practice.
- NNX09C [REDACTED] – IR Camera used as quality assurance to detect temperature changes +/- .5 degrees C in high speed rotating composite flex shafts. Saw to prepare difficult to cut titanium and large diameter stainless steel used to help build test shafts.

The technical evaluation sheets in use in 2008 required evaluators to review other direct costs. Specifically, the evaluation sheets asked evaluators whether “individual elements (i.e., labor hours or rates; materials; travel, etc.) of the proposed budget appear to be appropriate” and to provide an explanation if they did not. In all four cases, the technical evaluators indicated that the equipment was appropriate for the research delineated in the research proposal.

The true question is whether the identified equipment was essential for the accomplishment of the research proposed, could the research be accomplished without the equipment purchases, and would the firm have had a need for the equipment if not selected for this SBIR contract. The proposals were selected through a competitive peer review process as having high technical merit. Technical evaluators did not object to the equipment purchases as unnecessary or inappropriate. Neither FAR Part 31, *Contract Cost Principles and Procedures* nor the Small Business Administration’s (SBA) SBIR Policy Directive prohibits the use of SBIR funds for the purchase of equipment under Phase I and II contracts. By selecting these firms for award, the source selection authority was aware that equipment necessary to conduct the proposed research would be acquired and dispositioned at contract completion. There was no need for any of the firms to purchase this equipment if they had not been selected for award of a Phase I or II SBIR contract. Given these circumstances, the authority to allow equipment purchases under Phase I and II SBIR contracts was within the discretion of the contracting officer.

Finally, it was never the intent of the individuals drafting the 2008 SBIR solicitation to completely prohibit the purchase of equipment under Phase I or II SBIR contracts. While Provision 3.2.3.3 could have been more clearly worded in 2008 to reflect this desire, it was revised in the 2010 SBIR solicitation to better reflect the true intent of the SBIR Program Office.

Proposed costs for materials may be included. "Materials" means property that may be incorporated or attached to a deliverable end item or that may be consumed or expended in performing the contract. It includes assemblies, components, parts, raw materials, and small tools that may be consumed in normal use. Any purchase of equipment or products under an SBIR/STTR contract using NASA funds should be American-made to the extent possible. The purchase of equipment, instrumentation, or facilities under SBIR/STTR must be justified by the offeror and approved by the government during contract negotiations. Material costs should be broken out by individual items including the price, quantity and reason it is required. Firms should be prepared to justify all material costs during negotiations. See section 5.16 for further guidance.

c) Unallocable Costs: The OIG states that NASA awarded \$167,014 in unallocable direct costs on 7 of the 67 awards (10.4 percent) they reviewed. Allocable SBIR costs are those that are incurred solely to advance the work for which the SBIR contract is awarded. In contrast, costs that benefit work performed both on a NASA SBIR contract and other Government contracts should be included in an indirect cost pool and allocated to all benefiting contracts through an indirect cost rate. Examples of costs typically included in an indirect cost pool are corporate officers' salaries, administrative wages, recruiting and hiring, public relations, professional development, office supplies, rent, utilities, taxes, and depreciation.

NASA Management Response: The OIG's finding that these unallocable direct costs could have been avoided and not incurred by NASA is only true if 1) these costs had been included in the Contractor's indirect cost pool at the time of proposal submission and 2) the Contractor's Government business base was sufficiently large and diverse to spread those indirect costs out to Agencies other than NASA. If either of these conditions is not true, the claimed cost avoidance in the OIG's report is significantly overstated.

A significant portion of the small businesses submitting proposals under the SBIR program are seeking their first government contract. The business acumen of these firms is relatively unsophisticated and their familiarity with federal contracting policies and procedures is minimal. One of the principal benefits of the SBIR program is to be able to familiarize these firms with federal contracting requirements using one of the simplest,

lowest risk, contractual instrument available -- firm-fixed-price contracts with milestone payments.

The unallocable costs questioned by the OIG ranged in value from \$352 to \$89,923 (fully burdened) and the number of instances was split evenly between Phase I and Phase II SBIR contracts. In order to definitively determine whether these costs were properly allocated in the proposal, a field pricing audit (review of accounting procedures, status of accounting system, and audit of records) would need to be requested from DCAA.

The request of DCAA field pricing assistance in these circumstances is impractical for a number of reasons including:

- Schedule Constraints - The Agency generally has a 60 day period to award Phase I and Phase II SBIR contracts. These timelines are imposed by SBA and failure to adhere to them impacts the timing of subsequent selections in the out-years. DCAA field pricing audits generally take in excess of 90 days to complete.
- Limited DCAA Resources - The Department of Defense has requested DCAA to target its resources on high risk proposals to better serve their stakeholders. Effective September 17, 2010, the DoD FAR Supplement now limits contracting officer requests for audit services to fixed-price proposals over \$10 million and cost-type proposals over \$100 million.
- Cost of Audit Services - DCAA audit services are in excess of \$100/hour. The cost of field pricing audit assistance can easily exceed \$10,000, an amount often more than the costs being questioned.

NASA agrees that contracting officers should do a better job documenting the file in regards to inquiries with the Contractor and DCAA concerning whether the costs were properly allocated given the Contractor's accounting practices, rate structure, and type of costs proposed. In addition, contracting officers should do a better job documenting the disposition of these costs to include their allowability as a direct cost. Existing price negotiation memorandum templates and checklists will be revised to better document the disposition of these costs. Additional training on the analysis of direct and indirect costs is also warranted.

The OIG also questioned \$89,032 question on Contract NNXC [REDACTED]. These costs resulted from the Contractor misclassifying subcontracted labor costs ([REDACTED]) of \$296,774 as direct labor and then applying the prime contractor's overhead rate to all direct labor. In effect, the prime contractor's overhead rate was applied to subcontracted labor.

Removing the subcontractor's direct labor from the Contractor's overhead allocation basis results in a cost avoidance of \$89,032 ($\$296,774 \times 30\%$). But, to properly complete the analysis and calculate final proposal costs, one needs to apply the subcontractor's overhead rate to its direct labor cost and combine both cost elements

(subcontractor direct labor and subcontractor overhead) as a line item under ODCs. Applying the subcontractor's overhead rate (52.5%) to its direct labor cost computes to a subcontractor overhead cost of \$155,806. The Contractor's costs as proposed are actually understated and not overstated as cited in the report.

In addition, the Contractor only proposed a single indirect rate (overhead) in lieu of the two (overhead and G&A) generally found in SBIR proposals. By removing the subcontract costs from the overhead allocation base, none of the Contractor's G&A type costs have been applied against the subcontract costs, as would normally be the case when a firm establishes two indirect rates. This would imply that the contractor's proposed costs are again understated.

*d) **Unsupported Costs.*** The OIG states that the FAR and the 2008 SBIR Solicitation provide that contracting officers should not enter into contracts if proposed costs are inadequately supported. The OIG found that NASA awarded unsupported costs totaling \$117,932 on 2 of the 67 awards (3 percent) they reviewed.

NASA Management Response: The amount of \$42,181 of the questioned costs was for a solar exposure run test to be performed under subcontract by ██████████ in Huntsville, AL, under Contract NNX09C ██████████. The contract file contains correspondence between the contracting officer and Contractor verifying the need for the testing, source for the testing and amount. The correspondence was possibly inadvertently overlooked by the OIG during their review.

The remainder of the questioned costs was for polymers, electronic, sensors, electrodes, chemicals, fabrication costs, and lab supplies on another Phase II SBIR contract. While the technical evaluator indicated that the materials to be purchased were appropriate for the research delineated in the research proposal, we concur with the OIG's finding that the information provided in the proposal was minimal and should have been more adequately supported by the contractor. We do not concur that the materials were unnecessary for the research proposed or unreasonable in price. Existing price negotiation memorandum templates and checklists will be revised to ensure that proposed costs are adequately supported and the disposition of these costs is better documented.

Appendix B: Table 1

No.	Internal Control	Implementation Plan	Implementation Date	Disposition/Explanation
4	SBIR Program Management Office performs automated word search of (1) SBIR research proposals submitted to NASA and (2) research proposals funded by other SBIR awards. Program Management Office uses the NASA Electronic Handbook and the Small Business Administration databases. Automated word search produces a report of research proposals submitted to NASA that appear to duplicate research proposals funded through other SBIR awards. SBIR Program Management Office enlists technical personnel to compare research proposals. Technical personnel verify whether research proposal that firm submitted to NASA duplicated research proposal that firm received funding for from a SBIR award with another Federal agency.	Partially Implement	Initiate discussions with SBA March 2011	We agree that the automated search tool described would be a valuable internal control, but as noted in the body of the report, NASA SBIR does not have unilateral authority to implement controls that require other agency's data some of which is either not currently collected and/or verified. We will continue to have discussions with the audit team data-mining expert for search tool options to use. Challenges in complying with #4: <ol style="list-style-type: none"> Automated word searches would be limited to the public proposal summaries. An agreement with SBA and other agencies would be needed to access the actual awarded proposals. While awarded proposal abstracts are available through SBA's TECHnet database, currently we are unable to do a bulk download of awarded proposal summaries from TECHnet. Proposal abstract comparison will provide a large number of potential matches that will require technical review of the proposals to determine if it is duplicative. Based on our experience, using an automated search tool or initial screening generates over 60% false positives. The large number of potential matches may create a workload that may be time/cost prohibitive. Data submission by agencies to TECHnet is typically once a year and aligned with the prior fiscal year. Awards made in current fiscal year are unlikely to be available for real-time comparison. Unique identification of Small Businesses across agencies remains an ongoing challenge. TECHnet does not currently provide a unique identifier for companies.
5	SBIR Program Management Office performs automated word search of (1) SBIR research proposals submitted to NASA, (2) research proposals funded by a NASA grant or contract, and (3) research proposals funded by another Federal agency under a grant or contract. Program Management Office uses the NASA Electronic Handbook database, NASA grant and contract databases, and the General Services Administration Federal Procurement Data Systems database. Automated word search produces a report of research proposals submitted to NASA that appear to duplicate research proposals funded through another Federal grant or contract. Program Management Office enlists technical personnel to compare research proposals. Technical personnel verify whether research proposal that firm submitted to NASA duplicated research proposal that firm received funding for from another Federal grant or contract.	Partially Implement	Date dependent upon successful implementation of control 4	We agree that the automated search tool described would be a valuable internal but as noted in the body of the report the NASA SBIR does not have unilateral authority to implement controls that require other agency's data some of which is either not currently collected and/or verified. We will not attempt to implement control #5 until we have successfully implemented control #4. Challenges in complying with 5 same as 4 and <ol style="list-style-type: none"> Comparison against other NASA and federal grants and contracts is challenging in the absence of a centralized grants and contracts database for retrieving awarded proposal summaries. Currently, FPDS does not provide abstracts of awarded grants and contracts.
8	For each PI being considered for contract award: <ul style="list-style-type: none"> SBIR Program Management Office performs automated search of SBA Tech-Net database to obtain a report of SBIR awards during a period; Program Management Office uses an automated procedure to group the report of SBIR awards into SBIR awards, by PI; Program Management Office uses an automated procedure to identify PIs that have more than 2 SBIR awards during the period; Contracting officer requests contractor to provide percentage of time that PI worked for firm during the period; Program Management Office obtains percentages of time PI spent on SBIR awards that other Federal agencies funded during the period; Program Management Office and technical officer determine whether percentages of time appear realistic for 	Partially Implement	Date dependent upon successful implementation of control 4	NASA will refer any matters identified regarding unrealistic time percentages for PI or indication of a potential abuse, mischarging, unreported use of subcontractor, or failure to perform research to the IG. Known challenges in complying with 8 <ol style="list-style-type: none"> Currently agencies submit awards to SBA's TECHnet for prior fiscal year e.g. agencies are currently required to submit FY2010 (i.e. PY 2009 awards by March 2011). This gap makes it very challenging to check duplicative PI effort prior to making awards since TECHnet may not have the ongoing awards available in a timely manner. Uniquely identifying PIs is a non-trivial problem since no unique identifiers are available. Potential matches can be identified and would require manual review. SBA's TECHnet does not capture PI hours, so this data is not available for other agency awards. We can use the NASA SBIR EHB database to generate a list of

	PI or indicate a potential abuse (mischarging, unreported use of subcontractor, or failure to perform research). SBIR Program Management Office refers questionable firms, PI, and contracts to the OIG.			concurrent awards by firm and identify PIs working on multiple awards during the same period of performance.
10	Prior to contract award, contracting officer searches online state incorporation records, online local business license records, or Dun & Bradstreet databases to verify that firm is American-owned. SBIR Program reviews Form A and certifications for those firms that the search identified as not American-owned. SBIR Program refers firms that submitted false certifications to the OIG.	No planned implementation	NA	<p>The recommended internal control duplicates procedures already in place and utilized throughout the Federal Government.</p> <p>Contracting officers are required by FAR 4.1103 to verify that prospective contractors are registered in the Central Contractor Registration (CCR) database before awarding a contract or agreement. CCR is the primary registrant database for the U.S. Federal Government and is used to collect, validate, store, and disseminate data in support of agency acquisition missions. CCR validates registrant information and electronically shares the secure and encrypted data with the Federal Agencies' finance offices to facilitate paperless payments through electronic funds transfer. Additionally, CCR shares the data with federal government procurement and electronic business systems.</p> <p>CCR already includes information on the contractor's corporate information to include "Type of Organization" and "State of Incorporation".</p> <p>FAR 4.1201 requires prospective contractors to complete electronic annual representations and certifications within the Online Representations and Certifications Application (ORCA) in conjunction with the required registration in the CCR. ORCA eliminates the administrative burden for contractors of submitting the same information to various contracting offices; and establishes a common source for this information to procurement offices across the Government.</p> <p>Additional information on a firm's organization, business size status, TIN, and compliance with certain statutes and Executive Orders can be obtained in ORCA.</p>
15	Contracting officer should verify the firm's labor rates with the Defense Contract Audit Agency for firms that were audited; or with other funding agencies for firms that the Defense Contract Audit Agency has not audited	Implement	Active now	Contracting officers are currently performing this recommended internal control activity.
17	Technical officer prepares final performance file on Phase 2 contractor.	Implement	Active Now	Contracting officers are currently performing this recommended internal control activity
18	<p>SBIR Program Management Office and technical officers assess indicators that firm will have excess cash on a NASA SBIR contract. Excess cash occurs when firm's actual expenses are materially less than proposed. Program Management Office refers problematic firms to the OIG. Also, Program Management Office assesses the following indicators:</p> <ul style="list-style-type: none"> • Firm demonstrated substandard performance. Substandard performance can indicate firm spent less on actual labor than it proposed. • Firm recycled or plagiarized reports. Recycled reports can indicate that firm had to submit report from prior research as the deliverable because the firm did not spend contract funds on researcher labor. • Firm submitted duplicate proposals. Duplicate proposals can indicate that firm did not use actual conduct research. • PI has an unreasonable number of awards for period of contract. An unreasonable number of awards can indicate that PI did not actually perform research, firm used subcontractor to perform research, or firm recycled old research. • Firm lacks a legitimate business facility. Lack of a business facility can indicate firm did little, if any, actual research. • Firm proposed higher labor rates than it actually paid. 	Partially Implement	Active Now	<p>NASA will refer all issue to the OIG as necessary. Some of the elements of this control may not be possible to accurately determine with a fixed price contract. But we should be able to identify and forward issues of:</p> <ul style="list-style-type: none"> • Substandard performance. • Recycled or plagiarized reports • PI with an unreasonable number of awards • Legitimate business facility concerns

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	Higher proposed labor rates can indicate that firm knowingly proposed lower rates to provide firm excess cash.			
19	Contracting officer requires firms to break out costs on each invoice for the SBIR contract and to certify the costs. Break out should show direct labor, material, subcontract, and indirect costs. Direct labor costs should identify each employee and show their position, the hours the employee worked, and the related labor cost. The firm should certify that costs are accurate and allocable to the contract.	No planned implementation	N/A	<p>Phase I and II SBIR contracts are both written on a firm-fixed-price basis. A firm-fixed-price contract provides for a price that is not subject to any adjustment due to the contractor's cost experience in performing the contract. This contract type places upon the contractor maximum risk and full responsibility for all costs and resulting profit or loss. It provides maximum incentive for the contractor to control costs and perform effectively and imposes a minimum administrative burden upon the contracting parties (Reference FAR 16.202-1).</p> <p>Payment on SBIR contracts is predicated on delivery and acceptance of deliverables delineated in the schedule of the contract, not the performance of a specific number of labor hours, or use of a particular skill mix. Contractors under fixed price contracts are not required to account for or report on actual costs incurred, as the price is not subject to any adjustment due to the contractor's actual cost experience. The actual number of hours expended or skill mix employed is immaterial as payment is predicated on delivery and acceptance of a specific deliverable.</p> <p>NASA has available the same administrative, civil, and criminal remedies for fraudulent SBIR invoices as it does for any invoice submitted to NASA regardless of contract type or commodity being purchased. A separate SBIR certification is unnecessary and redundant.</p>
22	Contracting officer requires SBIR firms to describe researchers in progress reports. Firms should identify personnel who worked on the SBIR research during the reporting period and describe their role. Contracting officer requires SBIR firms to provide the names, phone numbers, and email addresses of the PI, researchers, and subcontract researchers.	Partially Implement	3rd Quarter OF FY11	See response to proposed Internal Control No. 19. However if fraud indicators are noted, the Contracting Officer do have the latitude to request additional supporting documentation and or conduct a site visit or "virtual" site visit
23	Contracting officer requires SBIR firms to submit evidence with the firm's invoice that firm has not billed NASA for nonexistent employees. Evidence could include employee addresses or email, written employment agreement, or other support.	Partially Implement	3rd Quarter OF FY11	If fraud indicators are noted, the Contracting Officer do have the latitude to request additional supporting documentation and or conduct a site visit or "virtual" site visit
26	Technical officer compares actual labor rates reported on invoice with verified rates from Control No. 15, above	Partially Implement	4th Quarter OF FY11	NASA will explore, but currently not a mechanism in place government wide for FFP contracts.

Appendix C: TABLE 2

	Internal Control	Implementation Date	Implementation Date	Disposition Explanation
6	SBIR Program Management Office performs automated word search of (1) SBIR research reports submitted to NASA that year, (2) research reports submitted to NASA under a grant or contract, and (3) research reports submitted to other Federal agencies under a grant or contract. Program Management Office uses the NASA Electronic Handbook database, NASA grant and contract databases, and the General Services Administration Federal Procurement Data Systems database. Automated word search produces a report of research reports submitted to NASA that appear to duplicate research reports submitted under another Federal grant or contract. SBIR Program enlists technical personnel to compare the research reports. Technical personnel verify whether research reports that firm submitted to NASA duplicated research reports that firm had submitted under another Federal grant or contract.	Will evaluate		<p>We agree that the automated search tool described would be a valuable internal process but as noted in the body of the report the NASA SBIR does not have unilateral authority to implement controls that require other agency's data some of which is either not currently collected and/or verified. We will work to implement controls #4 & 5, and then proceed to work with SBA and other agencies to successfully implement control #6.</p> <p>Known major Challenge</p> <p>Currently, there is no central data repository of all research reports for NASA and other federal agency awards. We are currently working with SBA and other agencies to address the broader challenge of a cross agency search and review capability.</p>
1	For each firm being considered for an award, contracting officer searches databases of addresses and locations (Google Earth, Yahoo Maps, e.g.) to determine whether place of business actually exists. For firms identified as potential problem during search, contracting officer searches local business records, Dun & Bradstreet databases, or state records to confirm that business actually exists. Contracting officer refers problematic firms to the OIG.	Evaluation not planned	Non-concurrence	See response to recommended Internal Control No. 10 in Appendix B
13	Contracting officer searches Dun & Bradstreet database to verify that SBIR firm does not exceed small business limits.	Evaluation not planned	Non-concurrence	<p>The recommended internal control duplicates procedures already in place and utilized throughout the Federal Government.</p> <p>In addition to the small business certifications and representations filed by the contractor in ORCA, CCR also provides small business size determinations for applicable North American Industry Classification System (NAICS) codes. SDB, 8A and HubZone certifications contained in CCR come from the Small Business Administration and are not editable by CCR vendors.</p> <p>Small business size status is derived from the receipts, number of employees, assets, barrels of oil, and/or megawatt hours entered by the vendor during the registration process.</p> <p>FAR 19.301-1(b) requires the contracting officer to accept an offeror's representation in a specific bid or proposal that it is a small business unless (1) another offeror or interested party challenges the concern's small business representation or (2) the contracting officer has a reason to question the representation. Challenges of and questions concerning a specific representation are to be referred to the SBA for disposition.</p>
20	SBIR Program Management Office reviews indicators in Control No. 19, above, against the firm's cost-type contracts. The review will assess whether the firm may have applied overruns on a NASA SBIR contract to a cost-type contract. SBIR Program Management Office refers problematic firms to the OIG.	Evaluation not planned		See response to Control 19 in Appendix B
21	SBIR Program Management Office reviews indicators in Control No. 19, above, against the firm's contracts with large indirect accounts. The review will assess whether the firm may have applied overruns on a NASA SBIR contract to indirect accounts. SBIR Program Management Office refers problematic firms to the OIG.	Evaluation not planned		See response to Control 19 in Appendix B
24	SBIR Program Management Office reviews indicators in Control No. 19, above, with indicators that the firm may have charged unallowable costs to a NASA SBIR contract. SBIR Program Management Office refers	Evaluation not planned		See response to Control 19 in Appendix B

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	problematic firms to the OIG.			
25	SBIR Program Management Office reviews indicators in Control No. 19, above, with indicators that the firm may have used funds from a NASA SBIR contract to support a commercial contract. SBIR Program Management Office refers firms to the OIG.	Evaluation not planned		See response to Control 19 in Appendix B

Appendix D: Process Improvements Since Release of 2008 SBIR Solicitation

Technical Evaluation - NASA has modified the technical evaluation forms for both the Phase I and II contracts. Previously, Phase I contracts relied solely on the source selection technical evaluation. Phase II contracts required the COTR to complete a technical evaluation in the SBIR Electronic Handbook, consisting of yes or no toggles and open text fields. The questions on the technical evaluation forms have now been expanded and allow contracting officers to enter specific ODCs for the COTR to address. Contracting Officers have also involved COTRs more extensively in the negotiation process as a key team member, utilizing their technical expertise and previous knowledge of the firms involved.

Negotiation Memorandum - NASA has modified the negotiation memorandum for both the Phase I and II contracts. NSSC utilizes a parametric analysis to review the cost elements of the proposal. This technique allows for NASA to compare the fully burdened hourly labor rate for a firm to the rates of other similar SBIR contractors. Procurement identification information, a chronology of events, negotiation summary, cost or pricing data and approvals are all addressed in the revised memorandum. An additional section has been added to provide a detailed ODC breakdown and narrative. Lastly, the cost/price analysis process now requires ODCs to be identified and supported with a basis of estimate. All Subcontracts require a statement of work and a budget.

Past Performance - NASA continues to query the Past Performance Database prior to negotiating a Phase II contract. If three or more contracts have not been satisfactorily performed by the SBIR contractor, commercial references for the firm are requested and checked.

Other - Audit information from DCAA is obtained when it readily available. The firm's bank is also contacted to verify that their accounts are in good standing. Contracts from the same firm are assigned to the same contracting officer to increase familiarity with that firm and to help aid in the detection of waste, fraud and abuse.

Training - NASA has standardized the review of all new contracts. Contract specialists now utilize templates and work instructions that specifically identify areas of the cost proposal that should be reviewed and notated; these include how to identify unallocable costs. Checklists have been developed that allow contract specialist to make note of any issues or recommendations for consideration by the contracting officer during negotiations. All NSSC personnel assigned to the SBIR program have completed the NASA Cost and Price Analysis training course conducted by NASA HQ.

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