Division of Industrial Innovation and Partnerships

Response to the 2016 Committee of Visitors (COV)

Report

Introduction

This report is the response to the Committee of Visitors (COV) Report for the Division of Industrial Innovation and Partnerships (IIP). The COV review of the IIP Division was conducted on June 15-16, 2016.

The IIP 2016 COV report was transmitted to Dr. Louis Martin-Vega, Chair of the Engineering Advisory Committee (ENG AdCom). This response is based on the report provided by Dr. Ann Sovoca and Dr. Brij Moudgil, the Co-Chairs of the 2016 IIP COV, to the ENG AdCom on July 1, 2016. The report was accepted without additional comment by the ENG AdCom at its meeting on October 19-20, 2016.

This IIP COV report covered the Industrial Innovation and Partnerships Programs, considering actions and active awards during FY 2013-15.

Below responses focus on specific recommendations noted in the COV Report. The recommendations have been summarized into the five major areas and our response is provided to each major area separately.

1. **Merit Review Process**

   1.1 COV Recommendations

   a. (I.1;p.4; I.2;p.4) For SBIR/STTR proposals, there is a need to demonstrate technical feasibility in the context of a business model, even in Phase I. Therefore, the COV suggests that a minimum set of commercial criteria be established for Phase I SBIR/STTR proposals and that the standard NSF template provided to Phase I reviewers be modified to specify intellectual merit, broader impacts, and additional commercial criteria. It is also suggested that the template provided to SBIR/STTR Phase II reviewers specify the relevant criteria for Phase II proposals.
   b. (I.2;p.4) Some SBIR/STTR panel summaries did not sufficiently address commercial feasibility. It is recommended that the Program Directors ensure that all panel summaries include a rich commentary on all criteria. Also, more constructive comments could be provided to declined proposals, where appropriate.
   c. (I.2;p.5) The Program Director review analyses tend to be more comprehensive for 'awards' than 'declines'. In these cases, a very comprehensive panel summary becomes even more important.

d. (I.3;p.6; I.6;p.7) The majority of the reviewers provided detailed comments, while a few reviews were brief and with limited insight. There is an expectation that reviewers provide substantive comments and it is the responsibility of the Program Director to emphasize this to the selected reviewers. It would be helpful for the PI to see more written suggestions for improving the proposal as appropriate. It is recommended that the Program Director emphasize this to the individual reviewers and also to the entire review panel.
e. (I.4;p.6) Panel summaries for declined proposals tended to be less robust. The panel summaries should include explicit comments on critical issues (e.g., fatal technical or commercial flaws, opportunities for meaningful improvement) for all proposals.
f. (I.5;p.6) The eJacket should include a copy of the correspondence informing the PI of the decision to decline.
g. (I.6;p.7) In the case of some declines, the PI may request a debriefing with the Program Director. There should be a 'box' to check in the eJacket indicating that there was a verbal debrief.

1.2 Division Response

a. IIP intends to establish a minimum set of commercial criteria for Phase I SBIR/STTR proposals. In addition, IIP is developing a standard SBIR/STTR review template which will be provided to reviewers to address intellectual merit, broader impacts, and additional commercial criteria. IIP is also developing a standard SBIR/STTR review template for Phase II reviews that specifies the relevant criteria for Phase II proposals.
b. IIP Program Directors will ensure that panel summaries contain constructive comments or will provide appropriate feedback to the PI. For proposals where the commercial criteria play a significant role in the recommendation, the panel summary or PD feedback will explicitly address these.
c. Award review analyses are more comprehensive because there is documentation justifying the expenditure of federal funds. IIP Program Directors will ensure that panel summaries contain constructive comments or will provide appropriate feedback to the PI.
d. In the calendar year 2017, NSF is piloting an activity to train reviewers on writing substantive analytical reviews prior to receiving access to proposals. IIP will look at this and other options to improve the quality of reviews.
e. IIP Program Directors will ensure that panel summaries contain constructive comments or will provide appropriate feedback to the PI.
f. eJacket currently includes a copy of the email notification of decline under Non-Award Documents.
g. Going forward, IIP will find a place in eJacket for Program Directors to indicate when a verbal debrief has been provided.

2. **Selection of Reviewers**

    2.1 COV Recommendations

    a. (II.1;p.8) For SBIR/STTR panels, the reviewers seemed to have more technical experience than commercial experience. The COV recommends that the constituency of the review panel be sufficient to address the commercial feasibility of the proposal.
    b. (II.3;p8) For self-nomination, the process is still for the investigator to contact a PD first; a self-nomination process for the PRIM database might broaden the reviewer base. Resource constraints in vetting the qualifications of the nominated reviewers might be in part alleviated by utilizing the current network of reviewers to assist in the vetting process.
    c. (II.3;p8) Outreach to minority groups and professional societies of underrepresented groups may help to increase the reviewer pool.

    2.2 Division Response

    a. SBIR/STTR panels include a mix of technical and commercial reviewers. Going forward, SBIR/STTR Program Directors will document in their Review Analyses how many technical and how many commercial reviewers reviewed each proposal.
    b. Although there is a mechanism in PRIM that allows for self-nominations from the web, IIP has found that vetting these self-nominations is labor intensive. Instead, IIP will add a slide in the panel briefing that tells panelists how they can recommend reviewers in PRIM once the panel is over.
    c. IIP is developing an SBIR/STTR Outreach and Broadening Participation Strategy to increase the number of women and underrepresented minorities submitting to the program and serving as reviewers.

3. **Management of the Program**

    3.1 COV Recommendations

    a.   (III.2;p.9) The SBIR/STTR COV subcommittee feels that the issue of portfolio management is extremely important; however, the committee members are unable to answer the question based on the information provided in the data book.
    b. (III.3;p.9) Each PD conducts a portfolio review with IIP Management after each solicitation cycle. The list of questions covered in the review is comprehensive and seems appropriate for a given program area. The IIP should articulate the output of this process.
    c. (III.4;p.10) IIP actions addressed all of the previous recommendations to some extent. There was progress in expanding the pool of reviewers to include more

women and underrepresented minorities, a significant increase in number/percentage of new PI submissions, an increase in award size and extensive utilization of pre-proposal tutorials and improved outreach efforts. IIP did not respond completely to the following COV recommendations:

    i. Include more commercial reviewers.
    ii. Provide coaching in panel summary for declined proposals including citing educational resources.
    iii. Expand the pool of panelists: Response addressed only one avenue for self-nomination (via I-Corps) and did not address the other parts of the recommendation. And no evidence was presented on the optimum size of panelist pool and how a focus on expansion might have addressed needs.
    iv. Include notations of entrepreneurial/commercial experience in PRIM.
    v. Develop measurable targets for key IIP improvement efforts and share with key stakeholders.
    vi. Provide data on the impact of outreach efforts in attracting new PIs.

3.2 Division Response

a. Over the past several years, the SBIR/STTR program has shifted the funding philosophy to be topically-inclusive and to focus more on earlier-stage small businesses. Because the program is nearly topic-agnostic, the traditional focus of portfolio management on "focus areas" may not be as appropriate as it is for other NSF programs. Instead, going forward, we will attempt to provide data that allows the COV to understand how the program's strategic focus on early-stage companies has been implemented in practice.

b. The portfolio reviews have been in place for almost a year. Future COVs will have the opportunity to review the summary of these reviews.

c. Responses are provided below:
    i. IIP is constantly recruiting new technical and commercial reviewers. This data will be tracked in PRIM for the next COV.
    ii. IIP Program Directors will ensure that panel summaries contain constructive comments or will provide appropriate feedback to the PI. We also plan to update the standard pre-panel briefing slides to include more training for reviewers in crafting panel summaries.
    iii. Although there is a mechanism in PRIM that allows for self-nominations from the web, IIP has found that vetting these self-nominations is labor intensive. Instead, IIP will add a slide in the panel briefing that tells panelists how they can recommend reviewers in PRIM once the panel is over.
    iv. The PRIM system contains a column for tagging reviewers as commercial, technical or both. IIP will update this information for all reviewers going forward.

> v. IIP is working with its SBIR/STTR Subcommittee of the ENG Advisory Committee to develop measurable targets for key SBIR/STTR improvement efforts.
>
> vi. IIP is just beginning to establish metrics for tracking Outreach efforts.

4. Questions about Portfolio

4.1 COV Recommendations

a. (IV.1;p.11) It would be helpful for the IIP to articulate a strategic intent with respect to the balance of awards across disciplines and track the portfolio changes against this strategic intent.

b. (IV.5;p.11) The IIP believes that the geographic distribution of awards is appropriate but doesn't provide criteria for the assessment so it is difficult for the COV to address this question. The distribution of awards seems to align with population density but it may be more appropriate to normalize the number of awards with other criteria such as a number of students or faculty associated with institutions of higher learning in a given state.

c. (IV.8;p.12) By their nature, the IIP Academic Programs integrate research and education. In addition, there are several educational supplements for both academic and SBIR/STTR awards. More outreach is recommended to academic centers to encourage the full utilization of educational supplements.

d. (IV.9;p.12) There has been a modest increase in the percentage of competitive proposals with women involved over the period 2013-2015 and the success rate for these proposals is significantly higher than that for proposals without women involved. While the modest increase in the number of women engaged in SBIR/STTR projects is a positive indicator, there needs to be significantly more progress. The COV encourages the IIP to understand the underlying factors in the higher success rate and determine if they are scalable.

e. (IV.9;p.13) There is very little improvement in the number of competitive proposals with minority involvement and the success rate for this group of proposals is lower than the success rate for proposals without minority involvement. There needs to be more progress in this area.

f. (IV.11;p.13) The COV recommends that IIP takes a more holistic approach to portfolio management including strategic intent as well as input and output measures.

4.2 Division Response

a. The major strategic intent of the SBIR/STTR program over the past five years has been to focus more on new companies, smaller companies, and companies with less prior Federal funding. This will allow the program to more effectively "move the needle", with each award making a more meaningful impact on the awardee

company, and will also allow a greater number of companies to participate in the program.

b. IIP will look at different ways to assess the appropriateness of the geographical distribution of Principal Investigators for IIP programs.

c. IIP will endeavor to do outreach to academic institutions by collaborating with academic colleagues in the ENG divisions and other NSF directorates. We will develop 2 slides that they can include in each of their outreach efforts to their communities.

d. IIP is developing an SBIR/STTR Outreach and Broadening Participation Strategy to increase the number of women and underrepresented minorities submitting to the program and serving as reviewers.

e. IIP is developing an SBIR/STTR Outreach and Broadening Participation Strategy to increase the number of women and underrepresented minorities submitting to the program and serving as reviewers.

f. Note the strategic intent mentioned in part 4.2(a) above and some preliminary data that speaks to this intent. In future COV databooks, we intend to provide detail on our strategic intent as well as inputs and outputs that speak to this intent.

5. Other Topics

5.1 COV Recommendations

a. (V.1;p.13) There is not much gender diversity at the Program Director level for SBIR/STTR programs. This should be addressed.

b. (V.2;p.13) Toward the SBIR/STTR goal of increasing private sector commercialization, the COV recommends regular assessment of whether the program is uniquely filling gaps in the broader investment ecosystem (e.g., angels, VCs). With regular shifts in the funding landscape over the past two decades, such an assessment may affect portfolio approach.

c. (V.2;p.13) The COV recommends more outreach be directed to tribal colleges to increase diversity.

d. (V.3;p.14) It would be helpful for the NSF to integrate its various information management systems to enable divisions to better mine data, improve knowledge management and enable the collection of metrics which now isn't feasible or is manually intensive.

e. (V.4;p.14) It may be worth considering giving the PDs more discretion to pre-screen and provide more opportunities for return without review. This might help with better utilization of valuable review resources.

f. (V.4;p.14) It is not clear if the outcome data includes information from grantees on whether the program is meeting their needs and what changes they would recommend.

g. (V.4;p.14) Virtual panels, especially mixed panels, merit further discussion. The jackets do not contain information about whether panels are virtual, in person or mixed, so it is difficult for the COV to come to a conclusion about their relative effectiveness. It would be helpful if the following information is added to the data book:
   a. Any correlation between the increased use of virtual panels and an increase in panel diversity.
   b. Any variation in the quality of the review process whether panelists are 'in person' or virtual.
h. (V.4;p.14) The COV commends the IIP on continued progress to broaden the participation of women and underrepresented minorities in review panels. However, members believe more progress could be made in this regard and suggest implementing outreach efforts to build the reviewer pipeline, especially from underrepresented groups.
i. (V.4;p.14) The COV recommends that areas of expertise in IIP databases be updated and harmonized so that common descriptors are used for submitting PIs and reviewers. This would facilitate identification of the pool of reviewers with the most appropriate experience to review a particular submission.
j. (V.5;p.14) The entire data book should be made available at the outset of the COV review process and include all of the information provided in this COV's final data book, including answers to questions asked by this COV.
k. (V.5;p.14) To supplement the orientation material provided to the COV at the outset of the process, it would be helpful for the COV to receive a copy of the instructions/documents panel reviewers get to prepare them for their role including merit review criteria and any additional criteria specific to programs such as SBIR/STTR. The IIP should make the COV aware of the protocol for sharing feedback with PIs (e.g., PIs receive the individual reviews and panel summaries without attribution).
l. (V.5;p.14) COVs should have access to output metrics (assessment), if possible by sector, at the outset of the process. It might inform the COV as to sectors which are more successful, PI experience/background that provides for better success rates, etc.
m. (V.5;p.14) Include more background information about reviewers (e.g., commercial vs. technical reviewer, relevant area(s) of expertise) in the jackets.
n. (V.5;p.14) Division and program level data/presentation should clearly outline the progress in meeting previous COV recommendations, e.g., what has been implemented and what is in progress.
o. (V.5;p.15) A COV report template should be tailored for IIP given that IIP programs are distinctly different from the other agency programs which focus on basic research.

5.2 Division Response

a. IIP just hired another female Program Director in the SBIR/STTR program and will continue to actively recruit women and underrepresented minorities as positions become available.

b. The SBIR/STTR Subcommittee of the ENG Advisory Committee has formed an assessment working group. IIP will work closely with this working group to develop an Assessment Strategy and identify how best to assess whether the program is uniquely filling gaps in the broader investment ecosystem.

c. IIP is developing a strategy for broadening participation that will include outreach to groups to increase the participation of women and all underrepresented minorities.

d. This recommendation will be forwarded to the NSF CIO for consideration as future investments in enterprise systems are discussed.

e. IIP will explore what flexibility there is to return proposals without external review.

f. Currently, IIP does not collect information from grantees on whether the program is meeting their needs and what changes they would recommend. IIP will consider how this data can be collected.

g. There is an NSF task force on virtual panels. IIP will look at their data collection efforts to see if there is some way to collect data for IIP's virtual panels regarding panel diversity and review quality.

h. IIP is developing an SBIR/STTR Outreach and Broadening Participation Strategy to increase the number of women and underrepresented minorities submitting to the program and serving as reviewers.

i. Because IIP covers such broad areas of technology, it is impossible to directly match reviewer expertise areas to the technology areas funded via keywords in NSF databases. IIP will look at different ways to present this data to the next COV that will be more useful for analysis and recommendations.

j. For future COVs, the entire data book will be made available at the outset of the COV review process and include answers to questions asked by this COV.

k. Future COVs will receive a copy of the instructions/documents that panel reviewers receive to prepare them for their role including merit review criteria and any additional criteria specific to programs such as SBIR/STTR. IIP will make the COV members aware of the protocol for sharing feedback with PIs.

l. IIP is beginning to explore internal and external methods for portfolio-wide outcomes assessment. Data will be provided by sector going forward.

m. Going forward, SBIR/STTR Program Directors will include information in their Review Analyses on how many commercial and technical reviewers reviewed each proposal.

n. Division and program level data/presentation will clearly outline the progress in meeting previous COV recommendations.

o. IIP will consult with the NSF Office of Integrative Activities about the possibility of tailoring the template for future IIP COVs.

Acknowledgement

The IIP Division thanks the members of the COV and in particular the work of the Co-Chairs, Dr. Ann Savoca, and Dr. Brij Moudgil, in providing the Engineering Directorate and the IIP Division with a comprehensive review and meaningful recommendations for improvement.

Appendix: Diversity and Conflict of Interest Report

1. The diversity, independence, and balance of COV members:

The 13 members of the COV included seven individuals from the business community and six from the academic community. The committee had six women and seven men and was geographically diverse.

2. Conflict of Interest report:

A Conflict of Interest (COI) briefing was provided prior to the COV meeting as well as at the start of the COV meeting. All COV members completed the NSF COI form. All members of the COV were barred from seeing proposals from their home institution. None of the COV members was involved in the review of a program in which he or she had a pending proposal. The ENG COI officer was available at all times during the COV meeting to answer questions and/or resolve issues regarding conflicts of interest. No real or apparent conflicts arose during the course of the COV review of IIP programs.