CORE QUESTIONS and REPORT TEMPLATE
for
FY 2013 NSF COMMITTEE OF VISITOR (COV) REVIEWS

Guidance to the COV: The COV report should provide a balanced assessment of NSF's performance in the integrity and efficiency of the ***processes*** related to proposal review. Discussions leading to answers for Part A of the Core Questions will require study of confidential material such as declined proposals and reviewer comments. ***COV reports should not contain confidential material or specific information about declined proposals.*** The reports generated by COVs are made available to the public.

We encourage COV members to provide comments to NSF on how to improve in all areas, as well as suggestions for the COV process, format, and questions. For past COV reports, please see *http://www.nsf.gov/od/oia/activities/CoV/covs.jsp*

FY 2013 REPORT TEMPLATE FOR
NSF COMMITTEES OF VISITORS (COVs)

Date of COV: April 24-26, 2013
Program/Cluster/Section: SBIR/STTR, GOALI, I/UCRC, PFI-BIC/AIR, NM, BC, EI, EA
Division: Industrial Innovation and Partnerships (IIP)
Directorate: Engineering (ENG)

Number of actions reviewed: 121
 	
 Awards: 87
 Declinations: 34
 Other: 0
 	
 Total number of <u>actions</u> within Program/Cluster/Division during period under review: 9,617
 	
  Awards: 1,367
  Declinations: 5,880
  Other: 2,370

Manner in which reviewed actions were selected: **Proposals from all IIP programs were randomly selected from FY2010-2012, and then cascaded to include their phases and/or supplements.**

INTEGRITY AND EFFICIENCY OF THE PROGRAM'S PROCESSES
AND MANAGEMENT

Briefly discuss and provide comments for *each* relevant aspect of the program's review process and management. Comments should be based on a review of proposal actions (awards, declinations, and withdrawals) that were *completed within the past three fiscal years*. Provide comments for *each* program being reviewed and for those questions that are relevant to the program(s) under review. Quantitative information may be required for some questions. Constructive comments noting areas in need of improvement are encouraged.

I. Questions about the quality and effectiveness of the program's use of merit review process. Please answer the following questions about the effectiveness of the merit review process and provide comments or concerns in the space below the question.

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
1. Are the review methods (for example, panel, ad hoc, site visits) appropriate? • To further strengthen the review methods for Broader Impact, the COV recommends o IIP should have the latitude to more crisply define evaluation criteria like Broader Impact and if needed break away from a strictly "academic" set of criteria. o IIP panels should incorporate more reviewers who can more effectively evaluate the broader "commercial, business, market analysis and product" related aspects of proposals. • In general the process is good but broader representation might be achieved through virtual panels. • The CoV recommends IIP continue/expand reverse site visits for the Type 2 AIR and Phase 2B SBIR programs.	YES
2. Are both merit review criteria addressed **a) In individual reviews?** • Both criteria were addressed pro-forma. However some comments were somewhat superficial. For example, in ~20% of cases there was not a lot of depth and reviewer comments were of mixed quality based on the credentials of the reviewers. • It would help to streamline the instructional material that is provided to these individuals and direct them to what is of highest priority for a particular IIP program. • The CoV recommends IIP create a training template for reviewing the Broader Impact/Commercialization Impact, including an example illustrating the criteria. . **b) In panel summaries?** • The combination of panel summaries and individual reviews is very valuable. It is open and fair.	YES YES

• It is important that the Program Director exerts leadership to create the proper open environment for critical and in-depth discussions. It was noticed that the panel summaries were of mixed quality in terms of richness of the assessment. **c) In Program Officer review analyses?** • The quality of the Program Directors (PDs) is very good in terms of their ability to integrate the various elements of the reviews into an incisive analysis. This takes into account the ultimate intent of the proposers and the match of the proposal with the aim of the program. • The reliance on the Program Directors is critical for the integrity of the programs. If they become too burdened then the quality of the program as a whole will be at risk.	YES

3. Do the individual reviewers giving written reviews provide substantive comments to explain their assessment of the proposals? • See Section I, Question 2a, for a relevant recommendation.	YES
4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)? • The review "grades" (i.e. Excellent, VG, etc.) criteria seem to vary from panelist to panelist and reviewers should justify with incisive comments about why a certain grade was assigned. • It would be helpful to have the panel, as part of their summary, differentiate the critical vs. non-critical aspects of the review. • The CoV recommends PDs append to the panel summary a generic checklist that lists common weaknesses in SBIR commercialization plans, and the relevant resources and educational materials for address each weakness. To quickly provide feedback to PIs, the PDs can then check off those topics which were observed as weaknesses in the commercialization plan. This will be a quick way for PDs to provide valuable feedback to declined proposals.	YES

5. Does the documentation in the jacket provide the rationale for the award/decline decision? • Yes, particularly for awards. • However, some jackets for rejected proposals seemed thin in terms of supporting documentation. See Section 1, Question 4 for a relevant recommendation on this topic.	YES

6. Does the documentation to the PI provide the rationale for the award/decline decision? • See comment on Q5 • Yes, if the individual reviews and the panel summary is rich. Perhaps some elements of the PD's proposal review analysis should be communicated to the PI. • The CoV observes that sometimes the panel reviews and panel summaries are not in complete alignment with the Program Director's award/decline decision. In these cases, particularly for declines, the CoV recommends the Program Director clearly address the rationale for the decline decision, to help the PI understand ways to improve the proposal. This rationale can also provide coaching to assist the PI with future commercialization success, as discussed in section 5.1.	YES
7. Additional comments on the quality and effectiveness of the program's use of merit review process: • The CoV understands that IIP fills an important national need in funding commercialization of innovative technology between seed and private investment. IIP staff understands this role and appears to be making award decisions in line with their mission. • The CoV observed that IIP staff understands the intangible metrics of potential business success. The PDs should be commended on evaluating the broader impacts of proposals using a diverse set of reviewers (technical and business). The CoV recommends that IIP continue to use diverse reviewers, and that PD notes document the broader impact metrics in the PD notes. • Program Directors should have an option for meritorious but rejected proposals to refer the PIs to a "boot camp", e.g., iCorps.	

II. Questions concerning the selection of reviewers. Please answer the following questions about the selection of reviewers and provide comments or concerns in the space below the question**.**

SELECTION OF REVIEWERS	YES , NO, DATA NOT AVAILABLE, or NOT APPLICABLE
1. Did the program make use of reviewers having appropriate expertise and/or qualifications? In general, the CoV finds the IIP reviewers very qualified, particularly reviewers with strong <u>technical</u> expertise and qualifications. The CoV recognizes this is a tough challenge and complements the IIP Program Directors for their good work in this area. IIP's mission is about change and innovation. So it needs panelists with a diversity of perspectives and experiences. Therefore, the CoV has the following recommendations to expand reviewer expertise and/or qualifications: • Increase Panelist Diversity o Increase participation from women; panels are typically majority male and often exclusively male. o Increase participation from underrepresented groups. o Increase participation from those with <u>commercialization experience</u>; this can include panelists who have retired from industrial careers, or academics who have commercialization experience. • Expand representation from additional areas, as well: o Continue to expand reviewers with commercial experience o Consider international reviewers, with caution to avoid export control/national interest issues. To implement these recommendations, the CoV suggests: • Continue to invest in the Panel and Reviewer Information Management (PRIM) database to o Expand the number of commercial reviewers o Expand the number of female reviewers o Expand the number of underrepresented reviewers o Expand the number of industrial reviewers; allow people who have retired from industrial careers, or those who are academics with commercialization experience, to be flagged as such to show their industrial experience o Include a brief CV or Bio, so that Program Directors (and future	YES, <u>with suggestions to increase diversity</u>

CoV members) can review their expertise
  - o Add flags to check for industrial, entrepreneurial, or commercialization experience
- Create a mechanism to allow members of the community to "self-nominate" themselves as a future potential reviewer, and promote this option through partnerships and networks.
- Ask Program Directors to use their network to broaden the IIP pool of potential reviewers.
- IIP should invite people to volunteer for future panels, and add these people to the PRIM database. IIP should specifically particularly target people who are
  - o female
  - o young
  - o members of underrepresented groups
- IIP should partner with trade associations and professional societies, to invite people to volunteer for future panels.
- When asking panelists to serve, also ask them if they have people who they recommend serve in the future.
- Learn from (and teach, as appropriate) other divisions with NSF, who have built systems similar to PRIM.
- Continue to explore mechanisms to allow panelists to participate, even if they cannot travel to NSF headquarters, for example:
  - o virtual panels,
  - o mail-out panels, and/or
  - o panels in locations outside Arlington VA

2. Did the program recognize and resolve conflicts of interest when appropriate? • The CoV feels IIP recognizes and resolves conflicts of interest effectively. • As a suggestion to assist future CoVs: Tell CoV members to look in the correspondence section in the eJacket to see that a potential conflict of interest was recognized and how it was resolved. The COV found excellent examples in the eJackets it reviewed, and we complement the Program Directors on their diligence on potential conflicts of interest.	YES

3. Additional comments on reviewer selection:

- The CoV recommends Program Directors "grade" reviewers after the panel, and record this grade in PRIM. Reviewers with consistently low grade would be excluded from future panels. The CoV would recommend low "grades" for:
  - o Reviewers who write just 1-2 sentence reviews
  - o Reviewers who do not offer specific, constructive suggestions to strengthen the review, particularly on the broader impact/commercialization sections

| • The CoV observes that some reviewers, and especially the IIP staff, assess proposals broadly and make decisions that are in line with the IIP mission. The CoV recommends IIP cultivate a diverse reviewer population that understands the IIP vision/mission. | |

III. Questions concerning the management of the program under review. Please comment on the following:

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MANAGEMENT OF THE PROGRAM UNDER REVIEW

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1. Management of the program.

- There is a demonstrated clear sense of mission across IIP.
- Overall the management of the programs in IIP is very effective. In particular the effectiveness of the management of the SBIR program has a clear focus on the "I (Innovation)" in the acronym. This is a unique strength of the NSF program that should not be lost in pursuit of shorter term goals.
- I/UCRC-specific management:
  - The I/UCRC continues to demonstrate <u>excellent management</u> by the highly engaged and helpful Program Director and staff, the excellent leveraging of federal funds.
  - The administrative burden on the PIs for reporting is very large for the IUCRC compared to other programs in the IIP portfolio. The CoV recommends IIP look to streamlining this to benefit both PIs and the PDs.
  - The role of the "Evaluator" for programs like the I/UCRC should be reexamined for cost effectiveness. The evaluator seems to require a significant part of the NSF budget allocated to the Center. Also budgets for these Centers are minimal for the requirements that NSF imposes on the PIs. Section 5.1 includes specific recommendations on the "Evaluator" role.
- The management burden appears very high for the number of dedicated staff members in IIP. Specifically the staff has to consider a much larger set of broader impact criteria relating to issues such as commercialization potential.
  - NSF should examine the burden and assess the staffing needs required.
  - We endorse the IIP plans to document best practices for proposal review and pre-proposal coaching within SBIR and recommends that this be extended across all IIP programs to reduce workload and improve quality. Processes should be developed to help ensure that these best practices are actually implemented.
- In one jacket reviewed, the PD was not copied on emails from the NSF accounting office to the PI requesting additional documentation. If this is a common problem it must be addressed.

2. Responsiveness of the program to emerging needs for innovation and partnerships.

- NSF is responsive to emerging needs. NSF IIP accepts and considers a wide range of proposals which harvests a diversity of innovative projects while being cognizant of major societal technology needs (i.e. water).
- The IIP program has a diversity of grant opportunities for businesses, partnerships, and entrepreneurship training.

- The IIP program may be able to attract a larger number of high quality proposals with outreach to the business community which may not be aware of NSF opportunities.
- The COV feels that the SBIR program is the primary on-ramp for ~~non academic~~nonacademic PIs. However we feel that this is not obvious to this community in terms of attracting and preparing them for submitting proposals to the IIP programs. Outreach activities such as web pages and webinars can be tuned to specific types of PIs, e.g., information on SBIRs for academic researchers can be different than SBIRs for non-academic entrepreneurs. There are also a number of non-NSF resources that could be leveraged to help with this.
- The NSF IIP programs are directed to the needs of innovation. This is of prime importance in terms of national priorities.
- For academic PIs with no commercial experiences navigating resources that are available could be better facilitated.

3. Program planning and prioritization process (internal and external) that guided the development of the portfolio.

- The strength of NSF is in its broad openness to engender new ideas without trying to predict market forces. IIP should continue to maintain this posture. Often seasoned entrepreneurs have already invested in trends and technologies that are the focus of targeted "innovation" topics by NSF. IIP should continue to focus on what is high risk-high reward and not simply "follow the herd".
- The strength of the IIP SBIR program is that the entrepreneurs don't have to compromise their strategic directions to qualify and compete for funding.
- It is appropriate that the IIP portfolio is responsive to National priorities. Moreover, it is also important that this not be the sole driver for the program priorities.

4. Responsiveness of program to previous COV comments and recommendations.

- The IIP team is committed to openness and a desire to strive for excellence in their programs. They have empowered this and the prior COV to seek out answers to the questions about the effectiveness of their programs.
- IIP was very responsive to many, but not all, of the previous COV recommendations.
- The CoV notes significant responsiveness by IIP to several recommendations from the prior CoV, although more progress can be made in the future. These include:
  - Section 2: <u>Reviewer selection</u>.
    - The PRIM database is an example of this responsiveness.
    - Other examples include the use of virtual panels and panels located outside Arlington.
  - Section 3: Management of the Program.
    - <u>Assessment</u>: The improvements in SBIR Assessment and I/UCRC Assessment are noted and endorsed. For example, the DIMS system shows excellent progress since the last CoV. However, significant improvements remain, as recommended elsewhere in this CoV report.
    - <u>Broadening Participation</u>: Resources have been added, and metrics on broadening participation have been compiled, as shown in Section 4.7. This is a great step forward.   We particularly appreciate that IIP was able to quickly

compile graphs showing the participation rates by women and underrepresented groups when we requested this data. This is a huge improvement compared to the status at the prior CoV review. However, significant improvements remain, as recommended in Section 4.7.

- Commercialization Assistance: The CoV applauds great progress in this area, and notes the value of the iCorps program, the enhanced SBIR commercialization assistance resources, and pre-proposal outreach activities like webinars have all been implemented since the last CoV. The CoV recommends IIP continue to expand its commercialization assistance activities, as described in section 5.1.

- Several of this COV's recommendations on the Merit Review Process (Section 1) are similar to those identified by the previous COV. The CoV Recommends IIP study root causes for the recommendations that were repeated.

- In general, it is difficult for the COV to assess the IIP responsiveness to prior COV recommendations because IIP did not present specific metrics and targets to assess progress. The CoV is recommending improved metrics and targets, as discussed in section 5.1 and section 5.5.

IV. Questions about Portfolio. Please answer the following about the portfolio of awards made by the program under review.

RESULTING PORTFOLIO OF AWARDS	APPROPRIATE, NOT APPROPRIATE, OR DATA NOT AVAILABLE

1. Does the IIP portfolio support the IIP vision: to be the pre-eminent federal resource driving the expansion of the nation's innovation capacity by stimulating partnerships among industry, academe, investors, government, and other stakeholders?
 	
Comments:
• The CoV endorses and applauds IIP's vision, and sees numerous examples of how IIP's portfolio and programs support the two key elements of IIP's vision:
   1. Expansion of the nation's innovation capacity. IIP can and should be the pre-eminent federal resource educating our nation's future innovators. The CoV recommends IIP focus on training the next generation of innovators and entrepreneurs. Pre-proposal webinars and coaching are great examples, as well as I-Corps and various IIP commercialization assistance programs.
   2. Stimulation of partnerships. Matching funds programs work to drive IIP's vision!
      ▪ I/UCRC is a great example of this leverage. The data showing that $1 of IIP funding yields $7+ dollars of outside investment is commendable, and clearly supports the vision of "stimulating partnerships among industry, academe, and other stakeholders."
      ▪ Other great examples include:
         • SBIR Phase 1B
         • SBIR Phase 2B
         • Cost Sharing and Overhead Sharing
      ▪ The CoV recommends IIP expand the types of "partnerships" they stimulate to achieve its vision. Today, IIP already has a variety of partnership types across its various programs. The CoV encourages additional creativity and flexibility. For example,
         • How might IIP partner with the nation's community colleges, or K-12 education resources, to advance its vision?
         • How can IIP catalyze more partnerships between universities and other stakeholders in the innovation ecosystem?
	Yes
	
	With recommendations to increase matching funds

- How can IIP identify and disseminate best practices employed for technology transfer and innovation across universities? - The CoV recommends IIP partner with other agencies, as appropriate, to <u>leverage their dollars and larger budgets</u> and enhance the nation's innovation ecosystem. The mission-based agencies (NIH, DOE, etc.) have constraints on spending options and topics. The CoV finds it good that IIP can avoid these mission-based constraints. - The CoV recommends IIP can help our nation's innovation capacity by reducing <u>Intellectual Property</u> barriers that discourage partnerships. For example, IIP can create guidelines and suggestions for navigating regulations that our nation's researchers and innovators can follow to expedite/streamline innovation. In I/UCRC centers, for example, the IP terms are well constructed and can be a model for other commercialization paths/partnerships. - Focusing outreach to proposals with NSF lineage feels very selective. The CoV recommends IIP ensure it attracts proposals without prior NSF-funding lineage. The SBIR program is the best on-ramp for these proposals, as discussed in Section 3.	
2. Are awards appropriate in size and duration for the scope of the projects? - I/UCRC: - The CoV endorses the increase in the I/UCRC FY2014 budget request. - The CoV endorses the "Managing Director" supplement as a good way to improve center marketing, management, and outreach. - The CoV recommends IIP reassess the use of individual evaluators, to identify more cost-effective ways to collect and provide this information. We expect the following benefits: - Fewer I/UCRC dollars, and less I/UCRC time, will be spent on evaluation - Better data will be collected on I/UCRC assessment - IIP can cross-pollinate best practices for assessment across its multiple programs, e.g., SBIR can learn from I/UCRC, and I/UCRC can learn from SBIR. - SBIR/STTR: - The CoV strongly endorses the recent increases in the award size for SBIR/STTR. - The CoV strongly endorses the use of supplements to focus awards on those grantees with the best opportunities for commercialization success, and for leveraging outside investments.	Yes with I/UCRC suggestions

• Some SBIR Phase 1 projects cannot be completed within 6 months. How can IIP support complex transformative innovation that requires more than one cycle of a phase I SBIR?
• GOALI/PFI (BIC & AIR):
    • The CoV applauds the recent innovations in PFI and the development of the BIC & AIR programs. We encourage IIP to continue to investigate ways to tailor these solicitations/programs to advance the IIP vision.
    • The CoV supports the current size and duration of GOALI/PFI.
    • The CoV endorses IIP's use of matching funds in GOALI/PFI to leverage outside investment.	

3. Does the program portfolio include awards for projects that are innovative or potentially transformative? • Yes • IIP should be able to measure innovation outcomes. See Section 5.1 for the CoV recommendations to improve assessment. The CoV recommends IIP take the leading role within NSF in measuring assessment.	**Yes** **with suggestions to improve assessment**

4. Does the program portfolio have an appropriate geographical distribution of Principal Investigators?
 	
• The CoV recognizes that overall there is a sincere attempt and a working track record of sensitivity to this issue within IIP.
• The CoV endorses IIP plans to develop regional support structures to further broaden geographical distribution of our nation's innovation ecosystem. We encourage them to partner with existing regional support structures, such as:
    ○ SBA offices
    ○ DOC's i6
    ○ Regional, State, and Local centers for entrepreneurship
	Yes.
	
	with suggestions for regional partnerships

5. Does the program portfolio have an appropriate balance of awards to new investigators? • Overall IIP - The CoV is pleasantly surprised by how high the percentage of awards to new PIs was for 2012. **The CoV applauds the IIP for attracting/funding so many new PIs**. • SBIR Phase 2 - IIP management reported that 73% of Phase 1 grantees in FY2012 have no prior Phase 2 awards from NSF or any agency. This is commendable, and reflects good progress in IIP's efforts to bring new, innovative companies into the SBIR program.	**YES**

• SBIR Phase 1 - The data for SBIR Phase 1 shows that 40% of Phase 1 proposals are from companies that have never submitted a proposal to the NSF in the past.	
6. Does the program portfolio include projects that integrate research and education? • This is program dependent. For example, I/UCRC, REU/RET/REV supplements, GOALI, and PFI do an excellent job integrating research and education, particularly in enhancing innovation capacity. • SBIR/STTR programs provide commercialization assistance, which can be viewed as entrepreneurial education. • NSF GOALI and NSF AIR are excellent conduits for integrating fundamental research and education with practical industrial application and transformation. Particularly, GOALI proposals are peer-reviewed by panels in the discipline's home-division; and thus NSF GOALI is especially well-devised for linking academic science and engineering with industry.	**Yes, where appropriate**

7. Does the program portfolio have appropriate participation of underrepresented groups[1]?
 	
WOMEN
• The CoV finds success rates are comparable to males.
• However, submission rates from women are still disappointingly low. <u>The key to broadening participations is getting more Phase 1 proposals from women</u>.
• The CoV recommends IIP take the following steps to increase participation from women:
    o Study the barriers that lead to low SBIR Phase 1 participation by women. For example, could/should IIP provide pre-Phase 1 planning grants to Women?
    o Form partnerships to overcome these barriers
    o Conduct outreach activities to overcome these barriers.
• The CoV recommends IIP provide training and mentoring opportunities for denied proposals from women, consistent with recommendations elsewhere, e.g., Section 1 Question 7.
• The CoV compliments IIP for having significantly better data available for tracking participation from women compared to the last CoV.	

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[1] NSF does not have the legal authority to require principal investigators or reviewers to provide demographic data. Since provision of such data is voluntary, the demographic data available are incomplete. This may make it difficult to answer this question for small programs. However, experience suggests that even with the limited data available, COVs are able to provide a meaningful response to this question for most programs.

UNDERREPRESENTED GROUPS:
 • The CoV finds success rates by underrepresented groups are comparable to the general population.
 • However, submission rates from underrepresented groups are still disappointingly low. These appear to be getting lower in the last few years. <u>The key to broadening participations is getting more Phase 1 proposals from underrepresented groups</u>.
 • The CoV recommends IIP take the following steps to increase participation from underrepresented groups:
     o Study the barriers that lead to low SBIR Phase 1 participation by underrepresented groups
     o Form partnerships to overcome these barriers
     o Conduct outreach activities to overcome these barriers
 • The CoV recommends IIP provide training and mentoring opportunities for denied proposals from underrepresented groups, consistent with recommendations elsewhere, e.g., Section 1 Question 7.
 • The CoV complements IIP for having significantly better data available for tracking participating from underrepresented groups compared to the prior CoV.	

8. Is the program relevant to national priorities, agency mission, relevant fields and other constituent needs? Include citations of relevant external reports. • Yes. • All IIP programs appear quite relevant to national priorities…from *Rising above the Gathering Storm* to initiatives from the White House and Congress today.	Yes
9. Additional comments on the quality of the projects or the balance of the portfolio: • No additional comments.	

V. Other Topics.

1. Please comment on any program areas in need of improvement or gaps (if any) within program areas.
   - The CoV <u>strongly recommends</u> that IIP develop targets for key objectives and that IIP report actual performance vs. target internally, and to future CoVs. The CoV recommends IIP define these metrics to support their vision, and trusts their ability to select valuable metrics that guide IIP management and operational excellence. Potential examples include:
     - participation by women and underrepresented minorities,
     - number of dollars raised by matching funds,
     - and many other examples.

   - The CoV recommends IIP expand "Phase 0" <u>pre-proposal support</u>, particularly for SBIR/STTR, such as webinars and web-based training materials that teach commercialization best practices. I-Corps is another excellent example of Phase 0 support; I-Corps has the full endorsement of the CoV. IIP can partner with numerous organizations to leverage existing resources for this support, such as the National Venture Capital Association, the Kauffman Foundation, other SBIR-granting agencies, state government economic development offices, and many others. We expect the following benefits:
     - Increased capacity of our nation's innovation ecosystem.
     - Increased participation from women and underrepresented groups

   - The CoV recommends IIP expand <u>commercialization assistance</u>, particularly for SBIR/STTR. The CoV recommends:
     - Providing more feedback and coaching to Phase 1 proposals that are denied. See Section 1 for more specifics on this recommendation.
     - Continuing to enhance existing commercialization assistance support for Phase 1 and Phase 2 grantees.

   - In general is difficult for the COV to assess IIP responsiveness to prior COV recommendations because there is a lack of metrics to enable an assessment of progress. The CoV has <u>two key recommendations to improve assessment</u> of IIP's broader impact/commercialization impact:
     - 1. Highlights Illustrating the Story of Individual Grantees
       - The CoV recommends IIP continue to invest resources to improve the preparation and quality of its highlights, and to promote the highlights. For example, the Science Nation videos produced were outstanding examples of SBIR grantee highlights.
     - 2. Quantifiable Measurement of Broader Impact and Economic Impact
       - The COV commends the use of Logic Models as shared by the staff for assessment of SBIR.
       - However, the COV recommends IIP develop a deeper understanding linking elements of these models to actual outcomes, and expanding similar Logic Models to all IIP programs.
       - The CoV recommends IIP continue to utilize resources outside IIP (either within NSF or third-parties such as the National Academies) to develop defensible estimates of their broader impact from their investments in programs in terms of jobs created, wealth created, and other societal benefits such as transformational research topics initiated. Sources for this can include:

- summary statistics on wealth creation and job creation from George Vermont's surveys of SBIR Phase 2 grantees
- summary statistics on matching dollars leveraged from programs such as SBIR Phase 1B & 2B, I/UCRC, and AIR.
- summary statistics on prior NSF lineage of IIP grantees that illustrate transformational research topics initiated.
  - The CoV recommends IIP continue to improve the way it communicates its broader impact and economic impacts to Congress and the taxpayer.

- The CoV recommends IIP continue to regularly measure and report participation by women and underrepresented minorities. To increase participation, the CoV recommends IIP form partnerships and conduct outreach to increase the number of Phase 1 proposals from these groups, as discussed in Section 4.7.

- The CoV recognizes that small businesses lack access to key resources such as those that are available in universities. The CoV recommends IIP stimulate partnerships between SBIR grantees and universities, by promoting the potential benefits/resources SBIR grantees will enjoy as a result of collaborating with universities. For example, this would be an excellent topic to cover at an SBIR Phase 1 grantees workshop.

- Additional recommendations/comments on IIP Programs:
  - REV: The CoV endorses the Research Experiences for Veterans (REV) supplement. The CoV recommends IIP partner with veteran's organizations such as the Veterans Administration to promote the availability of REV funding to eligible veterans.
  - RET: The CoV endorses the Research Experiences for Teachers (REV) supplement. The CoV recommends IIP partner with teacher's organizations such as the Department of Education to promote the availability of RET funding to eligible teachers.
  - I/UCRC:
    - The CoV recommends I/UCRC assess the success of the small business membership supplement for the IUCRC program, and collect feedback from small businesses and industry to assess their ROI as members of an IUCRC.
    - The CoV recommends I/UCRC explore options for extended Phase 3 status.
  - Cross-Pollination: The COV is impressed by the success of the GOALI, IUCRC, and SBIR programs. Are there lessons learned from these programs that can be leveraged to other IIP programs?

2. Please provide comments as appropriate on the program's performance in meeting program-specific goals and objectives that are not covered by the above questions.

- The COV compliments IIP's Program Directors and Staff. They are well qualified. The Program Directors are particularly qualified to understand both the technical and commercial aspects of proposed projects. This is rare to find.

3. Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.

- The CoV recommends NSF review its reporting and PI meeting protocols in the light of the new patent and Intellectual Property (IP) regulations. There is also the need for standard

procedures around the implementation of Freedom of Information Act (FOIA) requirements for PIs particularly for projects with sensitive IP and business practice, market analysis and cost implications. This is of particular concern for the newer programs.

- The COV recommends an NSF wide appraisal of the administrative burden required
  - for universities to participate in the various <u>academic</u> programs beyond the individual PI grant.
  - for PIs themselves
  - for Program Directors within NSF to administer the various NSF programs.
- Look at the new mechanisms that have been put in place like sheltered SBIRs in the ERC program to assess their effectiveness.

4. Please provide comments on any other issues the COV feels are relevant.

- No additional comments.

5. NSF would appreciate your comments on how to improve the COV review process, format and report template.
  - The CoV recommends IIP present its improved metrics and targets, along with actual performance vs. these targets, to future COVs, as discussed in section 5.1.
  - The CoV recommends IIP present Quantifiable Measurements of Broader Impact and Economic Impact to future COVs, based on
    - summary statistics on wealth creation and job creation from George Vermont's surveys of SBIR Phase 2 grantees
    - summary statistics on matching dollars leveraged from programs such as SBIR Phase 1B & 2B, I/UCRC, and AIR.
  - The COV recommends IIP present future COVs of summary of its outreach for attracting new PIs, especially those from women and underrepresented groups. Our deliberations would have been improved with presentation of such a communication/outreach plan.
  - The COV recommends IIP present statistics on awards to new PIs, by Program, in future COVs.
  - The COV was confused by the highlights provided. The highlights provided did not illustrate the broader impacts that we feel IIP is achieving.
  - The COV is supportive of all IIP programs, even those that we did not have extensive time to review, such as REU, RET, I-Corps, RAPID or EAGER programs. It would be useful to have The COV review these in the future.
  - The COV supports the use of a random sample of eJackets. They recommend IIP explain how the "cascading" works, as this remains a bit confusing to the COV.

SIGNATURE BLOCK:

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For the IIP COV
Tom Knight and Michael Silevitch
Co-Chairs