



NSF Webinar

Partnerships for Innovation: Building Innovation Capacity

PFI:BIC

Solicitation: NSF 13-587

--"Smart" Service Systems--

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The presentation with notes will be available following the WEBINAR

<http://www.nsf.gov/eng/iip/pfi/bic.jsp>

1

Welcome to the November 7 webinar for Partnerships for Innovation: Building Innovation Capacity. This presentation pertains to the competition for FY 2014 funds. (It is a slightly modified version the webinar from last month). I am Sara Nerlove, the program director for PFI:BIC .

This slide presentation will be available along with the Note Pages on the PFI:BIC web page, for those unable to attend or for further review.

Please note that there are six (6) additional Cognizant NSF Program Officers from 4 NSF research directorates listed in the solicitation.

They can help answer your questions, particularly those relating to efforts with a technology-basis and/or a service sector of the economy relevant to research communities in various other parts of NSF. You may want to consult with one of these other cognizant program officers regarding the nature of the "smart" service system that you have mind.

--Officers are Andre W. Clegg, MPS; Larry Hornak, ENG; Alexandra Medina-Borja, ENG; Edwin Romeijn, ENG; Ralph Wachter, CISE; and new, as of October, Heng Xu, SBE--



Solicitation: NSF 13-587

The line will be open for Q&A immediately after the presentation.

If you have additional questions after the webinar concludes, please send them via email to: snrlove@nsf.gov

The presentation with notes will be available following the WEBINAR
Also available are the visuals and audio for the September 25, 2013 , Virtual Forum:
NSF Academe-Industry Enabling Smart Service Systems
<http://www.nsf.gov/eng/iip/pfi/bic.jsp>

2

--You will be able to obtain further information and clarifications, whether or not you have been able to attend the webinar--



What is PFI:BIC?

An academe-industry partnership based on existing academic research discovery findings and focused on advancing a platform technology so that it can serve as an enabler of the creation or transformation, respectively, of a “smart(er)” service system that is customer-centered and has potential for significant economic/societal impact.

Further Description:
see “Introduction” and “Program Description” in the current solicitation

Industrial Innovation & Partnerships Solicitation: NSF 13-587

3

What is key? Originality—Innovative Thinking/Depth--Adaptability/Breadth

--Underpinnings are academic research discovery findings— what knowledge can be added/integrated/translated into the partnership to contribute to the project context?

--Two perspectives are joined at this formative stage: academe and business.

Thus, by their very nature, PFI:BIC “Smart” service projects are not only interdisciplinary, they are also cross-organizational.

--Think big, but start on some firm, definable ground. What obstacles in transforming or creating the “smart” service system must be overcome? Do the research tasks make clear that important problems are being tackled?

Be expansive in your vision. The importance of what the possibilities are matters. While you need to look ahead, your thinking must be grounded. A strong case for the project must be rooted in current science and engineering knowledge.

--Note that the technological bases of BIC projects must be less nascent than in the preceding 3 years of this program. They essentially need to be ready for the challenging task of integration with a “smart” service system. Integration, of course, with all the components and considerations that come into play, will require adaptations and modifications and overcoming various obstacles. Yet while, commercialization is important—it is off in the future re: these projects. What is of most concern now, and as one proceeds, is that projects are customer-centered and market-valued. However, some projects may indeed advance more than others toward their innovation goals in the course of their performance periods.



What PFI: BIC is NOT

- **Research about new business models for the service industry.**
Participation of faculty from business schools and entrepreneurship programs or from centers of economic development, if appropriate, can be incorporated to add value and/or to supply the expertise needed for the project but the project has to center on advancing a technology
- **Education, infrastructure for innovation, or the development of an innovation ecosystem that is not integral to this project**
- **Creating models of innovation or models of educating-to-innovate**
- **Moving prototypes, products, processes or systems to commercialization**
- **Creating companies (although this could happen in the course of this work)**
- **Assistance to businesses or contracting businesses to perform tasks for researchers**

Industrial Innovation & Partnerships Solicitation: NSF 13-587

4

Some of the items on this slide could occur and even be stimulated by, or be by-products of, the project, but they are not the focus per se of the projects.

The last bullet represents activities which are one-way and do not convey true partnership.

All of these elements are valuable and, certainly, education is an integral part of the BIC projects in the form of mutual learning of the members of the primary partnership group as well as in the form of education and inspiration of the students who will be engaged in various ways in the context of the work of the partnership group.



Solicitation NSF 13-587

Key Facts

- Letter of Intent (LOI) required: **November 18, 2013**
- Full proposal: **January 27, 2014**
- Awards: up to \$800,000/3-year duration
 - Estimated: 10 awards
 - Anticipated funding: \$8,000,000
- Submission restrictions:
 - One (1) submission opportunity/year
 - Two (2) proposals per institution, each proposal, respectively, pursuant to one (1) LOI
 - PI who is proposed
 - Cannot be PI on an active award from the NSF PFI:BIC program
 - PI cannot submit to both the PFI:BIC or either option of the PFI:AIR program (i.e., (1) AIR:Technology Transfer or (2) AIR:Research Alliance) for funding FY 2014 funds

Industrial Innovation & Partnerships Solicitation: NSF 13-587

5

Note that each institution may submit two proposals as a lead institution – this is different from previous years when the limit was one per institution. There is no restriction on participation as a subawardee on other PFI:BIC proposals.

Number of Awards & Program Funding—is always subject to actual funding available

Submitter restrictions -- the idea is that leadership responsibility for one of these types of partnership projects requires a particularly major effort.

PI—re: active award. Ok, if the current award graduates by the end of September 2014.



What Innovation Capacity Is Being Built?

- **Technological Innovation Capacity**

- Advance a platform technology by overcoming critical obstacles or barriers, identifying potential market(s) (adding new possibilities as the research progresses), and increasing the understanding of how to meet the needs of those markets.

- **Human Innovation Capacity**

- Growth and development of academic faculty and research scientists and industrial partners through interdisciplinary and cross-organizational collaboration.
- Preparation of next generation entrepreneurs: mentoring plan for each undergraduate or graduate student (as well as for postdoctoral researchers) so that exposure to and participation in this kind of collaboration is explicitly emphasized.

Industrial Innovation & Partnerships Solicitation: NSF 13-587

6

Expected Outcomes: “Takeaways” for faculty, students, and industrial partners:

Takeaways are defined as capabilities, competencies, or more tangible items that one can move forward with—contrasts with the more passive concept of “benefits”

There are takeaways for the faculty, students, other researchers, and industrial partners—everyone should be slated to win here and be able to carry on in a way that has been changed by the project. “Takeaways” are simply more than what you receive—the concept describes lively and dynamic outcomes. These “takeaways” not only may be important in continuing the work of this project but also in the context of other innovation research in different partnership contexts.

--With regard to industrial partner(s): the potential to contribute to being able to thrive and/or to grow.

--With regard to faculty: increased agility in adapting research in the interest of moving to market-valued solutions.

--With regard to students—the aim is for the project to have an indelible effect on the students who participate. Student involvement is essential, but note that these projects are research projects and are not focused directly on education. Students should get important added education directly through participation in the project.



What Is a “Smart” Service System?

- **A service system can be seen as a socio-technical system**
 - Configurations of people, technologies, organizations, and information designed to deliver services that create and deliver value
- **Illustrative capabilities of a “smart” service system**
 - Learning and decision making based upon data received, transmitted, and/or processed
 - Self-diagnostic, self-correcting, self-monitoring, self-organizing, self-replicating, self-control
 - Characterized by a sequence of features such as detection, classification, and localization leading to an outcome
 - Dynamic adaptation
- **The system itself can be seen as constituting a 3rd type of innovation capacity to be built**

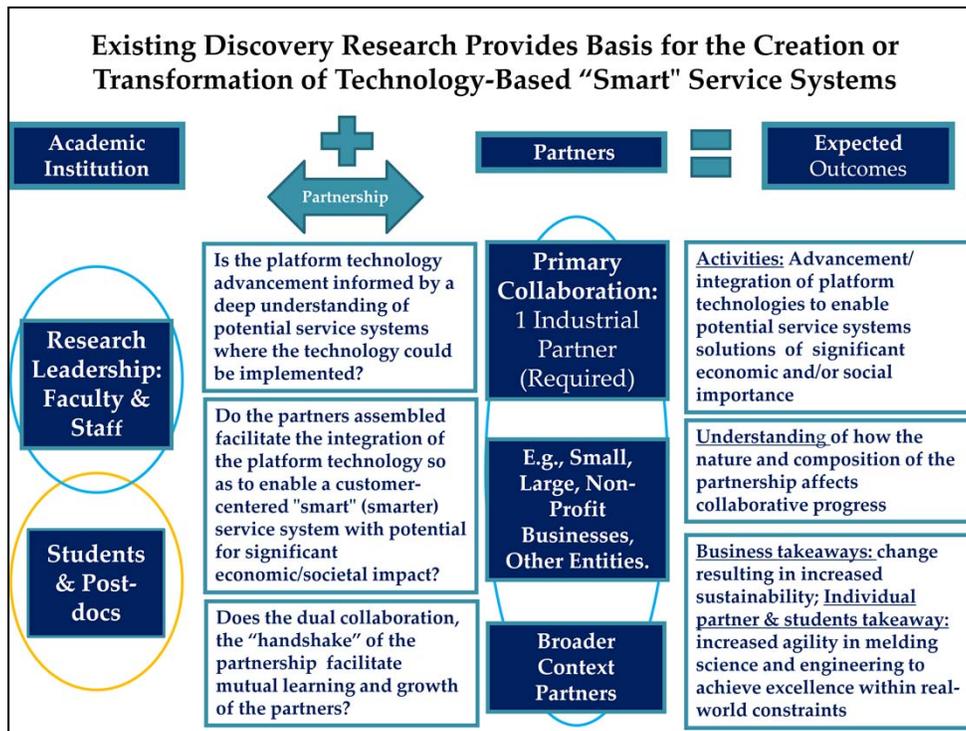
Further Description:
see “Introduction” and “Program Description” in the current solicitation

7

--A full understanding of the socio-technical system will require interdisciplinary teams to build the innovation capacity of the system. One needs to understand the technology, the organization and the people.

--In this context, technological innovation capacity and human innovation capacity must be combined in various ways.

-- A salient question to ask is, what has prevented such a system from being brought to fruition earlier?



An PFI:BIC academe-industry partnership is based on existing academic research discovery findings and focused on advancing a platform technology so that it can enable, respectively, the creation or transformation of a "smart(er)" service system that is customer-centered and has potential for significant economic/societal impact.

Integration of platform technologies in service systems can occur at different levels:

Service concept. Innovations leading to the emergence of novel services never before considered. [Examples include the emergence of online auction services in the 1990s or remote conferencing services facilitated by new technologies.]

Customer interface. Innovations in the customer interface. [Examples include the customer interface of self-service technologies, auto-translating technologies, auto-diagnosing technologies, etc.]

Manner of delivery. Innovations in the way the service is delivered. [Examples include innovation in mailing logistics, and online services that were initially provided over the phone or in person.]

Processing systems. Innovation in processing systems that feed service systems through the introduction of technologies, thereby creating value in the form of more efficient service systems or higher service quality on the back end but which do not necessarily involve the interface with the end customer. [Examples include communication technologies to track inventory.]



Recommend the Following Project Components Be Addressed in Detail

(1) Engineering component

- Clear understanding of service system design and system integration issues

(2) Computer science/information technology component

- Field of knowledge of discovery itself and/or
- Considerations involving data transfer, communication and/or data processing needed for successful integration of the platform technology into a “smart” service system

(3) Social/behavioral and/or cognitive science component

- An understanding of the effects of potential human factors on any technology proposed that will have an impact on potential users must be considered to ensure success.

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9

--The presence of these 3 components should be reflected in the project tasks.

--Engineering

(1) In addition to providing systems understanding, engineers in different areas can play a role with the technology development and/or (2) data processing requirements, etc.

--Social/behavior and/or Cognitive Science

(3) Human factors researchers can play the role(s) of the social/behavioral and or cognitive science component as appropriate.

Caution: human factors are important, but the core of the project must be technology-based. I.e., the project is to be centered around technology breakthroughs. Per the solicitation, human factors, usability and behavioral components of any effort need to show how the users will react to and value the system.



Project Components (Cont'd)

- **To ensure the success of the project, it is important to cover the skills and experiences required of the partnership as a whole to carry out the project, whether these capabilities come from the academic or the industrial side.**
- **Some individuals may cover more than one of these skill sets.**



Partnership Requirements

- A minimum primary partnership is composed of:
 - Lead academic institution researchers
 - One industrial partner with commercial revenues
- **All partners must have an explicit commitment (stated in the partnership letter on letterhead)**
 - Types of commitment: financial or in-kind
 - If partner qualifies as small business and has a subaward, commitment must be over and above subaward compensation
- **Other partnering—no specific requirements, but it is likely that other partners might be needed; e.g., so as to include explicit expertise in “smart” service systems and/or to cover the required components of the project**

Industrial Innovation & Partnerships Solicitation: NSF 13-587

11

The constraint on the industrial partner only pertains to the one (or more) of such partners that is designated as part of the minimum primary partnership.

The inclusion in the partnership of any organizational entities over and above the minimum partnership requirements is up to the proposer and is not subject any eligibility constraints.

The power of the joining of the perspectives of academe and industry is an important element of responsive proposals. A partnership entails interaction integral to the effort; it is more than a division of labor.

Note that strong, meaningful working relationships between the academic research team and the other partners are not likely to have been “born yesterday”.

Other partners may be for-profit, not-for-profit, additional industrial partners (either large or small), additional academic institutions, consultants, or government entities. These can belong to the inner circle of the partnership or the outer circle; for example, those in the outer circle may be in an advisory capacity or fulfill limited or special roles. If you elect to have additional partners, these partners are also required to provide commitment letters.

Regarding global partnerships: what is important in choosing partners is to view the BIC partnership project as clearly intended to be a win-win for the U.S. While no funds can go directly to international company offices, the global firm is benefitting from a research context enabled by U.S. tax dollars. So choose carefully, use your judgment, and describe the situation. Note too that the solicitation expresses interest in the U.S. service economy (a large part of our economy)--becoming “smart” or smarter, based on research discoveries.



Cooperative Research Agreement/s (CRAs)

- Between lead institution and the industrial partner(s) as well as with any other partners for which a CRA is relevant.
- Provide one signed document that can cover/include all agreements or provide multiple signed documents
- Distinguish CRAs from Cooperative Agreements (CAs) referred to in Section VII. B. of the solicitation

Think ahead, eliminate surprises, and foster lasting, amicable relationships

Industrial Innovation & Partnerships Solicitation: NSF 13-587

12

These two slides, this one and the next, provide information about Cooperative Research Agreements (CRAs).

IMPORTANT: While CRAs are required for all proposals, at the time of proposal submission, all that is needed is a letter from the lead institution stating that CRAs will be provided at the time of recommendation of an award.



Cooperative Research Agreement/s CRAs - Timing

- Draft CRAs early or, at least, think these through early—because “provided at the time of award” means **when the program officer is seriously contemplating an award** recommendation (i.e., this could be within days or weeks of the peer review panel meeting under which the proposal was reviewed)
- Know about fees (if any), review time for approval, etc.
- CRAs will need to be submitted to NSF in a timely manner upon request, in order for a recommended award to move through the internal review process
- Without completed CRAs (with electronic copies sent to NSF), there can be **no award**

Further Description:

See V.A.J(5) “Cooperative Research Agreements” in the current solicitation

13

Timing is of the essence—

Begin by sitting down with your partners early, prepare your LOI early, prepare your proposal early, and concern yourselves with the what-ifs of the CRA (singular or plural) early.

Partnership proposals need input from all partners, their cognizance of the entire project plan, and an opportunity for them to vet at least an advanced draft of the proposal--sometimes, the partners indeed may participate directly in some of the writing. If the partners are conversant with the project as described in the proposal, then all those partner organizations which are participating in the signing of CRAs will be able to appropriately anticipate them.

It is of vital importance not to underestimate the twists and turns in submitting a BIC partnership proposal involving many participants, not the least of which is traffic and other possible bottlenecks on the FastLane side of the equation.



Other Considerations

- **Preliminary results**

These projects might need to achieve a balance between seeking the answers to significant questions in order to adapt the existing discovery to this new service context and having obtained enough preliminary results to be convincing that the direction has potential

- **Portability/adaptability for different industry sectors & markets**

Industrial Innovation & Partnerships Solicitation: NSF 13-587

14

--**Preliminary Results**: Is this project one that would be enhanced by preliminary results? (Note, this is not a requirement and is neither feasible nor indicated for all projects.)

Having preliminary results in certain instances may be important for the following: the case for every project needs to have important grounding in science and engineering.

--**Portability/adaptability** may serve to identify those projects that have more potential for economic/societal impact.



Additional Review Criteria

Read them when preparing your proposal – the peer-review panelists will!

- Reference VI-A: “Merit Review Principles and Criteria”, under “Additional Solicitation Specific Review Criteria”

Industrial Innovation & Partnerships Solicitation: NSF 13-587

15

The Other additional review criteria are as follows:

- The promise of the platform technology to enable a “smart” service system or systems, which have the potential for economic/societal impact. *[Remember: this includes either the creation of a “smart” system or the transformation of a “smart” to a “smarter” system.]*
- The value of the activities to be carried out to address the central issue on which the partnership is focused; namely, identifying and advancing platform technologies so as to enable “smart” service systems to enter into the commercialization process and to help ensure positive social outcomes that would result from successful commercialization. *[Remember: commercialization is important—but it is off in the future re: these projects. What is of most concern now, and as one proceeds, is that projects are customer-centered and market-valued.]*
- The quality of the primary partnership (e.g., expertise, achievements, complementarities, commitment) as integral to the planning and execution of these activities
- The likelihood that the nature and participation of students and/or postdoctoral researchers in this culture of collaboration will prepare them to be future innovators.



Letter of Intent (LOI)

- Concerns have been expressed about character limits; these are standard and not malleable; however, the space available under **“Other Comments”** can be used to include additional important data that does not fit elsewhere.
- Read the additional information on LOI on the PFI:BIC website.

Reference: “VA. Proposal Preparation Instructions Letters of Intent (required)” in the solicitation and http://www.nsf.gov/eng/iip/pfi/bic/BIC_letterofintent.jsp

Under contacts: Be sure to provide a current phone number and e-mail for the PI in the LOI. It could make a difference! I.e., Can we reach you or not?



Reviewer Suggestions

- Annotated list (for annotations, e.g., see the key words you plan to provide in your project summary) of suggested reviewers with full contact information. Think also about individuals knowledgeable about “smart” service systems.
- Be mindful and conservative about conflicts of interest when suggesting reviewers.
 - If submitted prior to proposal submission, reference LOI number and send by email to snerlove@nsf.gov

Industrial Innovation & Partnerships Solicitation: NSF 13-587

17

If you do submit suggestions, that gives me a chance to get a further sense of dimensions of the projects when composing review panels.



Solicitation: NSF 13-587

Questions?

Questions may also be sent via email to:
snerlove@nsf.gov

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Industrial Innovation & Partnerships Solicitation: NSF 13-587

18

Parting words before questions: READ the Solicitation: Talking with me or writing to me is best done when you have done a lot of homework and have questions, rather than when you are seeking a more broad-gauged tutorial. My role is not really to advise you on the many matters where it must be your choice and your wisdom that are in line with what YOU think will be a dynamite project. You will be needing first and foremost to convince a peer review panel.

Let me note at this juncture that one of the cognizant program officers, Alexandra Medina-Borja, is an industrial engineer, who has a strong interest and background in service systems. Thus, she is a resource for your questions on services systems; however, for her to be helpful to you, you need to have questions and concerns that arise AFTER "Smart" Service Systems 101. ("Smart" Services 101 is your pre-requisite via your partners' wisdom and/or any other means at your disposal.)

Again, these slides as well as the note pages will be posted.



Solicitation: NSF 13-587

ADDITIONAL INFORMATION

Industrial Innovation & Partnerships Solicitation: NSF 13-587

19

Then there are 3 more slides—they are an addendum to this presentation. They are meant to help in the preparation of your proposal



Budget Justification

Line-by-line explanation of the budget items on the page for the Cumulative Budget

- If any of those items have subcategories, break out those subcategories and then show a total corresponding to the total for the line item
- For all consultants, provide a letter describing what each will be doing, daily rate, and time available. If the consultants are from or via partners, this information can be included as part of the partner letter. (Also, include under line item for Consultants in the Budget)

I urge PIs to be very involved in reviewing their own budgets—budgets speak volumes. Delegation is fine, but in the end, this is a matter for which you need to be responsible--it can cost you not to be.



Time commitment: PI & Co-PIs

- All PI/Co-Pis listed on the cover page and, in addition, at least one PD/leader on each subaward, should have a formal time-commitment—even if the time commitment is modest and, as may be the case, turns out to under-represent what actually is likely to occur for a project that the participants are passionate about
- PI is the intellectual leader of a project and in this context goes well beyond the role (albeit a critical one) of supervising students. Carefully consider what is an appropriate time commitment
- Be careful not to over-commit

Industrial Innovation & Partnerships Solicitation: NSF 13-587

21

PIs—think carefully when you choose a level of commitment to your project. While these projects involve coordination and delegation—these projects demand some serious direct intellectual leadership. The knowledge, experience, and savvy of the PI is of major importance here despite the need for a strong team. In joining the perspectives of academe and industry—it is important to say that in general, the more each side of the equation also has knowledge of the other, the better. The PI needs to roll up his/her sleeves in integrating the cultures of these two worlds and in ensuring the smooth operation and flow of the partnership activities and knowledge exchange.



Bio-Sketches for Partners

- From all main representatives and/or those playing explicit research roles.
- Not a Co-PI (more common)
 - If an industrial partner is not a Co-PI. Classify him/or her as *Senior Personnel* , whether or not he/she is Senior Personnel on a subaward
- Label Bio-Sketches and Cross-Reference in Partner Letters
 - Label top of each bio sketch: person's name, category of participation (PI/Co-PI, Industry/Other Organization, and Affiliation)

22

An attempt has been made to further clarify the matter of bio-sketches:

Bottom Line re: What NSF and reviewers want to know:

--Who is participating from and/or importantly representing the lead institution and the partner organizations?

--What is the background and experience of each?

Business partner participants are not usually official Co-PIs on the NSF proposal cover page. A business partner participant or one from another academic institution, however, can be made a Co-PI. Note the PI and all Co-PIs are classified as Senior Personnel. This certainly has happened on the PFI:BIC projects.

See F. under guide to submission of a proposal: it contains information about Co-PIs, who are Senior personnel, as well Non-Co-PIs--who must be classified as Senior Personnel-- so that bios for them can be submitted. All can submit their bios in the NSF separate bio-sketch module.

- Cross-reference in the respective partnership letter that the bio-sketch for each of those designated as a participating individual (i.e., the main representatives and/or those playing explicit research roles) is located with those of the PI and Co-PIs. and has been submitted through the FastLane module.
- Format/content can be adjusted to be relevant for individuals not in academe