

NSF Webinar



Partnerships for Innovation: Building Innovation Capacity (PFI:BIC)

Solicitation: NSF 16-591

“Smart” Service Systems

Alexandra Medina-Borja, Ph.D.

Program Director

Industrial Innovation and Partnerships

Directorate for Engineering

National Science Foundation

Fall 2016

The presentation (slides and recording) will be available following the webinar

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



Solicitation: NSF 16-591

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: amedinab@nsf.gov

**The presentation with notes will be available following the webinar
<http://www.nsf.gov/eng/iip/pfi/bic.jsp>**



What is PFI:BIC?

*“If you want to go fast, go alone;
if you want to go far, go together”*
African Proverb



What is PFI:BIC with a focus on Smart Service Systems?

- An academe-industry partnership led by an **interdisciplinary** academic research team collaborating with at least one industry partner in order to carry out research to:
 - advance, adapt, and integrate technology into a specified **human-centered, smart service system** that functions as a technology test bed.
- The objective is to create or transform a “smart(er)” service system that has the potential for significant social and economic impact.

Reference I. Introduction and II. Program Description in the solicitation for further description of PFI:BIC.

<http://www.nsf.gov/pubs/2016/nsf16591/nsf16591.htm>



Cognizant Program Officers

- **Alexandra Medina-Borja**, ENG/IIP/PFI:BIC, Program Director, telephone: (703) 292-7557, email: amedinab@nsf.gov
- **Gurdip Singh**, CISE/CNS, telephone: (703) 292-8061, email: gsingh@nsf.gov
- **Jordan M Berg**, ENG/CMMI, telephone: (703) 292-5365, email: jberg@nsf.gov
- **David J. Mendonca**, ENG/CMMI, telephone: (703) 292-7081, email: mendonca@nsf.gov
- **Leon Esterowitz**, ENG/CBET, telephone: (703) 292-7942, email: lesterow@nsf.gov
- **William J Cooper**, ENG/CBET, telephone: (703) 292-5356, email: wjcooper@nsf.gov
- **Michele Grimm**, ENG/CBET, telephone: (703) 292-4641, email: mgrimm@nsf.gov



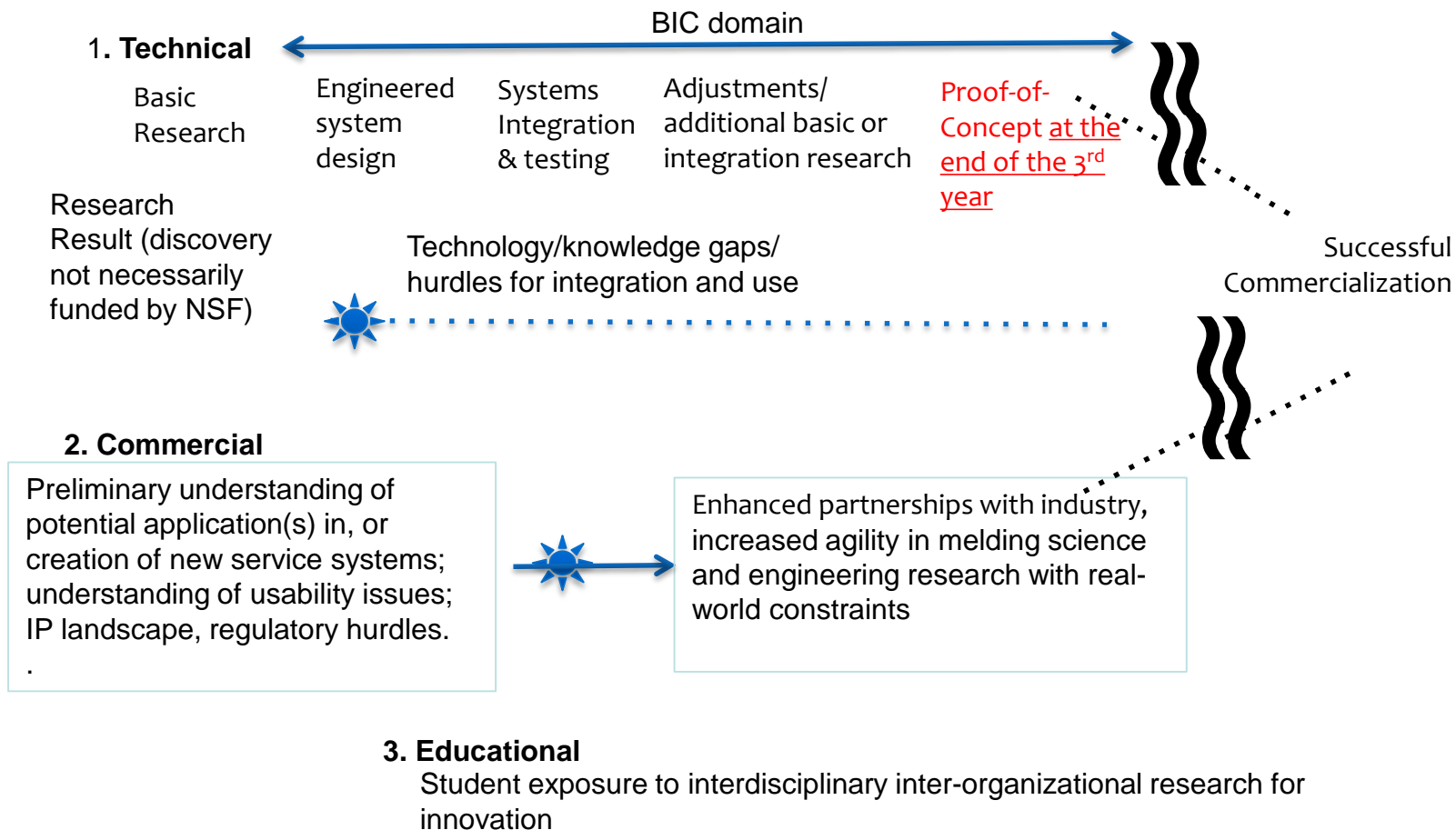
Solicitation: NSF 16-591

Key Facts

- Letter of Intent (LOI) required: **October 14, 2016**
- Full proposal submission deadline: **November 16, 2016**
- Awards: up to \$1,000,000/3-year duration
 - Estimated: 10 awards
 - Anticipated funding: \$10,000,000
- Submission restrictions:
 - One (1) submission opportunity/year
 - Two (2) proposals per institution, each proposal pursuant to the LOI that summarizes the intended proposal
 - Principal Investigator (PI) who proposes
 - Cannot be concurrently a PI on an active award from the NSF PFI:BIC program



PFI:BIC- Smart Service Systems





Partnership Project Types

- Open to any knowledge domain or application area,
- Operate in the post-fundamental/early translational space,
- Building on novel fundamental research discoveries,
- Technology requires interdisciplinary collaborations to be advanced,
- A clear path to commercialization does not need to be a central part of this proposal,
- Proposal must be mindful of the state of the art and the competitive landscape,



Partnership Requirements

- A minimum partnership is composed of
 - An academic research team
 - One industrial (aka corporate or business) partner (either for profit or not-for-profit) with commercial revenues in the United States in order to ensure that the project includes an informed business perspective
- *All* partners, whether primary or broader context, must provide an explicit signed confirmation of the partnership (stated in the partnership letter) on letterhead

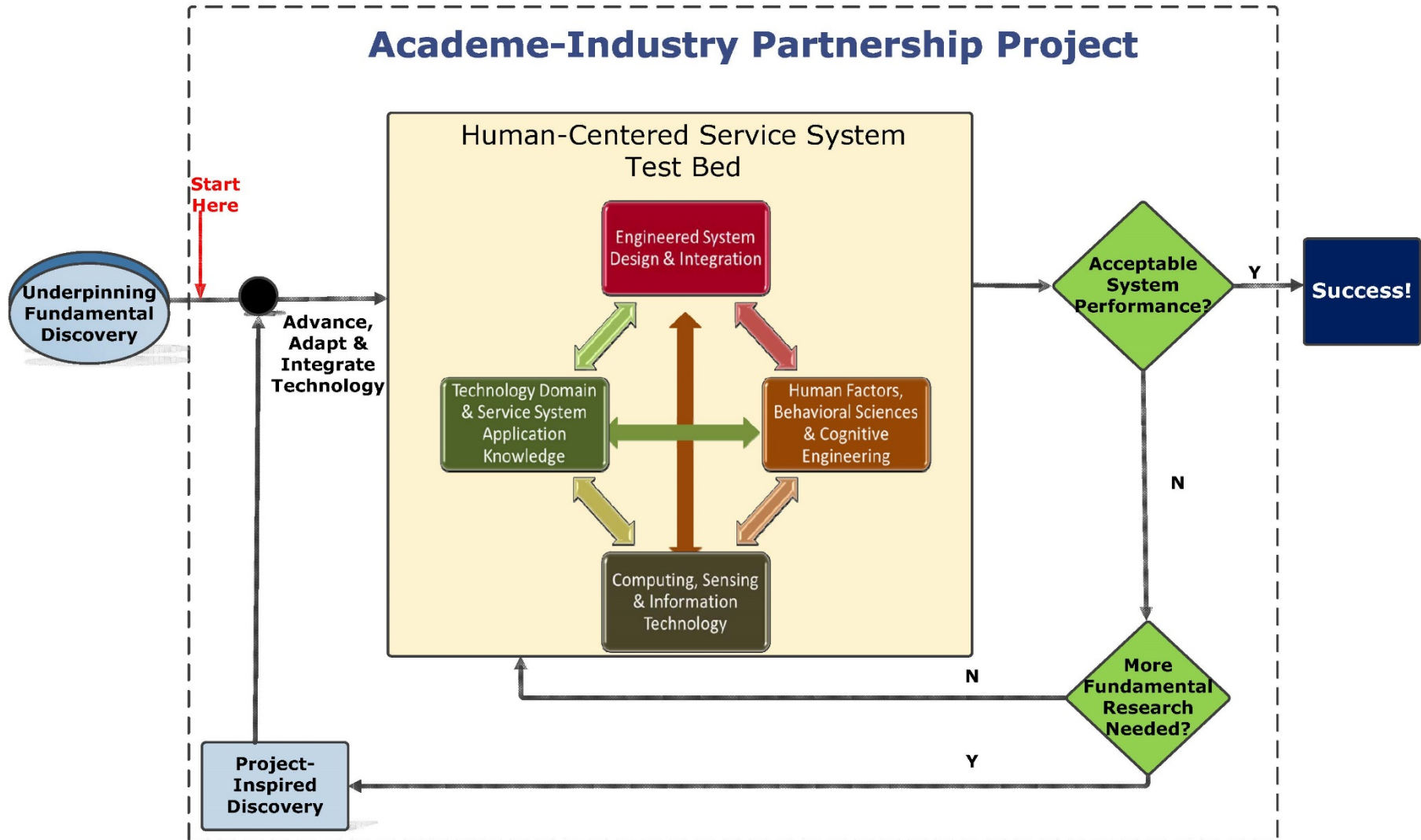


What is a Smart Service System?

- A **“smart” service system** is a system that interacts with humans and amplifies or augments human capabilities to identify, to learn, to adapt, to monitor and to make decisions
- The “smart” service system does so through
 - Self-detection, self-diagnosing, self-correcting, self-monitoring, self-organizing, self-replicating, and/or self-controlled functions
- These capabilities are the result of the incorporation of technologies for
 - Sensing, actuation, coordination, communication, control, etc.



Anatomy of a PFI:BIC Smart Service System Project





Successful Integration into a Smart Service System

(1) Engineered System Design and Integration

- To provide knowledge of service system design and system integration issues.

(2) Computing, Sensing and Information Technologies

- To provide knowledge of considerations involving data transfer, communication and/or data processing needed for successful integration of the technology into a “smart” service system.

(3) Human Factors; Cognitive Engineering or Behavioral Sciences

- To provide knowledge of the potential effects of human factors as they interact with the technology proposed. These findings will have an impact on ensuring that the design of the “smart” service system is human-centered.



Human-Centered Services:

About the Human Factors Research Component

- Conduct studies to evaluate how humans use these services, or how the human and the engineered system integrate.
 - What level is appropriate is project-dependent.
- This component is in conjunction with testing whether you achieved acceptable system performance.
 - Is it useful and practical, appropriate, hopefully easy to use.
- Use the results from these studies to inform the design of the system
- Testing the usability and usefulness of the system could promote project-inspired fundamental research



Key Elements of a PFI:BIC proposal

- A PFI:BIC proposal includes few elements different than those in a regular fundamental research proposal
- Still, a PFI:BIC proposal is an academic research proposal, so the same level of rigor and knowledge is required
 - This is a very competitive program, so you need a discovery that can revolutionize the service system or create a totally new one.
- The following slides cover some of these important sections that may be new to some.



Project framework.

- The Project Description now requires a Project Framework
 - Need or Gap and Broader Impacts of the Proposed Work.
 - Solution
 - Competitive Landscape and state of the art of the research
 - Partners and Partners' Contributions
 - Organizational/Roles (this sub-section can be integrated in the above or can be accomplished by a Diagram)
 - Objectives
- **Proposals without project framework will be returned without review**



Research plan in the Project Description.

- Distinct from the project framework
- Discuss the scientific context of the **original research discovery(ies) the team is planning to translate;**
- How the technology can be further advanced and adapted to allow integration into a service system.
- Must include test and evaluation plan
- Must include a discussion of the synergies and knowledge to be gained from the interdisciplinary and cross-organizational research
- Part 2: project management plan and schedule



The Primary Industrial Partner's LETTER

- Letters from primary partner(s) must include
 - A description of the contributions to the project
 - If a partner qualifies as a small business, and it also has a subaward, **contributions to the project must be over and above subaward compensation**
 - A sentence acknowledging that a Cooperative Research Agreement (CRA) between the academic institution(s) and the company will be negotiated involving the corresponding legal departments.



Cooperative Research Agreement

- Between the lead institution and the industrial partner(s) as well as with any other partners for which a CRA is deemed relevant (IP might be created).
 - Provide one signed document that can cover/include all agreements or provide multiple signed documents
 - CRAs will need to be submitted to NSF within 6 weeks after notification that the program is considering a recommendation for award (if that is the case, you will receive a communication from the program director within a month or two after the last peer review panel of the cycle has been convened).

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



Cooperative Research Agreements (CRAs) (cont'd)

- Without the fully executed (i.e., signed by all parties) CRAs (with electronic copies sent by email to the program director), there can be **no award**.
- Immediately discuss this requirement with your industry partners before you submit your proposal or better still before you submit your LOI; this might result in an understanding that this partner cannot meet this requirement
- Draft CRAs early or, at least, think these through early, but do not submit any documentation with your proposal other than the partner letter and the certification from your institution.
- Do not underestimate this matter



Other Additional Solicitation-Specific Review Criteria



Partnership



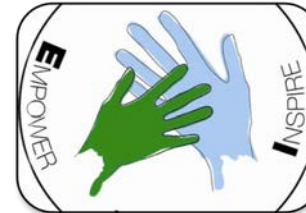
Technology



Testbed



Research Plan



Mentoring Plan



Other Additional Solicitation-Specific Review Criteria

- **Partnership.** The quality of the primary partnership
- **Technology.** The novelty and the potential of the technology
- **Test Bed.** The appropriateness of the smart service system to serve as a test bed for the integration of the proposed technology.
- **Research Plan.** The value of the research tasks to be carried out, including the test and evaluation plan for human-system integration.
- **Mentoring Plans.** The likelihood that the nature of the participation and the quality of students' and/or postdoctoral researchers' exposure in this interdisciplinary and cross-organizational culture of collaboration will prepare them to be future innovators.



Letter of Intent (LOI)

(Required)

- 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.
- Include in the Synopsis section of the LOI, the technology domain and area of application of the service system test bed.

**Reference: V. Proposal Preparation and Submission Instructions
A. Proposal Preparation Instructions, Letters of Intent (required)**



Solicitation: NSF 16-591

Questions?

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

The presentation with notes will be available following the WEBINAR
<http://www.nsf.gov/eng/iip/pfi/bic.jsp>



Solicitation: NSF 16-591

ADDITIONAL INFORMATION



Solicitation: NSF 16-591

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 these subcategories and then show a total corresponding to the total for the line item
- For each consultant, provide a letter describing what each will be doing, daily rate, and time available. (Also, include under line item for Consultants in the Budget).



Solicitation: NSF 16-591

Time commitment: PI & Co-PIs

All listed on the cover page and, in addition, at least one PD/leader on each subward, should have a formal time-commitment—even if the time commitment is modest and, as may be the case, turns out to underrepresent 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, his/her role goes well beyond that of supervising students, the importance of that role notwithstanding; carefully consider what is an appropriate time commitment
- Be careful of over-commitment vis a vis other activities and re: NSF limitations on time that can be budgeted



Solicitation: NSF: 16-591

Bio sketches for Partners

- From all main representatives of entities in the partnership 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/Senior Personnel/Representative, Industry/Other Organization, and Affiliation)