

## Survey Questions for PFI-AIR

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ID #	Logic		Item	Freq.	Response Scale	Variable type/Data entry format	Question Item Source Material	Outputs or Outcomes Addressed
1			How many publications have you authored based on technology or advancements in the underlying discovery supported by the AIR award?			Numerical text box	NEW	Immediate Outcomes: Knowledge in the technology sector is advanced
2		Only asked if member of the NSF-funded project team	To what extent has any of the following occurred as a result of your participation in the NSF PFI:AIR award? <b>TEACHING</b> <ul style="list-style-type: none"> <li>• I developed a new opportunity for students to gain innovation experience</li> </ul> <b>RESEARCH AND LEADERSHIP</b> <ul style="list-style-type: none"> <li>• I changed the way I think about my research</li> <li>• I led a change effort in my department, institution, or organization (e.g., policy, curriculum)</li> </ul>		A. Yes B. Some C. No D. Not applicable	Matrix/Array	EEC Impact Interview Protocol <sup>6</sup> ; I-Corps Indicators & Monitoring System <sup>3</sup>	Immediate Outcomes: Researchers and/or students use industry knowledge in other contexts

## Survey Questions for PFI-AIR

			<ul style="list-style-type: none"><li>• I encouraged my students to talk to potential customers about their research or technologies</li></ul> <p>CAREER</p> <ul style="list-style-type: none"><li>• I applied what I learned from the NSF-funded project in other projects or career endeavors</li><li>• I advised/mentored teams that are interested in commercializing their research or starting a venture related to their research</li><li>• I pursued new career opportunities related to research commercialization and / or venture development</li></ul> <p>ORGANIZATIONAL BENEFITS</p> <ul style="list-style-type: none"><li>• Encouraged other faculty to get involved with innovation projects</li></ul>				
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## Survey Questions for PFI-AIR

			<ul style="list-style-type: none"> <li>Lowered institutional barriers to collaborations with industry</li> </ul>					
3	Business Creation	Only asked if member of the NSF-funded project team	To your knowledge, has a company been incorporated based on technology advanced by this PFI:AIR project?	Annually, if answer in previous year was No	Binary: Y/N		Kauffman Firm Survey <sup>5</sup> ; I-Corps Indicators & Monitoring System <sup>3</sup>	Immediate Outcomes: New businesses incorporated
4	Business Creation	Only asked if member of the NSF-funded project team <i>and</i> company has been incorporated	What is the name of this company?	This may be redundant after year 1	Text: open		Kauffman Firm Survey <sup>5</sup> ; I-Corps Indicators & Monitoring System <sup>3</sup>	Immediate Outcomes: New businesses incorporated
5	Business Creation	Only asked if member of the NSF-funded project team <i>and</i> company	When was [COMPANY NAME] Initiated?		<ol style="list-style-type: none"> <li>Prior to participation in the NSF-funded project</li> <li>During the NSF-funded project</li> <li>After completing the NSF-funded project</li> </ol> <p>If known please provide the date of company initiation. Text box</p>	Multiple choice Text Box	Kauffman Firm Survey <sup>5</sup> ; I-Corps Indicators & Monitoring System <sup>3</sup>	Immediate Outcomes: New businesses incorporated

## Survey Questions for PFI-AIR

		has been incorporated						
6		Only asked if member of the NSF-funded project team <i>and</i> company has been incorporated	How many employees does [COMPANY NAME] have?		Numeric text box	Numeric entry	PFI:AIR Indicators & Logic Model	Immediate Outcomes: New businesses incorporated
7	Technology Development		Are there any products, services, or processes in the market, market ready, or awaiting regulatory approval whose commercialization you can attribute (to some degree) to your participation in the NSF-funded project?	Annual		Binary: Y/N	SBIR Common Questions; PFI:BIC Logic Model & Indicators <sup>2</sup> ; PFI:AIR Logic Model & Indicators; I-Corps Indicators & Monitoring System <sup>3</sup>	Intermediate Outcome: Technology advancement to commercialization
8	Technology Development	Only asked if commercialization can be attributed to the NSF-	[If yes] Please enter the following information about products, services, or processes to the best of your knowledge	Annual	Multiple textboxes – for each row: Describe Product Status Number of units sold (if any) Amount of sales in last fiscal year Amount of sales since commercialization	Multiple textboxes – for each row:	SBIR Common Questions	Intermediate Outcome: Technology advancement to commercialization

## Survey Questions for PFI-AIR

		funded project																					
9	New Research Directions	If above=NO	Primary issue affecting market/commercialization efforts:		1) Technical Failure or Difficulty a) Key personnel left company b) Estimated costs too high c) Ran out of money or other resources d) Intellectual Property Issues e) Technology obsolete 2) Market Demand Difficulty a) Market needs change b) Costs too high (not cost competitive in market place) c) Business segment in recession d) Market was not there to begin with	May choose option 1 or 2 ONLY; then any of the subheadings under that option	SBIR Common Questions; PFI:AIR Indicators & Logic Model	Intermediate Outcome: Technology advancement to commercialization															
10	Outputs: Collaborations	Only asked if company has been incorporated	Please list any external collaborations that you can attribute to your participation in the AIR program		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Partner Name</th> <th>Organization Type</th> <th>Financial contributions of partner organization</th> <th>Timing of collaborations</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Partner Name	Organization Type	Financial contributions of partner organization	Timing of collaborations	1					2					Multiple textboxes	I-Corps Indicators & Monitoring System <sup>3</sup> ; EFRI Indicators& Monitoring System <sup>4</sup> ; PFI:BIC Logic Model & Indicators <sup>2</sup> ; PFI:AIR Logic Model & Indicators	Intermediate Outcomes: New and sustained partnerships
	Partner Name	Organization Type	Financial contributions of partner organization	Timing of collaborations																			
1																							
2																							
11			How many NEW 3 <sup>rd</sup> party investors were attracted to the project after the award was made?			Numerical text box	PFI: AIR Logic Model	Intermediate Outcomes: New and sustained partnerships															
12	New Research	A. All B. Only if	A. Have you been able to identify new		<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>	Binary: y/n	EFRI Indicators & Monitoring	Intermediate Outcomes: New															

## Survey Questions for PFI-AIR

	Directions	A= YES C. Only if B=YES	market opportunities? B. Have you pursued funding for these new directions? C. Were you successful in securing funding for these new directions?				System <sup>4</sup> ; PFI:BIC Logic Model & Indicators <sup>2</sup>	Research Directions identified
13	Outputs: Licensing	Only asked if company has been incorporated	How many of the following does [the NSF-funded project TEAM MEMBER/INSTITUTION ] have that have been issued under the AIR award or related to the AIR project (post-funding decision)? Enter zero if none.		<ul style="list-style-type: none"> <li>• Inventions Disclosed</li> <li>• Licensing Agreements</li> <li>• Provisional Patent Applications</li> <li>• Full Patent Applications</li> <li>• Patents Granted</li> <li>• Patents in Use</li> <li>• Inventions Producing Royalties</li> <li>• Software Copyrights</li> <li>• Company Trademarks</li> <li>• Non-disclosure Agreements (NDA)</li> <li>• Materials Transfer Agreements (MTA)</li> </ul>	Numerical: open for each option	Kauffman Firm Survey <sup>5</sup> ; I-Corps Indicators & Monitoring System <sup>3</sup>	Intermediate Outcome: Technology advancement to commercialization
14			To your knowledge, has the technology developed in this AIR project been licensed?		<ul style="list-style-type: none"> <li>• Yes                             <ul style="list-style-type: none"> <li>• To small business not related to the PI/University</li> <li>• To small business spin off from the PI</li> <li>• Larger established firm</li> </ul> </li> <li>• No</li> </ul>	Radio buttons	PFI:AIR Indicators & Logic Model	Intermediate Outcome: Technology is licensed
15	Outputs: Workforce Development	Students/ Postdocs related to this NSF	<ul style="list-style-type: none"> <li>• How many students/postdocs have you mentored on this PFI:AIR</li> </ul>			Numerical text boxes for each.	NEW	Intermediate Outcome: Trainees pursue careers in

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		award	<p>project?</p> <ul style="list-style-type: none"> <li>How many of your students on the PFI:AIR project have graduated with a master's degree?</li> <li>How many of your students on the PFI:AIR project have graduated with a PhD?</li> </ul>					practically oriented research
16			(FOR PIs) Please describe the innovation/entrepreneurship training these students/post docs received.		Text Box		PFI:AIR Indicators & Logic Model	Intermediate Outcome: Trainees pursue careers in practically oriented research
17	STEM Workforce Development		(FOR PIS) How many of your former students/trainees supported by this award have gone on to careers in the following:		<p>A. Academic research in a STEM field</p> <p>B. Private industry in a STEM field</p> <p>C. Government</p> <p>D. Research administration</p> <p>E. Teaching</p> <p>F. Communication</p> <p>G. Start Up Firm (&lt;3 years old)</p> <p>H. Other</p>	Multiple answers with structured numerical text-box fill in for each	PFI:AIR Indicators & Logic Model	Intermediate Outcome: Trainees pursue careers in practically oriented research
18			In addition to your PFI:AIR funding, have you applied to other federal agencies for funding for technology transfer or research related to the AIR technology? If yes,			Yes/No with structured text box to list funding agencies and structured text box to	NEW	Intermediate Outcome: Culture shift rewarding innovation and commercialization

## Survey Questions for PFI-AIR

			which agencies?			indicate technology transfer or research		
19			How many new or continuing awards from other agencies or institutions have leveraged your AIR award?			Numerical Text box	PFI:AIR Indicators & Logic Model	Intermediate Outcome: Culture shift rewarding innovation and commercialization
20			How many AIR-supported technologies have successfully translated to commercial application at this time? Please describe the application eg. Standalone, part of an existing item (improvement), whole new market.			Numerical Text box and Open Text	PFI:AIR Indicators & Logic Model	Intermediate Outcome: Technology advancement to commercialization
21			Based on your experience, does the AIR partnership lead to a shorter average development cycle for commercialization of technology?			Yes/No with structured text box for comments	NEW	Intermediate Outcome: Technology advancement to commercialization



## Survey Questions for PFI-AIR

- [1] NSF Engineering, "GARDE Satisfaction Survey." 31-Jul-2013. OMB Control No: 3145-0157
- [2] NSF Engineering, "PFI:BIC Logic Model & Indicators." 26-Jul-2013.
- [3] NCIIA, "I-Corps Indicators & Monitoring System." 23-Oct-2013.
- [4] NSF Engineering, "EFRI Pilot Clearance." 20-Mar-2014.
- [5] "Kauffman Firm Survey - Annotated Questionnaire." Ewing Marion Kauffman Foundation.
- [6] NSF Engineering, "EEC Impact interview Protocol." 02-Aug-2013.