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Vanessa Peña
Jay Mandelbaum
Talla F. Babou
Cara P. Cavanaugh

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1701 Pennsylvania Ave., Suite 500
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**For More Information**


Vanessa Peña, Project Leader
vpena@ida.org, 202-419-5496

Kristen M. Kulinowski, Director, Science and Technology Policy Institute
kkulinow@ida.org, 202-419-5491


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# Opportunities to Advance Department of Defense Technology Transfer with Partnership Intermediary Agreements

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# Executive Summary

The Department of Defense's (DoD) technology transfer activities support the translation of knowledge and maturation of technologies resulting from research, development, test, and evaluation (RDT&E) occurring across its science and technology (S&T) enterprise. These technology transfer activities provide opportunities to leverage resources—including expertise, knowledge, and technologies—available across the public and private sectors. DoD entities may use numerous mechanisms, such as flexible legal authorities, in support of their technology transfer function. The focus of this study is on one such mechanism: the partnership intermediary agreement (PIA).

A PIA is an agreement between a DoD entity and a partnership intermediary. A partnership intermediary is defined as an "agency of State or local government, or nonprofit entity owned, charter by, funded, or operated on behalf of the State or local government" (15 U.S. Code § 3715 and 10 U.S. Code § 2368(f)). A partnership intermediary can engage in activities with academic institutions and industry or small businesses to increase the likelihood of successful cooperative or joint activities between DoD and those organizations.

## Purpose

In February 2020, the Office of Defense Laboratories and Personnel (ODL&P), under the DoD's Office of the Undersecretary of Defense for Research and Engineering (USDR&E), asked the IDA Science and Technology Policy Institute (STPI) to analyze and characterize the landscape of DoD's PIAs. This study includes analyzing the PIAs established across DoD, the organizational and funding models of partnership intermediaries involved in PIAs, activities performed under PIAs, and DoD's oversight role. ODL&P's need to understand this landscape is driven by the perceived growth in interest to use PIAs, for example from combatant commands and other DoD entities external to the traditional defense laboratory enterprise. ODL&P also perceived that this interest translated to a growth in the use of PIAs and the breadth of activities under existing PIAs. The study findings are intended to inform ODL&P's revisions to the DoD Instruction (DoDI) 5535.8 "DoD Technology Transfer (T2) Program" and provide recommendations for other guidance and activities to support the use of PIAs across DoD.

## Methods

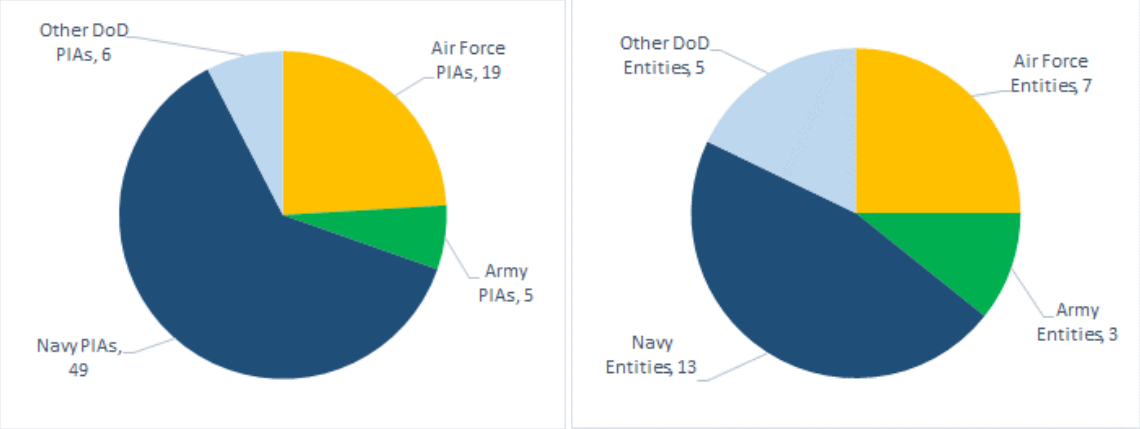
STPI pursued a multi-method approach to collect and analyze information relevant to DoD's PIAs from several information sources—a review of program documents and targeted literature relevant to PIAs, semi-structured interviews with more than 100 individuals across DoD entities, partnership intermediaries, and other Federal organizations, and questionnaires. STPI developed research questions, identified the sources of information to inform each question, and created a logic model to guide this study. Through these methods, STPI identified the active DoD PIAs—meaning PIAs that were not expired during the study period between February 2020 and June 2020. STPI qualitatively coded and analyzed information regarding the PIAs, combining information across sources to fill gaps. Based on this analysis, STPI identified challenges and suggestions and developed a process to identify exemplar practices.

## Characteristics of the DoD PIA Landscape

Since the PIA authority was established in 1991, the agreement has evolved in both policy and practice. STPI characterized the DoD PIA landscape by assessing the DoD entities that have established PIAs, the types of PIAs, and the geographic locations and distances between DoD entities and partnership intermediaries. STPI also analyzed the evolution in the use of PIAs, interactions among partnership intermediaries, and DoD's use of PIAs compared with other Federal agencies.

STPI identified 79 active DoD PIAs established across the Air Force, Army, Navy, and other DoD entities. At the time of the study, 16 additional PIAs were in the process of being established. The majority of active PIAs were established by the Navy, approximately one-quarter were established by the Air Force (mostly through the Air Force Research Laboratory), and the rest by the Army and other DoD entities, such as USDR&E, combatant commands, and other DoD agencies or offices (Figure ES-1).

There are two types of PIA that STPI categorized: (1) DoD-wide PIAs, which were established by USDR&E to provide services across the DoD, and (2) DoD entity-level PIAs, which were established by other DoD entities, such as laboratories and warfare centers, to serve the specific needs of their organization. There are currently two active DoD-wide PIAs, Techlink and MilTech. Other PIAs are DoD entity-level PIAs. However, TechLink and MilTech also have DoD entity-level PIAs that have been established so that the DoD entity can ensure their specific activities are supported and funded.

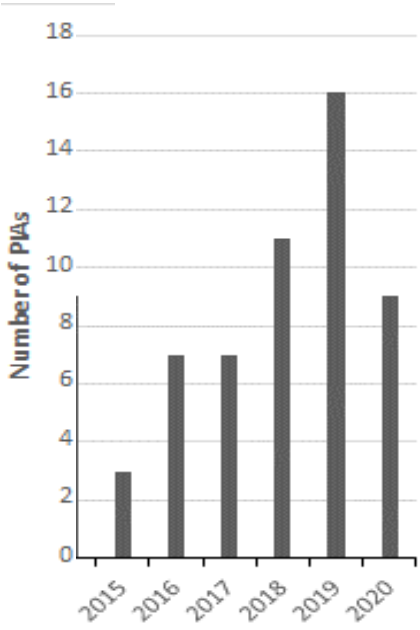



Notes: STPI did not identify any active PIAs in the Marine Corps and the Space Force. The Coast Guard, a service under the Department of Homeland Security, was considered beyond the scope of this analysis

**Figure ES-1. Active PIAs by Service and Other DoD Entities (left) and Service and Other DoD Entities Establishing PIAs (right)**

The number of PIAs has grown significantly in recent years from 2015 to 2020 (Figure ES-2). Across all types of PIAs, STPI found that the majority of partnership intermediaries are located within a 100-mile radius of their DoD entity, indicating that DoD entities tend to work with organizations that are in close proximity. The activities under PIAs have also evolved from focusing on traditional spin-out activities to incorporating more spin-in functions.

This growth led some interviewees to note that there are "too many" PIAs, and that the number of PIAs is creating an environment of competition among the partnership intermediaries. Furthermore, interviewees mentioned a lack of awareness about the PIA landscape and the absence of a comprehensive list of PIAs and the types of activities that they undertake. Interviewees made suggestions to address these challenges including establishing a collaborative platform or fora to support engagement among partnership intermediaries and creating an information repository of DoD PIAs that can be shared across the DoD and technology transfer community.




Note: At the time of the study in 2020, STPI identified 9 active PIAs and 16 additional PIAs were in the process of being established.

**Figure ES-2. Number of Active PIAs from 2015 to 2020**

## Organizational and Funding Models of Partnership Intermediaries

The PIA authorities allow for multiple possible organizational and funding models of partnership intermediaries. STPI found that while some PIA arrangements have been modeled after previous instances, no two agreements or organizations are exactly alike. Important aspects related to these models include:

1. The affiliation of partnership intermediaries with a State or local government
2. The focus of the organizational missions of the partnership intermediaries and whether they were established with the sole purpose of becoming a partnership intermediary
3. Other affiliations of partnership intermediaries, such as a university or parent corporation
4. The funding models used to support the partnership intermediaries

While the PIA authorities provide a definition for what is a suitable State and local government affiliation, in practice there is a range of interpretations of how to fulfill this requirement. Some partnership intermediary organizations have a strong relationship with a State or local government while others do not. Some partnership intermediaries are a unit of a higher education institution, such as a State university or a land grant institution. Other affiliations include partnership intermediary organizations that receive some portion of funding from a State or local government, or have received this funding in the past. There are partnership intermediary organizations whose articles of incorporation are within a State, or have received a letter from their State or local government authorizing them to perform their activities. In some cases, the organization may not have deep interaction with the State or local government, and performs its role as a partnership intermediary as their primary line of business. Other affiliations with the State and local government included State and local government employees participating in the activities of the partnership intermediary, including sitting on their executive board or other organizational committees, or overseeing funding provided by the State or local government.

The focus of organizational missions differs across partnership intermediaries, as many organizations were not established solely to become a partnership intermediary. Some partnership intermediaries may have other sources of funding and affiliations with other non-DoD organizations—and thus may have other lines of effort associated with their organization's operations. These other organizational affiliations have implications for a partnership intermediary's role—they may also provide services to other customers or may use the resources available to them through their organizational structure to accomplish their activities under PIAs. A partnership intermediary's organizational mission may also change after entering into the PIA, in particular for a funded PIA that may rely on DoD funding for their operations.

STPI also found variations in the funding models for partnership intermediaries. There are multiple streams through which a partnership intermediary organization may support their activities and operations, and DoD can be one of multiple funding sources. The DoD entity that has entered into the PIA may choose to fund their PIA partner for the requested activities, but there are also many instances of PIAs that are unfunded. The vast majority of the Navy's PIAs are unfunded, while funded PIAs are more prevalent in other parts of DoD.

Partnership intermediary organizations may receive funding from their State or local government, other DoD entities, other Federal Government entities, or customers outside of the Federal Government. A lack of sufficient funding across these sources may pose a challenge to partnership intermediaries in the execution of their activities. In situations where the DoD partner has provided funding to the partnership intermediary, the funding may be provided either as baseline or as project-based funding. Baseline funding provides a set amount of funding not dependent on specific projects. This is in contrast to project-based funding, which is provided for individual project accomplishments. A hybrid model consists of a mixture of the baseline and project-based funding. Several partnership intermediaries noted a challenge regarding a lack of baseline funding to support their staff and overhead costs.

Interviewees noted the confusion among stakeholders regarding what meets the requirement for a suitable State and local government affiliation for partnership intermediaries. Partnership intermediaries may also struggle to fund their operations and staff, in particular small organizations, without baseline funding. Interviewees made suggestions to address these challenges including increasing communication and awareness of PIAs and noted that DoD entities should consider providing baseline funding to diminish uncertainties in their business models due to funding variability.

## Activities Performed by Partnership Intermediaries under PIAs

PIAs involve numerous activities in support of the broad technology transfer functions across DoD entities, including spin-in, spin-out, and dual-use activities. STPI loosely categorized the partnership intermediaries' activities to include:

- Patent and intellectual property (IP) management—assisting with the development and execution of licenses and the development or management of patents and the broader IP portfolio
- Technology and market research—conducting technology and market landscape or forecasting studies to identify future directions for specific technologies, and provide broad situational awareness regarding the origins and development of a particular technology domain or industry

- Collaboration spaces—providing physical spaces located near the DoD entity that serve as a collaborative environment to engage with non-DoD researchers and businesses
- Technology showcases and events— consisting of technology demonstrations, showcases, industry days, design sprints, hackathons, workshops, and other events
- Prize competitions—planning and implementing prize competitions
- RDT&E collaboration agreements—supporting the development, coordination, and problem-solving activities in support of RDT&E collaboration agreements
- Prototyping and manufacturing capabilities—performing the prototyping, facilitating development of prototypes, funding prototyping activities, and advancing DoD's manufacturing capabilities
- Science, technology, engineering, and mathematics (STEM) education and workforce—assisting in STEM education and workforce development activities, including organizing K-12 outreach events, facilitating or supporting the administration of internships with DoD entities or student scholarships, and the development of the workforce pipeline to train and attract high quality talent to DoD facilities
- Support for SBIR and STTR programs—supporting the Small Business Innovation Research (SBIR) and the Small Business Technology Transfer (STTR) programs by performing technology scouting to identify and recruit small businesses to those programs
- Business incubation—supporting commercialization of DoD entity technologies or adapting commercial technologies to meet DoD needs

These activities are not mutually exclusive; rather, these activities can be complementary and one activity may be critical to the accomplishment of another. STPI found that any single partnership intermediary generally performed both spin-in and spin-out activities, rather than focusing entirely on one set of activities versus another. Some interviewees noted that their activities over the last few years had shifted to include spin-in activities. Conceptually and in practice, spin-in, spin-out, and dual-use activities reinforce one another to achieve technology transfer goals. Spin-in, spin-out, and dual-use activities for technology development support the overall needs to fill DoD's technology gaps.

The activities under PIAs may evolve over the course of the PIA. The partnership intermediary's organizational maturity influenced how their activities evolved. For example, STPI identified that newly established organizations experienced an initial learning curve executing their activities, in particular if the organizations were not highly

familiar with DoD or well-integrated into their local innovation ecosystems. As the relationship between DoD and the partnership intermediary strengthened, in some cases, the scope of activities shifted from being reactionary to one that was proactive and advisory.

STPI identified challenges impeding the execution of PIA activities, including bureaucratic burdens, the steep learning curve to understand PIA-related roles and functions, perceptions that IP is not conducive for commercialization, and the time and effort needed to build relationships in the innovation ecosystem. Several suggestions to address these challenges related to coordinating events and showcases across DoD, supporting information exchange, addressing engagement barriers for small businesses, and expanding certain activities under PIAs, such as STEM education and workforce development and situational awareness studies to inform DoD's strategic decision making for their RDT&E portfolios.

## Oversight and Performance of PIAs

There are several DoD drivers for establishing PIAs, including helping to establish processes that accelerate the commercialization of DoD technologies, sourcing solutions and expertise originating in industry, putting the necessary tools in the hands of the warfighter quickly and efficiently, and improving outreach efforts to local and State communities.

In DoD's oversight responsibilities, STPI identified several aspects of effective communication organized around the following:

- Identifying the project scope under the PIA
- Initiating work
- Establishing a DoD lead
- Enabling access to key stakeholders
- Monitoring activities to include keeping informed and managing the work
- Dealing with complex organizational interfaces

Defining success is the first step in evaluating PIA performance. According to stakeholders, success was defined in three different ways:

- Meeting specific DoD entity tasks and needs, implying success is situational
- Providing value through quality outputs that benefit the DoD entity
- Providing benefits beyond the DoD entity's immediate needs and to DoD's mission

More than two-thirds of PIAs are formally reviewed. Reviews of the performance of PIAs can include qualitative evaluation of the outputs and outcomes of activities under the PIA. Informally, many DoD entities conduct qualitative evaluations through their periodic or ad hoc meetings to review progress on projects. Deliverables, such as reports, are also used to provide qualitative evidence and a record of accomplishments. Metrics may be used as a quantitative measure of performance. STPI identified numerous metrics through the course of the study and categorized them as activity, output, near-term outcome, mid-term outcome, and long-term impact metrics. Many DoD entities use the results of their evaluations to disseminate information about the successes of their PIAs. These reviews and qualitative and quantitative evaluations of PIA performance can also inform redirection as well as the sunset of the PIA once the PIA has served its role in accomplishing a given goal.

In general, DoD entities are overwhelmingly satisfied with the performance of activities under each of their PIAs. Partnership intermediaries were also largely satisfied with the nature of the work they were asked to perform under the PIA. Yet, some stakeholders felt that improvements could be made to accomplish the activities under PIAs more efficiently and effectively in the future.

Challenges related to DoD's oversight and evaluation of PIA performance included insufficient time and effort to manage the technology transfer workload, varied understanding of the authority to use and fund PIAs, inadequate funding for PIAs, and dissatisfaction with DoD oversight processes. Dissatisfied partnership intermediaries mentioned oversight challenges related to unreasonable timelines and DoD entities assigning work unrelated to the PIA's scope. Some other comments reflected the underutilization of partnership intermediaries and not being asked to perform services that could support the DoD entity's strategic decision making. Suggestions for improvement in DoD's oversight activities included sufficiently funding technology transfer offices to support their involvement in PIA activities so that they can improve their relationship-building capacity and connections with their targeted innovation ecosystems. Other suggestions included clearly outlining the types of funds that can be provided to PIAs, identifying strategies to manage conflicts of interest, and conducting annual reviews for funded and unfunded PIAs.

## PIAs in Context with the Broader DoD Technology Transfer Landscape

Technology transfer is part of a broader framework of DoD-wide activities focused on innovation, maturation, and acquisition. In addition, there is no single way of accomplishing technology transfer goals or a specific technology transfer activity. Across DoD, there are numerous entities supporting technology transfer and innovation processes, such as the Defense Innovation Unit, Rapid Innovation Fund, the National Security Innovation Network, and the Defense Logistics Agency Procurement Technical Assistance

Centers. Other technology commercialization and engagement-focused efforts include the venture capital arms of DoD: In-Q-Tel, the Army's Venture Capital Initiative, and the now defunct Defense Venture Catalyst Initiative. The services have also established their own initiatives, such as Air Force's AFWERX, Navy's NavalX TechBridges, and the Army's xTechSearch to support their technology transfer and engagement activities. STPI also identified Federal examples external to DoD that support DoD's technology transfer function, as well as other examples external to the Federal Government.

Partnership intermediaries can interact synergistically with other technology transfer activities and mechanisms. Interactions occur for multiple reasons. In some instances, synergies can occur because there are multiple ways to accomplish certain functions with each method having its own strengths and weaknesses. More specific to PIAs, there are limitations on what a PIA can do in terms of the transition to an acquisition program. Consequently, the PIA role may stop and another technology transfer initiative may be pursued as a technology matures.

STPI identified that many DoD entities consider how the value proposition of using PIAs creates synergies and complements other DoD entity technology transfer activities, mechanisms, and goals. PIAs are one tool in the technology transfer toolbox; a DoD entity can pick and choose the best tool for the appropriate goal and technology. A few DoD entities mentioned they develop strategic plans, landscape maps, or roadmaps to inform their decisions on what technology transfer activities to support or revise, including the use of PIAs.

The benefits of PIAs in this broader technology transfer landscape may not be realized because of challenges including the need for long-term, strategic approaches in the use of PIAs, and a limited awareness of the value proposition for using PIAs. A suggestion to address this concern is for DoD entities to focus on developing long-term approaches for using PIAs, as needed, and clearly articulating the value position of PIAs to DoD and external stakeholders.

## Summary and Recommendations

Through multiple methods—reviewing relevant literature, conducting interviews with Federal and non-Federal stakeholders, and administering questionnaires to stakeholders involved in active PIAs—STPI identified challenges, suggestions to address those challenges, and exemplar practices related to the use of PIAs. DoD stakeholders largely view PIAs as a useful tool in the toolbox to help accomplish their technology transfer goals. There has been a rise in the number of PIAs from 2015 to 2020. PIAs perform a wide span of spin-in, spin-out, and dual use activities. In particular, since 2015, non-traditional DoD entities, such as combatant commands, service-level major commends, and military education institutions, have established their first PIAs. These trends demonstrate the flexibility of the PIA and their utility in supporting varied goals

across DoD entity missions. However, opportunities exist to resolve process inefficiencies; standardize and clarify inconsistencies in legislative and DoD policy, interpretations, and practices; and build out the ecosystem of partnership intermediaries to leverage their capabilities and create synergies with other relevant initiatives across DoD. STPI identified 16 suggestions provided by stakeholders on ways to improve the use of DoD PIAs. STPI also identified 29 exemplar practices, in particular those related to DoD's oversight, that could be useful references for DoD entities considering establishing new PIAs or improving the use of their existing PIAs as well as potential partnership intermediaries.

Based on the study findings, STPI suggests the following recommendations for USDR&E to improve the use of PIAs across DoD:

1. Revise DoD policies to clarify points of confusion in establishing and supporting activities under PIAs
2. Develop guidance and facilitate training about PIAs for technology transfer staff, legal counsel, and contracting officers to ensure that information about PIAs is unified, harmonized, and standardized
3. Encourage sufficiently funding activities that are expected to be performed under PIAs
4. Implement PIAs as a trust-based relationship between DoD entities and partnership intermediaries
5. Strengthen the PIA ecosystem to enable communication, information exchange, and coordination of PIAs
6. Coordinate USDR&E's technology transfer initiatives with relevant initiatives across DoD
7. Work with Congress to clarify and harmonize the PIA authorities

# Contents

# 1. Introduction

The Department of Defense (DoD)'s science and technology (S&T) enterprise comprises a vast network of program offices; defense laboratories; engineering, test, logistics, product, and warfare centers; depots; arsenals; federally funded research and development centers (FFRDCs); university affiliated research centers (UARCs); and academic, industry, and global partners. This enterprise provides technical capabilities for the Nation's warfighter while supporting discoveries and innovation in non-defense sectors, in particular bolstering capabilities across the defense industrial base.

DoD's innovation outcomes are bolstered by technology transfer activities occurring across its S&T enterprise. In support of this technology transfer function, DoD entities may use numerous tools to engage with organizations across the S&T enterprise. The focus of this study is on one such tool, the partnership intermediary agreement (PIA). A PIA is an agreement between a DoD entity and a partnership intermediary. A partnership intermediary is defined as an "agency of State or local government, or nonprofit entity owned, charter by, funded, or operated on behalf of the State or local government" (15 U.S. Code § 3715 and 10 U.S. Code § 2368(f)). A partnership intermediary can engage in a multitude of activities to "assist, counsel, advise, evaluate, or otherwise cooperate" with academic institutions and industry or small businesses that "need or can make demonstrably productive use of technology-related assistance" from certain DoD entities. PIAs aim to increase the likelihood of successful cooperative or joint activities between DoD and those organizations.[1]

## A. Purpose

In February 2020, the Office of Defense Laboratories and Personnel (ODL&P), under the Department of Defense's Office of the Undersecretary of Defense for Research and Engineering (USDR&E), asked the IDA Science and Technology Policy Institute (STPI) to analyze and characterize the landscape of DoD's PIAs. ODL&P's need to understand this landscape is driven by the perceived growth in interest to use PIAs, the establishment of new PIAs, and the breadth of activities under existing PIAs.

ODL&P also asked STPI to identify exemplar practices and recommendations for improving the use of PIAs. In parallel to STPI's study, ODL&P has undertaken plans to

[1] See 15 U.S. Code § 3715 and 10 U.S. Code § 2368(f) for further on the two PIA authorities, and refer to Chapter 7. Policy and Guidance Related to PIAs for a comparison of the PIA authorities.

revise its overarching policy regarding PIAs through DoD Instruction (DoDI) 5535.8 "DoD Technology Transfer (T2) Program" (DoD 2018b). The study findings are intended to inform ODL&P's DoDI revisions and provide recommendations for other guidance and activities to support the use of PIAs across DoD.

## B. Defining Terms

*DoD entities* consist of the military service departments, defense agencies, field activities, program offices, intelligence community agencies, combatant commands, and any laboratories, offices, or agencies under these and within DoD. *DoD laboratories*, broadly defined as organizations conducting research, development, test, and evaluation (RDT&E) activities, are considered a type of DoD entity for the purposes of this report. Through two legislative authorities (10 USC 2368; 15 USC 3715), certain DoD entities can establish *PIAs*. PIAs are the contractual arrangements between certain DoD entities and a *partnership intermediary*, which are organizations meeting the eligibility requirements as outlined in the provisions under the PIA authorities. Across DoD, PIAs are generally used to provide services supporting DoD's technology transfer function and enhance engagement opportunities with potential partners across *innovation ecosystems*. These innovation ecosystems include DoD's S&T enterprise as well as other Federal and non-Federal researchers and entrepreneurs; State and local governments; small, medium and large businesses and manufacturers; resource and information providers; and enablers supporting these communities across industries and sectors.

*Technology transfer*, for the purposes of this report, is "the process by which existing knowledge, facilities, or capabilities developed under federal research and development (R&D) funding are used to fulfill public and private need" (FLC 2013). Two aspects of this definition are particularly noteworthy—the first is that technology transfer spans beyond tangible and the physical dimensions of a technology, and includes intangibles such as knowledge and capabilities. The use of technology transfer in this report recognizes *technology* in the broadest sense to include generally any outputs of RDT&E, such as knowledge, capabilities, processes, inventions, and technologies.

The second notable aspect of this definition is that outcomes include the fulfillment of public and private sector needs. In the context of DoD's mission, technology transfer outcomes include providing the DoD, as a public sector department, with the technologies it needs to advance its capabilities to "provide the military forces needed to deter war and to protect the security of our country" (DoD n.d.a). Referred to as *spin-in*—also known as *technology transition*—this situation includes the transfer of technology into the DoD in support of a planned or projected capability advancement by the DoD. The sources of technologies for spin-in can include those external to DoD (e.g., generated by external research communities and industry), as well as internal to DoD. Internal spin-in activities can involve technologies developed by one laboratory that are used by another DoD

laboratory or center for further maturation. Generally, the DoD technology transfer community refers to spin-in activities as predominantly relevant to transitioning sources of technology from outside of the DoD.

On the other hand, *spin-out* activities refer to the transfer of DoD originated technology to non-DoD activities, including the private sector and other public sectors for conversion into new processes, products, and services. Spin-out activities include the relatively traditional activities of technology transfer, such as patenting, licensing, and transferring technologies to the private sector to support their commercialization of new products in the market. Spin-out activities build and strengthen the RDT&E capabilities and technologies developed by the defense industrial base and other RDT&E performers in the private sector. Some technology transfer activities are *dual-use,* referring to technology that has both DoD and private sector applications, supporting both *spin-in* and *spin-out* approaches.

Spin-in, spin-out, and dual-use activities for technology development support the overall needs to fill DoD's technology and capability gaps. At the same time, technology maturation is a process that benefits from a combination of these activities. These activities can include development of technologies customized to meet DoD's mission requirements. These activities can also include improving overall capabilities in the local industrial base and innovation ecosystems across the Nation to support DoD's future needs. Conceptually and in practice, spin-in, spin-out, and dual-use activities reinforce one another to support achievement of DoD's technology transfer goals (Figure 1). In the context of DoD's technology transfer goals, as a mission-oriented department, the roles of spin-in, spin-out, and dual-use activities are cyclic and complementary.

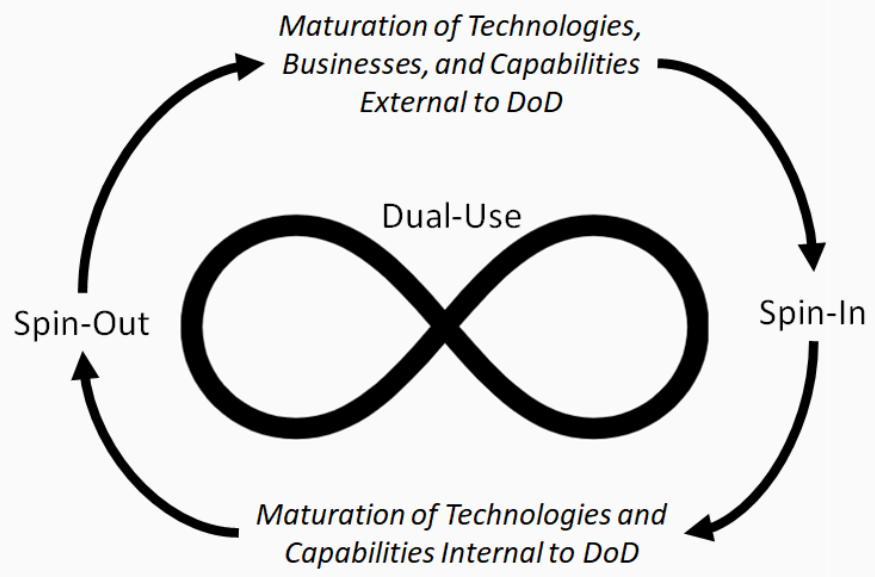



**Figure 1. Conceptual Diagram of Reinforcing Roles of Spin-In, Spin-Out, and Dual-Use Activities Supporting DoD Technology Transfer**

## C. Methodology

STPI pursued a multi-method approach to collect and analyze information relevant to DoD's PIAs from several information sources—a review of program documents and targeted literature relevant to PIAs, semi-structured interviews, and questionnaires. STPI developed research questions, identified the sources of information to inform each question, and created a logic model to guide this study. Through these methods, STPI identified the active PIAs—meaning PIAs that were not expired during the study period between February 2020 and June 2020. STPI qualitatively coded and analyzed information regarding the PIAs, combining information across sources to fill gaps. STPI also developed a process to identify exemplar practices.

### 1. Study Questions

STPI developed study questions to help guide the analysis (Appendix A). The study questions focused on the following topics:

- Relevant DoD Policy Landscape—including questions about the landscape of legislative and DoD policies on PIAs, their historical intent, and comparisons and evolution of existing DoD and service-level policies;
- DoD and Other Federal PIA Landscape—including questions primarily focused on the extent to which DoD entities have established PIAs, evolution of PIAs, types of activities under PIAs and their evolution, involvement of State and local governments and other stakeholders in those activities, as well as some questions about how other Federal agencies have used PIAs and comparisons across agencies;
- DoD PIAs in Context with Broader Technology Transfer Activities—including questions about broader technology transfer activities, how activities under PIAs compare with similar technology transfer activities under other mechanisms, and expected benefits of PIAs compared with other options to accomplish activities;
- DoD Oversight of PIAs—including questions about the extent to which DoD oversees PIAs, measures and metrics used for their evaluation, and use of formal reviews to evaluate performance;
- DoD PIA Outputs, Outcomes, and Performance—including questions about the extent to which PIAs have led to expected outputs, outcomes, and value to the DoD mission, overall satisfaction with activities under PIAs, and comparisons with other similar technology transfer activities to accomplish similar activities; and
- Suggestions for Improvement—including questions about how to improve policy, processes, practice, and evaluation of PIAs, as well as overall

performance in achieving expected outputs, outcomes, and value to the DoD mission.

### 2. Logic Model

The logic model served as a guide for our study team to understand the resources, activities, processes, and expected outputs and outcomes from establishing PIAs and performing their activities. STPI used the logic model to rationalize how activities under PIAs are expected to lead to desired outputs and outcomes. The development of the logic model was informed by initial interviews with ODL&P staff and other technology transfer program managers across the services. The logic model identifies near-term outcomes, mid-term outcomes, and long-term impacts from the use of PIAs (Appendix B).

### 3. Review of Literature

STPI performed a review of relevant published literature, including: articles and reports published by the Federal Government—such as Federal agencies, DoD entities, and the Government Accountability Office (GAO)—partnership intermediaries, and academics. STPI also reviewed DoD and partnership intermediary program documents related to PIAs and technology transfer—including policies, directives, instructions, and relevant guidance received from DoD staff and partnership intermediaries—and public solicitations related to establishing or performing activities under PIAs (refer to Appendix C for a description of the process to identify relevant public solicitations). Although there was generally a dearth of published literature specific to the topic of PIAs, the supplementary review of program documentation and solicitations provided STPI with information about PIAs established at DoD as well as across the Federal Government.

### 4. Semi-Structured Interviews

STPI developed a preliminary list of active PIAs based on the review of relevant literature and initial interviews with ODL&P and service-level staff. STPI identified at least one point of contact at the DoD entity establishing the PIA and the partnership intermediary. STPI aimed to interview all relevant DoD entities that had established active PIAs and some partnership intermediaries. These interviews were semi-structured and not for attribution. STPI selected a mix of partnership intermediary organizations aiming to obtain diversity across the services establishing PIAs, the nature of the work of the DoD entity establishing the PIA, geographic location, and the number of PIAs with the partnership intermediary. Appendix D provides a list of interviewee organizations and the interview discussion guides. STPI used the semi-structured interviews to validate and update a list of active PIAs. In the course of these interviews, STPI identified some PIAs that had expired and others that were not initially on the list. In total, STPI interviewed

more than 109 individuals: 48 from 33 DoD entities, 58 from 28 partnership intermediaries, and 3 from 3 other Federal organizations.

### 5. Questionnaires

STPI designed and administered two questionnaires—one for DoD entities that established PIAs and another for partnership intermediaries. Appendix E provides the questionnaire design. Since STPI was not able to interview all DoD entities and partnership intermediaries, the questionnaire served as a way to collect information about PIAs from these remaining organizations. The questionnaire also provided a means for STPI to collect granular information about PIAs that were beyond the focus of the interviews. Through the questionnaires, STPI was able to fill in the gaps in information from the interviews and identify some information about every active PIA identified. The questionnaires also provided STPI with a means to validate the information collected about active PIAs. Through the questionnaire, STPI identified one additional PIA that was not captured through other information sources.

### 6. Qualitative Coding and Analysis

STPI coded the qualitative information collected through interviews and the survey. The process included developing a codebook describing the major themes and topics, or codes, from the discussions. STPI employed a top-down *and* bottom-up approach using deductive and inductive coding to develop the codebook and code the interview responses. STPI began with a predefined set of codes and assigned those codes to the interview responses. STPI manually coded the information and iteratively updated the codebook using inductive coding to reflect new themes and topics arising from content analysis of the responses. Appendix F provides STPI's codebook.

### 7. Exemplar Practices

STPI developed a structured method to determine whether practices identified by interviewees should be included in the report as an exemplar practice. STPI denoted an exemplar practice as one that met one or more of the following criteria:

1. Addresses one or more challenges identified by multiple stakeholders;
2. Adopts or continues implementation of a practice by more than one DoD entity or partnership intermediary;
3. Is logically necessary for the successful completion of a required function; and
4. Involves past, present, or planned allocation of dedicated resources—including time, funding, and expertise—to support the practice.

In some cases, STPI received additional details about the practices from interviewees (e.g., program reports, presentations, and press releases). STPI obtained other information through web searches about the organizations involved.

Using these criteria, STPI identified 29 exemplar practices and grouped them into thematic categories that coincide with the chapters of this report. Table 20 provides a summary of these exemplar practices.

## D. Structure of the Report

The remainder of this report presents:

- Landscape of Active PIAs Across DoD (Chapter 2)
- Organizational and Business Models of Partnership Intermediaries (Chapter 3)
- Activities Performed by Partnership Intermediaries under PIAs (Chapter 4)
- DoD Oversight and Evaluation of the Performance of PIAs (Chapter 5)
- PIAs in Context with the Broader DoD Technology Transfer Landscape (Chapter 6)
- Policy and Guidance Related to PIAs (Chapter 7)

The report concludes with a summary of the challenges, suggestions, and exemplar practices identified throughout the report and STPI's recommendations for USDR&E to improve the use of PIAs. Additional appendices provide supportive information to supplement the findings.

# 2. Characteristics of the DoD PIA Landscape

This chapter introduces the landscape of active PIAs and describes DoD entities that have established PIAs, types of PIAs, geographic location and distance between DoD entities and their partnership intermediaries, the evolution in the use of PIAs, interactions among partnership intermediaries, and compares DoD and other Federal agency PIAs. The chapter also includes challenges, suggestions, and exemplar practices related to the topics presented.

## A. PIAs Across DoD Entities

STPI identified 79 active PIAs in the course of its analysis (Table 1). At the time of the study, there were an additional 16 PIAs in the process of being established. Active PIAs represent 62 partnership intermediaries located in 21 States across the Nation (Figure 2). Twenty-eight DoD entities established these PIAs. This section summarizes the number of PIAs across the services—Air Force, Army, and Navy—and other DoD entities.[2]

### 1. Air Force

Approximately one-quarter of the PIAs (19 PIAs) were established by seven DoD entities within the Air Force. The majority of Air Force PIAs were established by the Air Force Research Laboratory (AFRL) and its various components at Kirtland Air Force Base in New Mexico, Rome Laboratory in New York, and Wright-Patterson Air Force Base in Ohio. Other Air Force organizations that established PIAs include its educational institutions, such as the Air Force Academy in Colorado, Air University in Alabama, and the Air Force Global Strike Command in Louisiana.

### 2. Army

The Army has fewer PIAs (5 PIAs) than the Air Force and the Navy. The Army Research Lab (ARL) operates three of those, with the U.S. Army Combat Capabilities Development Command Army Aviation and Missile Center and the U.S. Army Corps of Engineers Engineer Research and Development Center establishing the remaining two.

[2] STPI did not identify any active PIAs in the Marine Corps and the Space Force. The Coast Guard was considered a service under the Department of Homeland Security and beyond the scope of this analysis.

### 3. Navy

Thirteen DoD entities across the Navy established the majority of DoD PIAs (49 PIAs). Most of the Navy PIAs are operated by Naval Surface Warfare Centers (NSWC), including those at Indian Head, Crane, Port Hueneme, Dahlgren, Naval Undersea Warfare Centers (NUWC) at Keyport and Newport, and Naval Information Warfare Centers (NIWC) Atlantic and Pacific, among others. More than half of the DoD entities in the Navy have established more than one PIA.

### 4. Other DoD Entities

Six PIAs were established by five other DoD entities, including combatant commands and other DoD components. Two were established by USDR&E (see 2.B.a DoD-Wide PIAs). Others DoD entities establishing PIAs include the National Geospatial Intelligence Agency (NGA), U.S. Special Operations Command (SOCOM), United States Cyber Command (CYBERCOM), and the DoD Office of Economic Adjustment.

## B. Types of PIAs and Partnership Intermediaries

There are two types of PIAs that STPI categorized: (1) DoD-wide PIAs that were established by USDR&E and operate across DoD, including across the services; and (2) DoD entity-level PIAs that were established by DoD entities to meet the needs of their individual organization, such as a laboratory, warfare center, or combatant command. This distinction is worth noting because DoD-wide PIAs are funded by USDR&E while DoD entity-level PIAs are funded by DoD entities, as needed.

### 1. DoD-Wide PIAs

TechLink and Miltech, both operating out of Montana State University, were established as partnership intermediaries by USDR&E to operate across DoD and not specifically to provide services for any single DoD entity. Techlink was established in 1996 initially to support the National Aeronautics and Space Administration's technology transfer activities. In 1999, TechLink became the first DoD-wide PIA. Its initial success, in particular the growth in the number of licensing agreements to DoD patents, was likely an impetus for the creation of other PIAs.[3] Throughout the early 2000s, five other DoD-wide PIAs were established by USDR&E. TechLink and MilTech are the only DoD-wide partnership intermediaries that remain active.

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[3] For further discussion of historical PIAs, see Swearingen, W.D., and J. Dennis. 2009. "US Department of Defense Technology Transfer: The Partnership Intermediary Model," *International Journal of Technology Transfer and Commercialisation*, 8, no. 2-3: 270–285

## 2. DoD Entity-Level PIAs

Other active PIAs were established at the DoD entity level to achieve their specific missions. In a couple instances, DoD entities have established separate PIAs with the DoD-wide PIAs—TechLink (Army Research Laboratory) and MilTech (e.g., United States Air Force Academy and Navy's Marine Corps Systems Command) (Table 1). DoD staff interviewed mentioned that, in establishing these separate PIAs, they considered that TechLink and MilTech would provide them with capabilities to meet their individualized needs and that they could provide resources for those efforts, as needed.

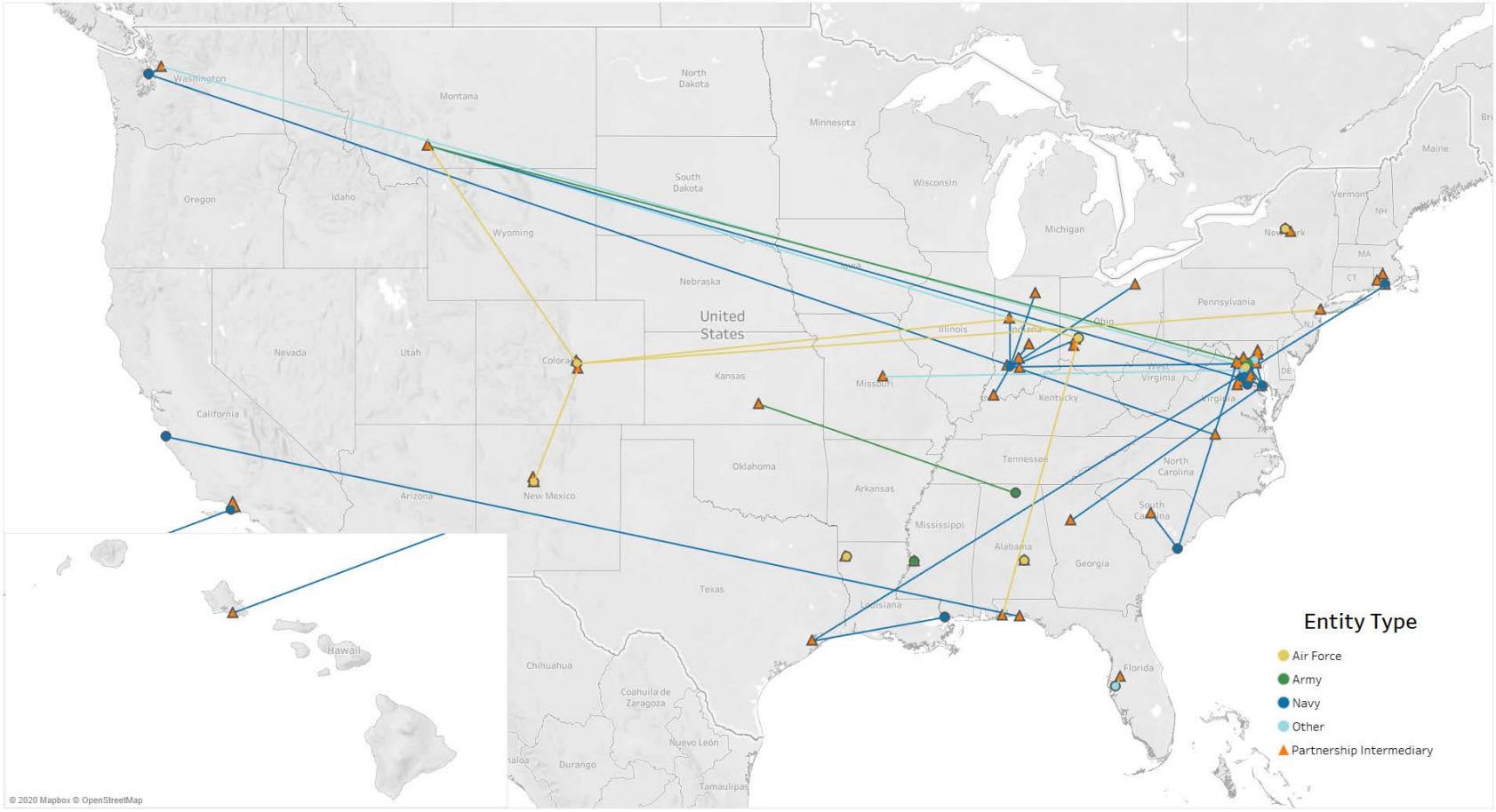
**Table 1. Active PIAs Across DoD**

| DoD Entity Establishing the PIA | Partnership Intermediary |
|---|---|
| **Air Force** | |
| Air Force Global Strike Command | Cyber Innovation Center |
| Air Force Research Laboratory (AFRL), Air Force Office of Scientific Research | Virginia Tech Applied Research Corporation |
| Air Force Research Laboratory (AFRL), Kirtland Air Force Base | Catalyst Campus for Technology & Innovation |
| | New Mexico Explorer |
| | New Mexico Tech (2 PIAs) |
| | New Mexico Trade Alliance |
| Air Force Research Laboratory (AFRL), Rome Laboratory | Griffiss Institute |
| | New York State Technology Enterprise Corporation |
| Air Force Research Laboratory (AFRL), Wright Patterson Air Force Base | Wright State Applied Research Corporation |
| | DEFENSEWERX - Doolittle Institute |
| | Purdue Foundry |
| | Wright Brothers Institute |
| Air University, Maxwell Air Force Base | DEFENSEWERX - MGMWERX |
| United States Air Force Academy | Catalyst Campus for Technology & Innovation |
| | Center for Technology, Research and Commercialization |
| | MilTech |
| | Purdue Foundry |
| | RTI International |
| **Army** | |
| Army Research Laboratory (ARL) | Energetics Technology Center |
| | TechLink |
| | Virginia Tech Applied Research Corporation |
| U.S. Army Combat Capabilities Development Command Army Aviation and Missile Center | FirePoint Innovations Center |

| DoD Entity Establishing the PIA | Partnership Intermediary |
|---|---|
| U.S. Army Corps of Engineers Engineer Research and Development Center | DEFENSEWERX - ERDCWERX |
| **Navy** | |
| Marine Corps Systems Command | MilTech |
| Naval Air Warfare Center Aircraft Division, Patuxent River (NAWCADPX) | Energetics Technology Center |
| | Georgia Tech Applied Research Corporation |
| | Maryland Technology Development Corporation |
| | The Patuxent Partnership |
| Naval Facilities Engineering and Expeditionary Warfare Center | Hawaii Technology Development Corporation |
| | Regional Defense Partnership for the 21st Century |
| | The Economic Development Center-Ventura County |
| Naval Information Warfare Center (NIWC) Atlantic | South Carolina Manufacturing Extension Partnership |
| | South Carolina Research Authority |
| Naval Information Warfare Center (NIWC) Pacific | CONNECT Foundation |
| Naval Meteorology and Oceanography Command | Mississippi Enterprise for Technology, Inc. |
| Naval Postgraduate School | DEFENSEWERX |
| Naval Surface Warfare Center (NSWC), Crane Division | Battery Innovation Center |
| | Bloomington Economic Development Corporation |
| | Indiana Innovation Institute |
| | Indiana University |
| | Ivy Tech Community College-Bloomington, Indiana |
| | NineTwelve Institute |
| | Ohio Aerospace Institute |
| | OrthoWorx, LLC |
| | Purdue Foundry |
| | Purdue University |
| | Radius Indiana |
| | State of Indiana |
| | The Growth Alliance For Greater Evansville |
| | University of Southern Indiana |
| | Wright Brothers Institute |
| Naval Surface Warfare Center (NSWC), Indian Head Explosive Ordnance Disposal Technology Division | College of Southern Maryland |
| | Energetics Technology Center |
| | Maryland Technology Development Corporation |
| | Morgan State University |

| DoD Entity Establishing the PIA | Partnership Intermediary |
|---|---|
| | The Patuxent Partnership |
| | United States Bomb Technicians Association |
| Naval Surface Warfare Center (NSWC), Port Hueneme Division | Global Trade & Technology |
| | Regional Defense Partnership for the 21st Century |
| | The Economic Development Center-Ventura County |
| Naval Surface Warfare Center (NSWC), Dahlgren Division | Center for Innovative Technology |
| | Fredericksburg Regional Alliance at the University of Mary Washington |
| | Gangplank VA |
| | King George County, Virginia |
| | Maryland Department of Commerce |
| Naval Undersea Warfare Center (NUWC), Division Keyport | Impact Washington |
| | San Diego Unified Port District |
| Naval Undersea Warfare Center (NUWC), Division Newport | City of Newport, Rhode Island |
| | Mississippi Enterprise for Technology, Inc. |
| | Polaris Manufacturing Extension Partnership |
| | The Southeastern New England Defense Industry Alliance |
| | University of Rhode Island Business Engagement Center |
| **Other DoD Entities** | |
| National Geospatial Intelligence Agency | Missouri Technology Corporation |
| U.S. Special Operations Command | DEFENSEWERX - SOFWERX |
| United States Cyber Command | Maryland Innovation and Security Institute |
| Office of Economic Adjustment | Impact Washington |
| Office of the Undersecretary for Defense Research and Engineering | MilTech |
| | TechLink |

Note: This table represents PIAs that STPI identified as active during the timeframe of the study from February 2020 to June 2020.

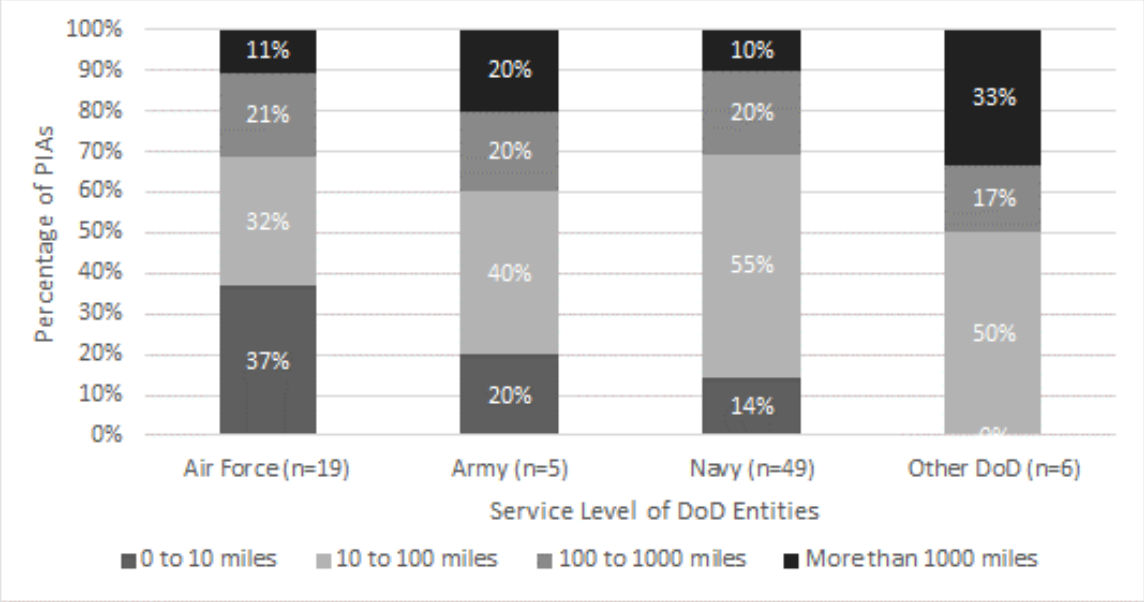



Note: Air Force entities are denoted as yellow circles, Army entities as green circles, Navy entities as dark blue circles, Other DoD entities as light blue circles, and partnership intermediaries as orange triangles. The lines represent an active PIA and connect the DoD entity with the partnership intermediary for a single PIA. The lines are color coded according to the DoD entity type—Air Force as yellow, Army as green, Navy as dark blue, and Other DoD as light blue. The length of the lines illustrates the distance between the DoD entity and the partnership intermediary organization for a single PIA. Multiple lines extending from a single DoD entity indicate that the DoD entity established multiple PIAs with different partnership intermediaries.

**Figure 2. Locations of DoD Entities Establishing Active PIAs (Denoted by Service or Other) and Partnership Intermediaries**

## C. Geographic Locations and Distance between DoD Entity and Partnership Intermediaries

The map in Figure 2 demonstrates that DoD entities may be working with partnership intermediaries that are located within their local innovation ecosystems (e.g., in the same State or region), or with those that are located farther away across the country. The majority of partnership intermediaries are located within a 100-mile radius of the DoD entity establishing the PIA (52 of 79 PIAs, 66 percent). Across the services, the distances between DoD entities and their partnership intermediaries are not similarly distributed. Across the services and other DoD entities, the distribution of distances of the partnership intermediaries located more than 100 miles away spans from 30 percent to 50 percent (Figure 3).




Source: STPI's analysis

**Figure 3. Distance between DoD Entities and Partnership Intermediaries (N=79)**

The analysis of the distance between a DoD entity and their partnership intermediaries indicates that DoD entities may tend to work with organizations that are in closer proximity to them, but they are not excluding organizations that are farther away. A partnership intermediary does not need to be an organization that is located within the bounds of a DoD entity's local or regional innovation ecosystem. The landscape demonstrates that many partnership intermediaries are located on another coast with the farthest partnership intermediary located almost 3,000 miles from their sponsoring DoD entity. To rationalize this, some interviewees mentioned that they seek out the specific capabilities, expertise, and networks offered by the partnership intermediary. Depending on the technology

transfer goal, a close geographic proximity may not be a priority for DoD entities in selecting the partnership intermediary.

## D. Comparison of DoD PIAs with Other Federal Agency PIAs

STPI identified other Federal agencies that have established PIAs. By analyzing public solicitations (Appendix C), STPI found that the Department of Homeland Security (DHS) and the National Institute of Standards and Technology (NIST) within Department of Commerce (DOC) have established PIAs. Based on the analysis of relevant literature, STPI also found that the U.S. Department of Agriculture (USDA) established the Agriculture Technology Innovation Partnership (ATIP) Foundation, which is a consortium of partnership intermediaries (ATIP n.d.). The literature showed that NIST also established at least two PIAs, one created a program to support entrepreneurial training through the NIST Science and Technology Entrepreneurship Program (N-STEP) and a second with Montgomery County's Department of Economic Development to support the National Cybersecurity Center of Excellence in Maryland (Heinz 2016).

Based on the Federal PIA landscape described in solicitations and the literature, STPI did not find a preponderance of other Federal agencies establishing PIAs. DoD seems to be the major establisher of PIAs relative to other agencies.

In terms of the focus of the activities under DoD and other Federal agency PIAs, PIAs established by NIST and USDA primarily supported spin-out activities (refer to Box: USDA's ATIP and NIST's N-STEP). At DHS and DoD, activities under PIAs are for spin-out, spin-in, or dual-use purposes. The mission context is important when considering the use of PIAs for spin-in, in particular for mission-oriented agencies such as DHS and DoD that field technologies to support their operations. However, PIAs are not used exclusively for spin-in purposes in any agency. The activities under DoD's PIAs are further described in Chapter 3.

**Box: USDA's ATIP and NIST's N-STEP**

The NIST N-STEP PIA is with the Maryland Technology Development Corporation (TEDCO), a partnership intermediary entity that also has a PIA with the DoD. The N-STEP PIA is used to allow researchers to spin-out technologies from the NIST Federal laboratory in Gaithersburg, Maryland. The N-STEP also facilitates other cooperative activities, such as small business licensing partnerships, and publicizes NIST inventions with commercial potential.

The ATIP Foundation PIA is between USDA and eight economic development organizations, including TEDCO. This PIA is used to meet goals related to spinning-out technology, providing guidance and training, and promoting regional development.

Source: Swearingen and Dennis 2009

## E. Partnership Intermediary Interactions with Other Partnership Intermediaries

Some partnership intermediaries stated that they interact with other partnership intermediaries to accomplish their activities. These activities span informal interactions and knowledge sharing (e.g., through engagement events, conferences, and the like) to joint activities in which multiple partnership intermediaries are involved in supporting activities—such as analyzing and sharing information and tools—for their sponsoring DoD entity. Sometimes, the DoD entity establishing the PIAs was the driver for pulling together their partnership intermediaries and ensuring they are coordinating to the extent necessary. However, this is not always the case. One DoD entity mentioned that it is able to take advantage of the cross-engagement of their partnership intermediaries because they have a history of involvement in their local innovation ecosystems and are part of each other's networks.

These interactions are widespread across the PIA landscape. Of the partnership intermediaries that responded to the questionnaire, approximately half said that they "sometimes" or "often" interact with other partnership intermediaries. These interactions provide a valuable way to address the challenges of "stove piped" activities that partnership intermediaries stated they experienced. Among interviewees, there was general support for continued and strengthened interactions among partnership intermediaries. However, some interviewees identified a marked hesitancy to take part in these interactions due to the perceived competition between PIAs for DoD resources, caused in part by the increased number of PIAs. One interviewee noted that geographic proximity is helpful in allowing PIAs to coordinate and partner together—to pool networks and expertise when hosting industry days, connect with DoD researchers, and understand the industry and technology landscape to support technology scouting.

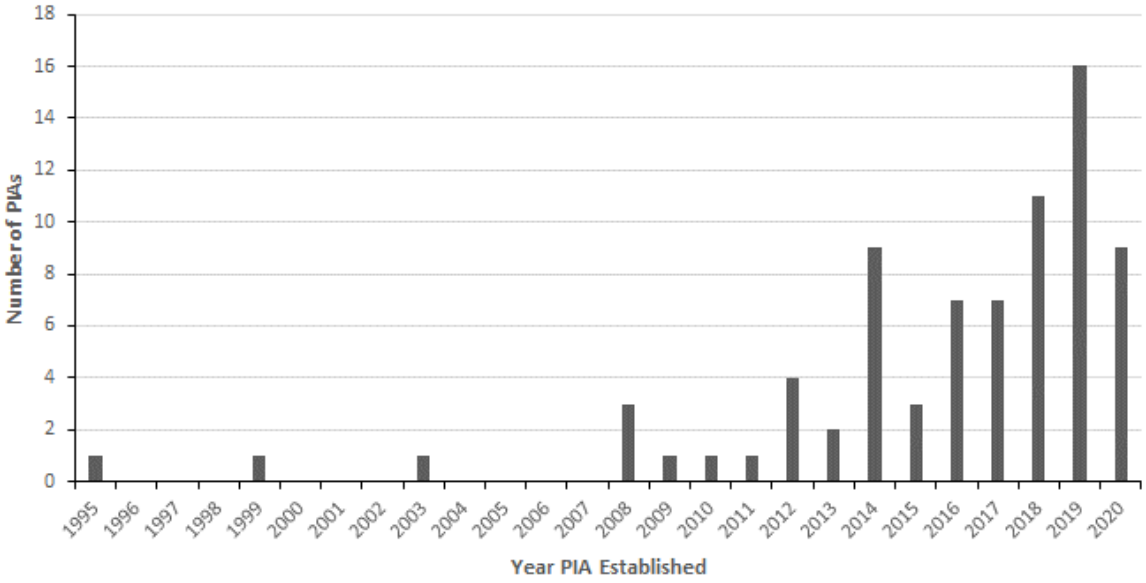
## F. Evolution in DoD's Use of PIAs

Since the PIA authority was established in 1991, the agreement has undergone changes both in policy and practice. In 1991, the first PIA authority, now under 15 USC 3715, was created by amending the Stevenson-Wydler Technology Innovation Act of 1980 through the passage of the National Defense Authorization Act (NDAA) for Fiscal Year 1991 (Section 827. Use of Partnership Intermediaries). A second legislative authority was established by Congress almost 30 years later in 2018 under Title 10 of the U.S. Code (10 USC 2368(f)) specifying that a Center for Science, Technology, and Engineering Partnership could use PIAs to promote defense research and education. The legislative policies are further described in Chapter 7.

The Air Force was one of the first prominent users of PIAs, with the creation of the PIA with the New Mexico Tech in 1995 to assist with technology transfer for AFRL (Swearingen and Dennis 2009). Many interviewees noted growth in the number of PIAs in

recent years. A couple interviewees attributed this growth to the Air Force's efforts to expand their use of PIAs over time, especially following the success of the Techlink PIA, which was established over 20 years ago. One interviewee remarked that as the Air Force began using PIAs more frequently, the Army and the Navy followed their lead and practices. However, a recent GAO report also noted the Army's use of PIAs had declined in recent years (GAO 2020).

Another interviewee opined that PIAs were used across DoD steadily for the first 10 years or so, and then their use has surged in the last few years. An interviewee perceived that the interest in the use of PIAs has gained momentum more recently with the establishment of 10 USC 2368(f) in 2018, which provided a PIA authority specifically under Title 10 and only applied to DoD. STPI indeed found a rise in the number of active PIAs from 2015 to 2019 (Figure 4).[4] During this time, numerous non-traditional DoD entities, such as combatant commands—SOCOM and CYBERCOM—NGA, and the DoD Office of Economic Adjustment as well as military academic institutions—Air University, Air Force Academy, and Naval Postgraduate School—established PIAs. In addition, during the time of this study, STPI identified an additional 16 PIAs that were in the process of being established by Navy entities in 2020.




Source: STPI interviews and questionnaires

Note: STPI did not obtain information about the year established for 2 active PIAs.

**Figure 4. Number of Active PIAs by Year Established (n=77)**

[4] STPI could not make further conclusion about historical trends from the data beyond the last 5 years since the typical life-span of a PIA is about 5 years.

Interviewees noted that the capabilities and services provided by partnership intermediaries under their PIAs have also evolved. Some interviewees said that PIAs are increasingly agile organizations and are able to respond to rapidly changing needs. One interviewee mentioned that partnership intermediary's services have evolved from a focus on the traditional spin-out activities, such as patenting and licensing, to include spin-in approaches, which provide DoD entities with information about cutting edge industry technologies that can be adopted and adapted for DoD's needs. PIA activities are further described in Chapter 3.

The funding landscape of PIAs has also evolved, in particular for the DoD-wide PIAs. One interviewee mentioned that the number of DoD-wide PIAs decreased after their support from congressional earmarks at the time dwindled. Certain partnership intermediaries were not able to sustain their business models without those earmarks. The funding landscape and business models are further described in Chapter 3.

Another interviewee specifically mentioned that from 2017 to 2019, the use of PIAs were analogous to the "Wild West" without much oversight or guidance from DoD. They remarked that only since 2019 is this concern being addressed through greater oversight activities, policies, and guidance. DoD's oversight role is further described in Chapter 5 and policy and guidance further described in Chapter 7.

## G. Challenges

Interviewees and questionnaire respondents identified some challenges relating to the PIA landscape. These challenges largely address the perceptions of competition between partnership intermediaries and a lack of understanding of the PIA and partnership intermediary landscape.

### 1. Perception of "Too Many" PIAs and Unwillingness to Collaborate

Some interviewees emphasized that the number of PIAs has increased considerably in recent years. One interviewee mentioned that they feel that there are now "too many" PIAs, which can have unintended consequences. In addition to the growth of PIAs, partnership intermediary activities may be growing and overlapping in areas that other partnership intermediaries also service. For instance, numerous partnership intermediaries may be performing similar services or providing similar capabilities under separate PIAs. As a consequence, some partnership intermediaries may perceive there to be a larger number of new players working in their "lane." Some interviewees mentioned that this situation creates an atmosphere of competition among partnership intermediaries and limits their incentives to interact with one another in joint activities. Interviewees described this competition as including infighting, tribalism, and silos of excellence that are not willing to communicate and share their expertise with others. This situation also signals a possible

lack of coordination among DoD entities that is further hindered by the challenge that follows.

### 2. Lack of Awareness and No Comprehensive List of PIAs

A main driver for this study was that USDR&E was not aware of the landscape of PIAs and the differences in their use across DoD. Several interviewees who also felt that they were not aware of the activities supported by other partnership intermediaries echoed this sentiment. STPI identified only one service that monitored their PIAs in a centralized manner through a data management system that tracked PIAs, as well as other collaborative and R&D agreements, as reported by their service-level entities. STPI was able to use the database to develop an initial list of active PIAs, but found that the centralized list was outdated. Interviewees remarked that they would benefit from having knowledge about what other partnership intermediaries exist, their activities, and their capabilities to help identify opportunities for exchanging information, coordinating, and leveraging resources.

**Exemplar Practice**

1. Service-level program managers maintain centralized information about PIAs established across their organization
    - Addresses one or more challenges
    - Adoption or continued implementation of a practice

## H. Suggestions

STPI identified two suggestions to address the challenges related to the PIA landscape (Table 2).

**Table 2. Summary of Suggestions and Challenges Addressed Related to the DoD PIA**

| Suggested Action For | Suggestion Description | Challenges Addressed If Implemented |
|---|---|---|
| USDR&E<br>Services<br>DoD entities | Establish a collaborative platform or fora to support interactions among partnership intermediaries | Perception of "too many" PIAs and unwillingness to collaborate |
| USDR&E<br>Services | Establish an information repository of all DoD PIAs | Lack of awareness and no comprehensive list of PIAs |

### 1. Establish a Collaborative Platform or Fora to Support Interactions Among Partnership Intermediaries

Some interviewees suggested establishing collaborative platforms or fora for partnership intermediaries to facilitate sharing information about their activities and capabilities. They mentioned that such avenues could help partnership intermediaries keep abreast of technology needs sought across DoD and understand the technical capabilities across partnership intermediaries. One interviewee noted that this platform could help to establish a cohesive network of partnership intermediaries, so long as it is well managed and engaging. One interviewee discussed how an attempt to network partnership intermediaries occurred in the past through the proactive interest of one partnership intermediary. However, it was felt that an effort to create a network of existing partnership intermediaries should be led out of the DoD, by DoD entities and USDR&E.

### 2. Create an Information Repository of All DoD PIAs

Some interviewees suggested that DoD should establish an information repository to facilitate sharing information about PIAs and partnership intermediaries to relevant stakeholders. Such a repository could be created by USDR&E, and the information shared could be based on relevant and standardized information collected across DoD. STPI did not identify a centralized effort that (1) maintained up-to-date information on active PIAs or (2) broadly shared appropriate information with stakeholders across DoD and partnership intermediaries.

**Exemplar Practice**

2. DoD entities provide timely information about new or inactive PIAs to DoD leadership or service-level program managers
    - Addresses one or more challenges
    - Is logically necessary

# 3. Organizational and Funding Models for Partnership Intermediaries

The PIA authorities allow for multiple possible organizational models of partnership intermediaries. This chapter describes the organizational structure, in particular the affiliation with State and local government, the focus of organizational missions, and other affiliations of partnership intermediaries. This chapter also describes the business models of partnership intermediaries, including the varying approaches to staffing and providing funding under PIAs. The chapter also includes challenges, suggestions, and exemplar practices related to the topics presented.

## A. State and Local Government Affiliation of Partnership Intermediaries

The PIA authorities define a partnership intermediary as an "agency of a State or local government, or a nonprofit entity owned in whole or in part, by, chartered by, funded in whole or in part by, or operated in whole or in part by or behalf of a State or local government" (15 USC 3725, 10 USC 2368(f)). The range of affiliations required under the PIA authorities is wide, and multiple approaches have been used to fulfill the requirement. Some interviewees noted that there is a wide range of interpretations of the legal requirement. Some partnership intermediary organizations have a very close relationship with their State or local government, or are an arm or agency of the State or local government. Others have a more tenuous relation to their State or local government.

Examples of interpretations for ways partnership intermediaries meet the State or local government affiliation requirements of the PIA authorities included:

- There are partnership intermediaries that are agencies of a State or local government. Examples of this situation include King George County, Virginia; the City of Newport, Rhode Island; and the Bloomington Economic Development Corporation in Indiana.
- There are partnership intermediaries that are chartered by their State or local government to perform a specified function but are not considered an agency of the State or local government. Examples of these functions include economic development activities in the local or regional communities and business incubation for local businesses. These organizations may enter into PIAs with DoD entities if their missions align with DoD's needs. An example of this

affiliation is the San Diego Unified Port District, which was established by the California legislature to serve as a public benefit corporation.

- Some partnership intermediaries are a unit of a higher education institution, such as a State university or a land grant institution. In this way, the partnership intermediary's employees may also be State employees or they may have an affiliation with the State or local government through the university or community college. Various examples of this affiliation include University of Southern Indiana and New Mexico Tech as well as other organizations with affiliations to universities and colleges, such as TechLink, MilTech, Purdue Foundry, and Georgia Tech Applied Research Corporation, among several others.
- Partnership intermediary organizations may also receive some portion of funding from a State or local government. These organizations may or may not be actively performing other activities for the State of local government with these funds, as they could have supported projects in the past. The majority of questionnaire respondents stated they received some State or local funding or had received this funding in the past. Examples of these are numerous, and include some of the organizations that are an agency of or chartered by State or local governments.
- There are partnership intermediary organizations whose articles of incorporation are within a State, or have received a letter from their State or local government authorizing them to perform their activities. In some cases, the organization may not have deep interaction with the State or local government and can perform its role as a partnership intermediary as the primary line of business. Examples of these affiliations are also numerous as the matter of an organization being a nonprofit was regarded as constituting affiliation with the State or local government.
- Other affiliations with the State and local government included State and local government employees participating in the activities of the partnership intermediary, including sitting on their executive board or other organizational committees, or overseeing funding provided by the State or local government.

These affiliations are not mutually exclusive—one or more of these situations may apply for any single partnership intermediary. In addition, these affiliations were identified solely on the basis of what DoD entities and partnership intermediaries directly told STPI, and not based on further analysis to validate these affiliations or evaluate whether they met the eligibility criteria in the PIA authorities. Further analysis regarding the State and local government affiliation in context with the legal mandates is described in STPI's

recommendations in Chapter 8.B.7 Work with Congress to Clarify and Streamline the PIA Authorities.

## B. Focus of Organizational Mission

In general, partnership intermediaries can be nonprofits and State or local government agencies that existed prior to becoming a partnership intermediary organization or organizations established with the sole purpose of providing services to DoD under a PIA. Based on the questionnaire, the large majority of partnership intermediaries were not established for the sole purpose of becoming a partnership intermediary. In most cases, these organizations existed with their own mission and purpose. For example, many of the Navy PIAs fall into this category, to include economic development agencies and centers affiliated with universities and community colleges.

The missions of some partnership intermediaries changed after their PIA was established or as the focus of their activities for DoD shifted over time. For organizations that existed prior to the establishment of their PIAs and were newly established within a few years before their PIA, a few remarked that their mission changed substantially to accommodate the growing emphasis of their activities under their PIA. For organizations established to fully support the activities of their PIA, substantial changes in the organization's activities or overall mission were relatively rarer given they were created with a specific focus by the DoD entity.

## C. Other Affiliations

Partnership intermediaries often have other affiliations based on their organizational structure. There are partnership intermediary organizations that function as a unit within a larger organization, such as a university or a parent corporation. A few partnership intermediaries noted that, depending on their relationship with the affiliated organization, they had been able to leverage resources from the affiliated organization to support their PIA activities. Some DoD entities considered these other affiliations as being beneficial to the accomplishment of the PIA activities.

### 1. Universities

Partnership intermediaries may be affiliated with a university. As noted earlier, there are partnership intermediary organizations that are an independent unit of a university, such as TechLink and MilTech. The relationship between the partnership intermediary and the university can vary depending on the organization. Interviewees described the following examples of the relationship with universities:

- There are partnership intermediary organizations that are generally not involved in their university's operations, and operate almost completely independent from

the university's operations. The reason for this may be to avoid potential conflict of interest, or a concerted effort by the university to create an organization with a different business model or an organizational mission that is distinct from that of the university.

- Other partnership intermediaries will foster a closer relationship with their parent university. In this case, the partnership intermediary may reach back to the university for subject matter experts (SMEs) when their expertise is needed. The partnership intermediary may also function as the technology transfer office of their parent university, or serve as an incubator for technologies developed within in the university.

At times, the relationship with the university provides a pathway to talent in demand by the local DoD entities establishing the PIA. One interviewee noted that their affiliated university was one of the main talent pools for the DoD entity in the region, further strengthening the ties between the DoD entity, the partnership intermediary, and the university. Partnership intermediaries may also work directly with students as part of their STEM activities, which can include helping students find avenues to commercialize their technologies or providing training and other workforce development programs.

Parent university affiliations may also help partnership intermediaries to supplement the partnership intermediary's capabilities and their staff as needed, in particular as smaller partnership intermediaries maintain flexible staffing depending on the pipeline of projects (Box: Partnership Intermediary Organizational Staffing Models).

**Box: Partnership Intermediary Organizational Staffing Models**

**Full-Time Staff**

The number of people employed by a partnership intermediary varies, with some organizations having as few as 2 full time equivalents (FTEs), while others have tens of employees or even over 100. The make-up of the staff varies by organization, but some partnership intermediaries are staffed or led by retired military employees. Interviewees noted that ex-military employees have the knowledge and familiarity with DoD processes to help outside parties work with the DoD. Partnership intermediaries also have employees from the private sector, and this combination of ex-private sector and ex-military staffing allows them to efficiently fulfill their role as intermediaries between DoD entities and outside parties.

**Part-Time Staff**

In addition to FTEs, some partnership intermediaries rely on part-time staff. As the services required of a partnership intermediary may shift with DoD or other government priorities, part-time staff provide flexibility. One interviewee noted that their use of part-time staff allows them to "expand and contract" depending on their funding level. When new funding and projects arise, the number of part-time staff can easily respond to meet these demands.

## 2. Subsidiaries

Another partnership intermediary affiliation is with a parent corporation or organization. One example of this is a partnership intermediary organization that is a

wholly owned subsidiary of another organization that also serves as partnership intermediary. This is the case of the DefenseWERX partnership intermediary, which operates several PIAs with different DoD entities. To focus its activities under those PIAs, DefenseWERX created separate subsidiaries, or "innovation hubs"—Doolittle Institute, ERDCWERX, MGMWERX, and SOFWERX—to support activities under those PIAs (DefenseWERX n.d.). One benefit of this parent corporation and subsidiary relationship is the exchange of information that is facilitated among the subsidiaries. The parent corporation can also support the coordination of engagement strategies and activities among its partnership intermediaries.

## D. Funding Models

The funding models for partnership intermediaries will vary depending on the finances and needs of different DoD entities, as well as the lines of business a partnership intermediary may have in addition to their PIA. The following section describes the business models of PIAs, specifically how partnership intermediaries are funded, from what sources they receive funding, and the allocation of funds to different efforts and lines of business. Table 4 summarizes some advantages and disadvantages of these funding models.

**Table 3. Summary of Funding Models and Select Advantages and Disadvantages**

| Funding Source | Possible Advantages | Possible Disadvantages |
|---|---|---|
| Unfunded | DoD entities can leverage funding from other sources to achieve common goals | Partnership intermediaries may have trouble sustaining their operations if they do not find alternative funding streams |
| Congressionally Added Funding | DoD entities can leverage PIAs without committing dedicated budgetary funding from other DoD sources | Partnership intermediaries may go inactive after funding is no longer earmarked |
| DoD Baseline and Project Based Funding | Sustains partnership intermediary staff and operations through consistent and dedicated "core" funding or through funding directly tied to PIA projects | Partnership intermediaries with solely project-based funding may have difficulties with overhead costs and can face uncertain funding levels throughout the year |
| State or Local Government Funding | Provides an alternative funding stream to maintain partnership intermediary staff and operations and fulfills the eligibility requirement mandated by legislation | Partnership intermediaries may have missions tied to other funding sources and DoD may not be the primary customer<br>Possible inconsistencies in expected goals |
| Other Federal Funding | DoD entities can leverage funding from other sources to achieve common goals | Potential for conflicts of interest to arise |

| Funding Source | Possible Advantages | Possible Disadvantages |
|---|---|---|
| Non-Federal Funding | DoD entities can leverage funding from other sources to achieve common goals<br>Alleviates challenges related to a lack of Federal, State, or local government funding | |

### 1. Unfunded PIAs

While many partnership intermediaries receive funding from their DoD partner to perform their functions, this situation is not universal. DoD entities are not required to fund the organization with which they enter into a PIA, and there are also several partnership intermediaries that receive no funding from the DoD. Of the partnership intermediaries interviewed and responding to the questionnaire, at least a third of them did not receive funding from DoD. The vast majority of the Navy's PIAs are unfunded, while funded PIAs are more prevalent for PIAs established by other parts of DoD. In particular, STPI identified only one case of a PIA across the Navy that received DoD funding (for further analysis of unfunded PIAs, see Chapter 7). For these organizations, other lines of business sustain their operations.

An interviewee emphasized that there is value added from unfunded PIAs. There are cases where the DoD entity would be open to providing funding to their PIAs if the funding was available. However, some DoD entities also stated they had no initial intent to provide funding under their PIA. In these situations, DoD entities perceive that, through the PIA, they can leverage the existing funding that partnership intermediaries receive from other sources to accomplish common goals. For many of these activities, the DoD entity is not the focus of the partnership intermediary's activity. Rather, they consider the DoD entity as an important stakeholder in their innovation ecosystem and, supported by the PIA, engage with them to support their common interests.

The attitude regarding funding partnership intermediaries is not consistent across DoD entities. On one hand DoD entities may rather enter into a PIA with an organization that already has a well-developed business model. On the other hand, some DoD entities believed funding should always be provided under a PIA if it is expected that they perform any work for DoD.

### 2. Congressionally Added Funds

For partnership intermediaries that receive DoD funding, there are multiple sources from which that funding may come. One possible source is congressionally added funds or "earmarks." The two DoD-wide PIAs, TechLink and MilTech, both began by operating with earmarked funds before later transitioning to include other sources of funding across

DoD and other Federal agencies. Specifically, TechLink became of part of the DoD's budget in 2003, and they have been a program element of DoD budgetary process ever since. The management and funding of TechLink began in USDR&E and devolved to the Air Force to achieve efficiencies in program management (DoD 2017). TechLink receives baseline funding to support its core activities through DoD's RDT&E budget process and congressional authorization of the budget. Other early partnership intermediaries were also established with earmarked funds (Swearingen and Dennis 2009; Howieson et al. 2013a). These partnership intermediaries were not active due to challenges surrounding establishing sustainment of funding (Howieson et al. 2013b).

### 3. Baseline and Project-Based Funding

For partnership intermediaries that receive funding directly from the DoD establishing their PIA, there are primarily two possible classifications of funding: baseline funding and project-based funding. Baseline funding is generally not tied to any specific project, and is primarily for the sustainment of the partnership intermediary's core activities under their PIA. A small number of partnership intermediaries receive baseline funding.

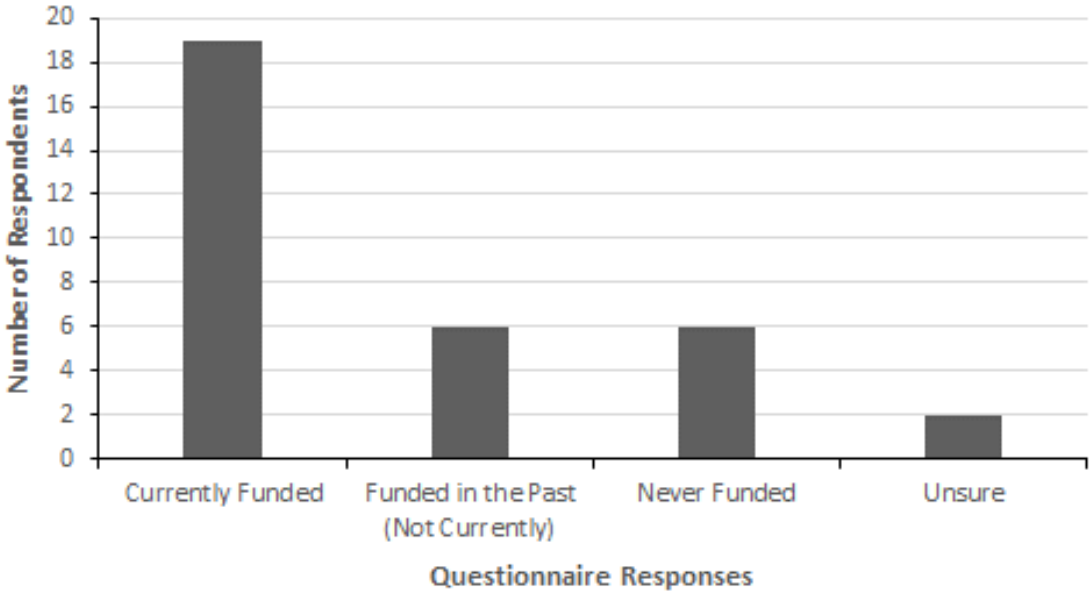
Project-based funding refers to a funding model in which funding is provided for a specified project, so total funding is subject to change based on the number of projects the partnership intermediary is tasked to perform throughout the year. Project-based funding is generally ad hoc. Partnership intermediaries with this funding model must ensure that they have sufficient DoD projects to continue their operations and maintain their staff, or that they have sufficient funding from other sources since they may operate with uncertain levels of DoD funding throughout the year.

Generally, partnership intermediaries can also operate on a hybrid model—in which they receive baseline funding and project-based funding for additional projects beyond their core activities under their PIA. STPI did not identify the amount of funding for every partnership intermediary; however, several interviewees and questionnaire respondents mentioned their approximate annual funding. Annual funding varied greatly with some receiving some tens of thousands of dollars while others receiving multiple tens or hundreds of millions of dollars in annual funding.

### 4. State or Local Government Funding

Partnership intermediaries may also receive funding from their State or local government. Partnership intermediaries must have a local or State government affiliation. This requirement can be satisfied by being funded in whole or in part by a State or local government. This funding may be tied to other functions the partnership intermediary performs on behalf of the State or local government. The majority of partnership intermediaries responding to the questionnaire receives or have previously received some portion of their funding from their State or local governments (Figure 5). State and local

governments may also provide other forms of nonmonetary support, for instance contributing advice and direction as the partnership intermediary's board member.




Source: Questionnaire for partnership intermediaries

**Figure 5. Partnership Intermediaries Receiving State or Local Government Funding, n=39**

## 5. Other Federal Funding

Partnership intermediaries can also receive funding from other sources within the Federal Government, within or external to DoD. There are a few cases where the DoD partnership intermediary performs services or was in the process of setting up a PIA with other Federal entities. In addition, several DoD entities described how other DoD entities use an already established PIA to fund additional activities under an existing PIA. These additional requests from other DoD entities are reviewed by the DoD entity that established the PIA to ensure that the tasks are aligned with the work described in the PIA. In these cases, the additional tasks can be funded through a Military Interdepartmental Purchase Request (MIPR) to the DoD entity that established the PIA. One interviewee remarked that this arrangement provides contributing DoD entities with flexibility to coordinate requests and resources under their PIA.

## 6. Non-Federal Funding

While PIAs are primarily agreements with Federal Government entities, partnership intermediaries may have other lines of business with customers outside of the Federal Government. Partnership intermediaries may offer similar services and capabilities to non-Federal customers or may fill another role entirely. Partnership intermediaries that receive

no funding from their DoD entity that established their PIA, for example, support their operations with services provided to non-Federal customers.

## E. Challenges

This section describes several challenges pertaining to confusion about affiliation requirements, a lack of awareness of PIAs, and a lack of baseline funding.

### 1. Confusion about State or Local Government Affiliation Requirements

While the legislation for PIAs defines the required relationship between a partnership intermediary and a State or local government, an interviewee noted that "there is a lot of confusion" in the community as to what a State or local government affiliation means. This interviewee made extensive efforts to identify, in coordination with their legal counsel, options for what would be legally sufficient to meet the affiliation requirement. These efforts alleviated some of their initial concerns that the potential partnership intermediary did not meet the legislative requirement.

**Exemplar Practice**

3. DoD entities and partnership intermediaries work to clearly identify the State and local affiliation requirement, in coordination with legal counsel, as needed
    - Addresses one or more challenges
    - Is logically necessary

### 2. Lack of Awareness of PIAs and of Alternative Contracting Mechanisms to Establish PIAs

Several interviewees noted issues related to a lack of general awareness or understanding of the PIA authority and its capabilities (further discussed in Chapter 5.G.2. and Chapter 7).

While the technology transfer office and staff at a DoD entity may be familiar with PIAs, that familiarity will not always extend to the contracting staff, legal personnel, or command leadership. An interviewee noted that a lack of information for the contracting staff may lead to them assuming a PIA should be treated like a Federal Acquisition Regulation (FAR)-based contract, even though the legal authorities provide for various mechanisms to establish a PIA, including non-FAR-based contracts.

Some interviewees also noted that challenges may arise when a command's contracting officer or legal counsel places restrictions on PIAs that are not required in the legislation or DoD policy, for example restricting the use of certain budgetary accounts, or

"colors of money" (refer to Chapter 5.D.). In addition to these challenges, command leadership may also not be aware of the value of PIAs, and therefore may not provide the level of support necessary to initiate or execute these agreements. These challenges have the potential to delay the process to establish a PIA, or prevent it altogether.

### 3. Lack of Baseline Funding

Several partnership intermediaries described challenges related to a lack of baseline funding. Partnership intermediaries that do not have baseline funding must rely on a continuous stream of project-based funding to sustain their operations or rely on other sources of funding from their other lines of business. This funding from year to year may be inconsistent, which can then lead to concerns over instability for smaller-sized partnership intermediaries. An interviewee mentioned that a lack of baseline funding led to workforce challenges, as they could not maintain a larger staff with expanded capabilities through project-based funding, which also led to the cycle of insufficient staff to grow capabilities and to pursue opportunities for new projects. Another interviewee commented that no members of their staff are funded full-time to work on activities under their PIA, as they only receive project-based funding and covering the time for staff means they must work on multiple other projects.

Partnership intermediaries that are not funded by their DoD partners also commented that they have to find other funding streams to maintain their services under their PIA. This has led to, in some cases, limited activity on unfunded PIAs. An exemplar practice in this regard is for a partnership intermediary organization to focus on customer needs to develop their business model. Some partnership intermediaries have developed new business across DoD or the Federal Government based off their initial PIA activities. In this way, as one interviewee described, the activities performed by the partnership intermediary should be self-perpetuating as long as the value proposition of the PIA justifies the cost.

**Exemplar Practice**

4. Partnership intermediaries focus on customer needs and clearly articulate their value proposition as part of their business model
    - Addresses one or more challenges
    - Adoption or continued implementation of a practice

## F. Suggestions

This section describes the suggestions related to PIA organizational and business models. Table 5 summarizes these suggestions.

**Table 4. Suggestions Related to Organizational and Business Models of Partnership Intermediaries**

| Action For | Suggestion Description | Challenges Addressed If Implemented |
|---|---|---|
| USDR&E<br>service leadership | Increase communication and awareness of PIAs | Lack of awareness of PIAs and of alternative contracting mechanisms to establish PIAs<br>Confusion about State or local government affiliation requirements |
| DoD entities | Consider providing baseline funding | Lack of baseline funding |

### 1. Increase Communication and Awareness of PIAs

A few interviewees suggested that USDR&E and technology transfer program managers at the services should clearly communicate the role of PIAs throughout DoD entities, including other stakeholders, such as contracting officers and legal counsel.

### 2. Consider Providing Partnership Intermediaries with Baseline Funding

Several interviewees suggested that DoD entities should consider providing baseline funding to the partnership intermediaries. Baseline funding could be beneficial for those partnership intermediaries that may be new, that experience uncertainties in the sustainability of their funding, and that were created with the sole intent to provide services for DoD. Several interviewees remarked that baseline funding would help the organization support their operations and maintain their staff while they grew out their capabilities and services.

# 4. Activities Performed by Partnership Intermediaries under PIAs

PIAs involve numerous activities in support of the broad technology transfer functions across DoD entities, including spin-in, spin-out, and dual-use activities. This chapter describes the breadth of activities performed by partnership intermediaries under their PIAs. These activities have evolved over time depending on the changing needs of the DoD entities. Another aspect of these activities described in this chapter includes the geographic scope of outreach and engagement activities—for instance the emphasis on local or regional communities. The chapter also includes challenges, suggestions, and exemplar practices related to the topics presented.

## A. Breadth of Activities under PIAs

Partnership intermediaries perform numerous activities, spanning activities focused on spin-in, spin-out, and dual-use, or a combination of these. Spin-in activities in this case are defined as activities meant to take a capability or technology from outside of the government and help transition it and integrate it into the government. Spin-out activities are meant to take Federal knowledge and technologies and transfer it outside of the government through commercialization, licensing, and other mechanisms. STPI loosely categorized the partnership intermediaries' activities to include:

- patent and intellectual property (IP) management
- technology and market research
- collaboration spaces
- technology showcases and events
- prize competitions
- RDT&E collaborations and agreements
- prototyping and manufacturing capabilities
- STEM education and workforce
- support for Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs
- business incubation

These activities are not mutually exclusive; rather, these activities can complementary and may be critical to the accomplishment of another. In this section, STPI describes these activities and explains how these activities can be complementary. The description includes some illustrative examples from specific partnership intermediaries.

### 1. Patent and IP Management

Partnership intermediaries assisted with the development and execution of licenses and the development or management of patents and the broader IP portfolio. The majority of partnership intermediaries stated that they supported assistance with patent licensing. These activities included identifying potential licensing partners or outreach to potential partners. This outreach included informal discussions to further disseminate information, such as helping the potential partner to better understand the utility of a patent in the context of their business or industry. A partnership intermediary may choose to conduct preliminary due diligence or background research to gauge the feasibility of the potential partner as a licensee before introducing the potential licensee to the DoD entity. In some cases, this background research involved the partnership intermediary communicating with the DoD researchers who are inventors on the patent to better understand the technology and the market context. These interactions tended to be coordinated through the technology transfer office but did not have to be. STPI observed it was the preference of the technology transfer office that dictated how much direct contact with DoD researchers the partnership intermediaries had.

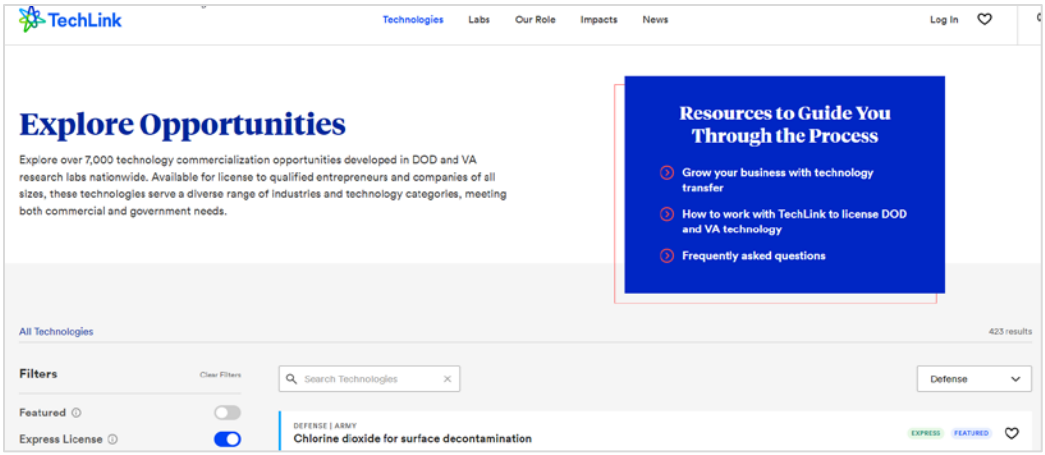
Typically, partnership intermediaries were not involved directly in the negotiation of terms for licensing agreements. In fact, one interviewee stated that they preferred if the partnership intermediary was not directly involved in these negotiations and rather that their technology transfer office handle all aspects of outlining licensing terms as these were viewed as highly dependent to the technology and patent of interest. However, in other cases, partnership intermediaries assisted in the negotiations of a patent licensee. For instance, TechLink provides an express licensing service in which DoD entities can agree to use a simplified process with pre-negotiated terms to license certain patents (Box: TechLink’s Express License).

**Box: TechLink's Express License**

TechLink maintains a database of all DoD patents. TechLink's express licensing service was designed to address the challenges associated with negotiating legal and financial terms for patent licenses. The express license is a simplified agreement that streamlines the licensing process. TechLink helps the potential licensees navigate the process at no cost to them.

DoD interviewees mentioned that they can work with TechLink to select technologies and patents that are made available under an express license. The licensing agreement is pre-approved and much of the application and review processes are conducted online.

The process aims to enable more rapid licensing of DoD patents to meet businesses' rapidly changing needs for commercializing new products. A custom license may take 6 to 12 months to negotiate. TechLink touts that their express license may take as little as 15 days. Over the last few years, laboratories across all three services have been expanding their use of TechLink's express licensing process. At the time of writing, there were 423 DoD technologies available for express licenses through TechLink's online database.




Source: Cooper, M. 2018. "Air Force expands use of express licensing." https://www.afmc.af.mil/News/Article-Display/Article/1651677/air-force-expands-use-of-express-licensing/; Carter, T. 2019. "Naval Research Lab rolls out 'express licensing' of patented inventions." TechLink. https://techlinkcenter.org/news/naval-research-lab-rolls-out-express-licensing-of-patented-inventions; U.S. Army. 2018b. "From Minds to Markets." https://asc.army.mil/web/news-alt-jfm18-from-minds-to-markets/; TechLink. n.d. "Explore Opportunities." https://techlinkcenter.org/technologies, accessed September 26, 2020.

Many partnership intermediaries also provided assistance with the development and management of IP portfolios. Their assistance includes facilitating invention disclosures for patents, at times working with DoD researchers and the technology transfer offices to identify patentable IP and to facilitate completion of the patent application paperwork and process. One partnership intermediary stated that their efforts in this vein can also involve helping DoD entities write their invention disclosures to describe their discovery and claims in a way that is "enticing to the private sector," suggesting that the private sector perspective and their potential uses could inform invention disclosures at their outset.

Technology transfer offices continuously analyze their IP portfolio to optimize their active patents. DoD entities do not patent all of their IP because there are periodic fees to

maintain active patents. To inform their decisions, they have worked with partnership intermediaries to identify IP that has the most potential for future commercialization. Partnership intermediaries also inform decisions on whether patents with upcoming fees should be renewed. To support this evaluation, partnership intermediaries typically perform technology or market research to identify the commercial viability of an invention or patent, including identifying potential licensees, industry players, and how the technology could be integrated with others to support new capabilities, among other factors.

A couple of partnership intermediaries mentioned they conducted these evaluations to help the DoD entities develop a commercialization plan associated with a specific patent. The commercialization plan includes identification of licensing opportunities with specific businesses and an engagement strategy that the partnership intermediary can facilitate.

**Exemplar Practice**

5. Partnership intermediaries expend high-levels of effort, as needed, to understand DoD discoveries and how to frame them to garner interest from the private sector
    - Addresses one or more challenges
    - Is logically necessary
    - Involves past, present, or planned allocation of dedicated resources

### 2. Technology and Market Research

The majority of partnership intermediaries identified that they performed technology and market research as part of their activities under PIAs. These activities supported the patent and IP management activities, as well as many other activities that required identifying and engaging with potential partner organizations for technology events, educational partnerships, collaborative R&D, manufacturing capability maturation, among others.

In addition, some partnership intermediaries conducted technology and market research, such as technology forecasting studies, which identified trends and future directions for specific technologies. STPI observed that DoD entities may not have pursued follow-on actions or have had them in mind when initiating these studies. Rather, the value of these studies is that they provided DoD entities with broad situational awareness regarding the origins and development of a particular technology domain or industry. These studies have been used to inform strategic planning and prioritization of R&D and activities by providing DoD entities with information about novel or emerging technologies, markets, and industries that were of interest. From a spin-in perspective, these studies also help inform RDT&E programs and technology transfer offices of technologies and

capabilities available in industry or academia and how best they could be adapted to meet DoD's needs. One interviewee mentioned that these partnership intermediary activities are particularly helpful for relatively small or new technology transfer offices or RDT&E functions, with limited staff and bandwidth to dedicate to strategic analyses.

In one case, a partnership intermediary employed data analytic techniques to support their technology and market research activities. Other partnership intermediaries stated that they were drawn to collaborate with this partnership intermediary so they could take advantage of their data analytic capability, such as identifying potential event participants, to support activities under their own PIA.

### 3. Collaboration Spaces

Many partnership intermediaries provided services associated with a collaboration space. These collaboration spaces were mostly physical spaces located near the DoD entity. These spaces provide a collaborative environment to engage with non-DoD researchers and businesses. In many cases, these spaces are non-classified environments. In one example, a partnership intermediary manages a campus that serves as a collaborative innovation ecosystem in which industry, entrepreneurs, R&D funders, venture capital firms, small business resource providers, and other ecosystem supporters are tenants on the campus (Box: Catalyst Campus for Technology and Innovation). The partnership intermediary used the space on the campus and leveraged the broader campus ecosystem to accomplish activities under their PIA, such as hosting technology showcase events, informal meetings, and other engagement opportunities (further described in Chapter 3.A.4. Technology Events and Showcases). However, one partnership intermediary was involved in building a facility now serving as a space for classified, collaborative RDT&E between DoD and non-DoD researchers. The classified environment may provide a way to enable a deeper technical discussion of DoD needs that facilitates technology transfer. While providing additional flexibilities for deeper discussions, a classified space can narrow the pool of potential engagement partners, in addition to the potential burdens for DoD to fund and sustain new clearances to support these interactions.

**Box: Campus Catalyst for Technology and Innovation**

The Catalyst Campus for Technology and Innovation (CCTI) provides collaborative R&D workspaces, meeting rooms, computer laboratories, and other amenities to its tenants. Based in Colorado Springs, Colorado, CCTI serves as a partnership intermediary with the Air Force Research Laboratory's Space Directorate and the Air Force Academy to support the implementation of a 12-week business accelerator program that facilitates human-centered design activities to explore, design, and develop solutions to Air Force technical problems.


Source: CCTI. n.d. "Our Ecosystem at Work." https://www.catalystcampus.org/; https://www.catalystcampus.org/ecosystem-at-work/

In at least one instance, a collaboration space was supported as a virtual environment in which DoD could work securely online with private sector researchers. The collaborative online platform or the data and information exchanged in these platforms were managed by the partnership intermediary. In discussions with several partnership intermediaries, the opportunity to collaborate virtually was noted as a particular focus for activities post COVID-19, given the continued limitations on travel and meeting inside facilities.

Several DoD entities and partnership intermediaries alike emphasized the benefits of collaboration spaces in providing an environment where "meaningful collisions" between SMEs and ideas can occur. Another benefit touted by some interviewees was that these spaces often provided opportunities for DoD entities to engage with non-DoD researchers without having to deal with the security concerns of hosting events or visitors in DoD facilities. In addition, some interviewees mentioned that, from the perspective of the private sector, these collaboration spaces provided a more neutral space to engage in discussions with businesses, in comparison with a secure DoD facility. A few partnership intermediaries discussed how demand exceeds availability of workspace in their respective collaboration spaces, suggesting these spaces, in general, are successful in attracting businesses and other potential DoD partners.

### 4. Technology Events and Showcases

Many partnership intermediaries planned, organized, and facilitated technology showcases and events as part of their activities under PIAs. These events included ad hoc, one-off events or recurring annual or semi-annual events. These activities were strongly

connected to the activities related to providing a collaboration space. Technology events consisted of demonstrations, showcases, industry days, design sprints, hackathons, workshops, and other events. These events supported activities that are either or both (a) spin-in, such as articulating DoD's needs to the commercial sector and identifying promising solutions external to DoD, and (b) spin-out, such as showcasing DoD-developed technologies with prospects for commercialization and demonstrating DoD equipment, facilities, and capabilities that can be used by the commercial sector.

Some DoD entities may not provide partnership intermediaries with any funding to support these technology events and showcases. In some cases, the event is one developed under the mission of the partnership intermediary's organization, and DoD may be one of many organizations invited to participate in the event. In these situations, the partnership intermediary is likely funding the event, leveraging its non-PIA activities to support DoD's technology transfer activities and needs. For instance, DoD entities stated that they have recruited DoD inventors from their laboratories to attend events, speak on panels, and network with industry participants to showcase their technologies. In other cases, the DoD entity requests the partnership intermediary to organize a specific event with direction on the topic and participants managed by, or strongly coordinated with, the DoD entity. These events have included activities focused on small businesses, specific technical domains, and training events for DoD researchers (see Chapter 3.A.10. Business Incubation Services). In these situations, DoD typically funded the partnership intermediary to plan, organize, provide space for, or manage the event, including any post-event analysis or engagement with participants.

In a few cases, a single partnership intermediary supported multiple DoD entities given the expertise of their staff or their unique access to industry or academic networks. This specialized expertise was viewed by some DoD entities as a valuable resource to meet their own missions. In addition, STPI identified that some partnership intermediaries facilitated knowledge transfer to support the adoption and adaptation of technology event processes across various DoD entities (Box: Innovation Discovery Days Adopted Across DoD).

**Innovation Discovery Days Adopted Across DoD**

The Innovation Discovery process began in 2008 at the Navy's NSWC Crane Division as a means to support spin-out of Crane's technologies. Based on the success of these events, in 2014, the Navy developed a handbook and other informational materials, in coordination with TechLink, to facilitate adoption or adaptation of the Innovation Discovery Days process across other Navy laboratories. Several interviewees stated that they worked initially with TechLink to adopt and adapt the Innovation Discovery Days process for their laboratory's needs. This facilitated knowledge transfer from TechLink's SMEs to technology transfer offices and partnership intermediaries across the Navy and Air Force. These other technology transfer offices later hosted their own events supported by their own partnership intermediaries.

Source: Interviews; U.S. Navy. 2014. "Innovation Discovery Handbook." https://techlinkcenter-assets.s3-us-west-2.amazonaws.com/innovation-discovery/Navy-Innovation-Discovery-Handbook-May-2014.pdf

### 5. Planning and Implementation of Prize Competitions

Many partnership intermediaries planned and implemented prize competitions for DoD entities. Prizes are competitions among individuals or teams, industry, academia, and Federal, State, and local government stakeholders that involve requiring participants to submit solutions in response to a defined problem.[5] Prizes can include monetary or non-monetary rewards. One interviewee mentioned that prize competitions have attracted participation from organizations that have not traditionally worked with DoD—in particular, start-ups, small businesses, and other organizations.

Partnership intermediaries facilitated prize competitions to support spin-in activities in which DoD could pursue further investments with the prize winners to use their proposed or developed solutions. Prize competitions also supported spin-out activities—for example, to support the spin-out of collaborative teams and start-ups based on DoD patents or technology areas of interest.

Prize competitions supported by partnership intermediaries also included university design competitions (refer to Chapter 3.A.8. STEM Education and Workforce Development), in which prize winners would continue to participate in business accelerator and incubation activities (refer to Chapter 3.A.10. Business Incubation Services). Some partnership intermediaries served as a connector between organizations with complementary capabilities to facilitate their participation in the prize competition—for example, to identify cross-sector researchers working in the specified technical domain and with appropriate security clearances to fill technical and logistical requirements for their participation. Other roles partnership intermediaries played include developing the problem set, scouting and recruiting participants for the prize competition, developing judging criteria, and evaluating submissions. The level of DoD's participation in implementation of the prize competitions has varied, and, in some cases, partnership

[5] Federal prize competitions are enabled by legislative authorities 10 USC 2374a and 15 USC 3719.

intermediaries have had a relatively large amount of autonomy in administration of the prize competition and selection of the winners.

### 6. Support of RDT&E Collaboration Agreements

Many partnership intermediaries supported the development and coordination of RDT&E collaboration agreements, such as collaborative R&D agreements (CRADAs), educational partnership agreements (EPAs), and Technology Transfer Agreements, among others. These activities were reinforced by other activities under PIAs, such as providing a collaboration space, organizing technology events and showcases, and prizes, among other activities in which partnership intermediaries conduct outreach, engage with, and identify potential partners. Some interviews opined that partnership intermediaries provided value in their efforts to spin-out IP primarily by building the brand recognition of DoD across industry and expanding their DoD entity's network and outreach to non-traditional research communities. One interviewee emphasized that their partnership intermediary provided a critical role in marketing their laboratory's facilities and capabilities in support of testing and commercialization efforts by industry. In addition, many partnership intermediaries connect DoD laboratories with a subject matter expert at a company or in academia to address a laboratory's problem, and that relationship may result in a CRADA or other collaboration agreement.

Partnership intermediaries also assisted in problem solving activities in support of facilitating RDT&E collaboration agreements. For instance, they provided or solicited input from SMEs for DoD's strategic thinking about technical challenges and the solution space for those challenges. One DoD entity mentioned that their partnership intermediary helped them better understand the scope and feasibility for their acquisition strategy, including what mechanisms they might use, and companies or technologies that can meet their needs. Partnership intermediaries have also served as SMEs themselves and participated in brainstorming activities for improving technical or technology transfer processes with DoD entities.

### 7. Prototyping and Manufacturing Capabilities

Many partnership intermediaries stated that they supported prototyping activities under their PIAs. The scope of these activities included performing the prototyping, facilitating the development of prototypes, and funding prototyping activities. A partnership intermediary can conduct one or more of these activities depending on the nature of the technical problem or prototype sought. Several partnership intermediaries developed prototypes themselves or in coordination with non-DoD partners to meet the DoD's needs. One partnership intermediary mentioned that they managed the prototyping process entirely from DoD's initial request to mature a technology to a specified level. In their case, the DoD entity was involved in down-selection of any potential non-DoD

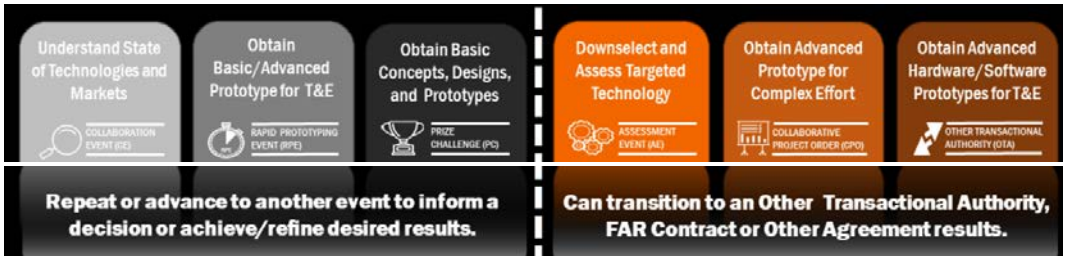
partners involved in developing and maturing prototypes. It was the partnership intermediary's decision whether to develop the prototypes in-house or facilitate prototyping through external partners.

In other instances, prototyping activities were informed by other partnership intermediary activities, including providing collaborative spaces, organizing design sprints and technology demonstrations, and administering prizes. In particular, STPI identified an innovative use of prize competitions for rapid prototyping. DoD entities used prize competitions alongside other technology transfer mechanisms, such as Other Transaction Authority (OTA), to mature technologies and expand their partnerships with prize winners (Box: Partnership Intermediaries Support DoD Approaches to Stack Authorities for Prizes and Other Transactions).

**Box: Partnership Intermediaries Support DoD Approaches to Stack Authorities for Prizes and Other Transactions**

In a partnership intermediary's capacity to facilitate the maturation of technology, they may utilize events or prize competitions to field promising ideas and solve problems to benefit the Warfighter. SOFWERX, for example, uses prize competition and other events to understand the state of technologies and markets and down-select promising technologies that may move forward for a possible transition to a DoD partner. Prizes for these competitions may also be non-monetary, depending on the sophistication of the technology and the market.

SOFWERX may present the prize winners and their potential ideas to SOCOM. Depending on the acquisition strategy, SOCOM may decide on follow-on activities, such as contracting through FAR-based contracts or OTA for Prototype Projects (10 USC 2371b). While the partnership intermediary in this case may not be involved in the actual acquisition of the winning technologies, their activities support the process that can lead to further partnerships through other mechanisms. SOFWERX provides an array of activities that support the advancement of technologies through events to inform SOCOM's decisions to transition technologies and prototypes through other follow-on agreements or contracts.




Source: SOFWERX. n.d. "SOFWERX." https://events.sofwerx.org/; Prizes for advanced technology achievements (10 USC 2374a); Prize Competitions (15 USC 3719)

STPI found that a broader set of partnership intermediaries facilitated the prototyping process while not conducting prototyping activities themselves. These activities involved partnership intermediaries liaising between DoD and non-DoD technical experts to facilitate information exchange. Several partnership intermediaries also funded other organizations through sub-contracts to develop prototypes, identifying commercial

organizations that met the requirements most likely to be successful in meeting DoD's needs.

Several partnership intermediaries supported the advancement of DoD's manufacturing capabilities. In these activities, partnership intermediaries worked with identified companies on behalf of the DoD to identify improvements that would increase their capability to meet the DoD's needs. These activities also involved assessing manufacturing capabilities that can meet DoD needs and providing technical assistance to improve the efficiency of manufacturing processes. These activities supported down-stream manufacturing and production of technologies, for instance, by licensees of DoD technologies or other existing or potential RDT&E collaboration partners.

### 8. STEM Education and Workforce Development

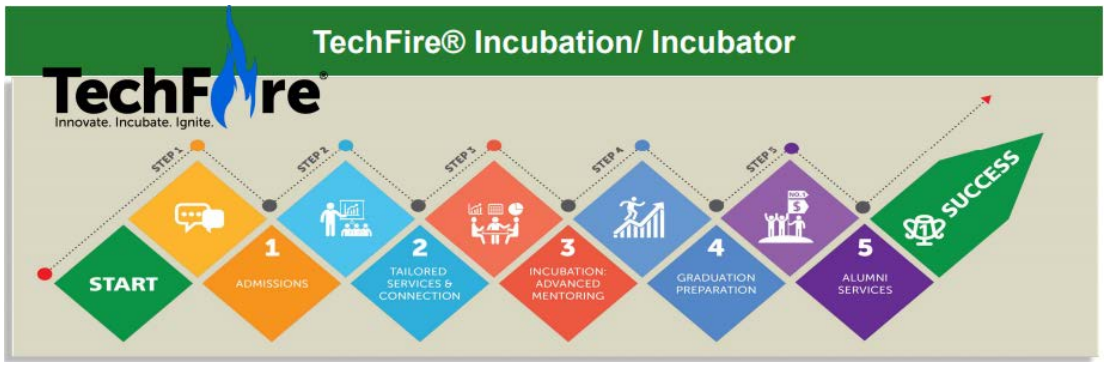
Many partnership intermediaries stated that they assisted in STEM education and workforce development activities, including organizing K-12 outreach events, facilitating or supporting the administration of internships with DoD entities or student scholarship, and the development of the workforce pipeline to train and attract high quality talent to DoD facilities. These activities included those focused on nurturing underrepresented groups in STEM or developing work-based learning opportunities in specific technical areas of need, such as cybersecurity. Some partnership intermediaries worked on developing and attracting talent to their regions, at times in partnership with universities, to develop curricula and other training opportunities for students.

Other workforce development activities were focused on DoD researchers and personnel to improve their skills associated with entrepreneurial R&D activities and marketing their ideas and technologies to commercial organizations. Training also included patent training for engineers to gain familiarity with the patenting process and training for potential non-DoD partners to help them understand how to work with DoD, pitch their ideas and technologies to DoD, and identify sources of DoD partnership opportunities (Box: Entrepreneurial R&D Training).

**Box: Entrepreneurial R&D Training**

Partnership intermediaries can help support broader commercialization activities by training DoD researchers and engineers, helping them understand the patent process and encouraging development of an entrepreneurial mindset. Partnership intermediaries such as the Energetics Technology Center (ETC) facilitate such training and take advantage of other Federal entrepreneurship programs to assist in this effort.

For example, in order to encourage startup companies to commercialize ARL patents, ETC conducted two Lean Start-up sessions based on the National Science Foundation (NSF) I-Corps program at TechFire® ARL. The first session was held in March 2017 and consisted of a day-long kickoff meeting, followed by an interim check-in meeting 5 days later, culminating in final presentations 2 weeks after the kickoff. Four ARL technologies were selected to be put through the customer discovery process. A second session was held in May 2017 and three ARL technologies were put through the customer discovery process during this session. In most cases, the researchers were highly engaged with these teams, which was critical, since the I-Corps teams consisted mostly of business students, per NSF's program design for I-Corps. Activities like this not only help to accelerate the commercialization process for DoD technologies but also provide useful workforce development opportunities for students, researchers, and engineers.




Source: Leonard, W. 2018. "ARL implements new business model in effort to collaborate with academia and industry." https://www.army.mil/article/200932/arl_implements_new_business_model_in_effort_to_collborate_with_academia_and_industry; Millemaci, J. n.d. "U.S. Army RDECOM, Technology Commercialization." https://www.arl.army.mil/opencampus/sites/default/files/CM%2018%20ETC%202017%20OCOH%20Commercialization%20Combined%20editedWEKC.pdf

## 9. Support for the SBIR and STTR Programs

Many partnership intermediaries provided support for the SBIR and STTR programs by performing technology scouting to identify and recruit small businesses to those programs. Other activities include hosting SBIR and STTR industry events or technology sprints for SBIR awardees, facilitating the development and submission of proposals, and providing technical expertise to assist in the transition from Phase I to Phase II of the SBIR program, among other support for DoD's program execution. One partnership intermediary mentioned that they engage with their local U.S. Small Business Administration's Small Business Development Center and the Procurement Technical Assistance Centers, which provide information resources for government contracting. In one case, the partnership

intermediary's support for the SBIR program included providing them with a collaboration space that the program could use to engage with potential applicants.

There is one opportunity identified to strengthen related PIA activities. One interviewee pointed out that co-location of the DoD entity with the SBIR program coordinator could help improve the partnership intermediary's own coordination of their activities with those of the SBIR program.

### 10. Business Incubation Services

Several partnership intermediaries stated that they performed business incubation services under their PIAs. Under these efforts, partnership intermediaries perform activities in support of commercializing DoD entity technologies or adapting commercial technologies to meet DoD needs as part of their PIA functions (Box: TechPort Maryland Region Program Business Incubation). Typically, these activities focus on relatively higher technology or manufacturing readiness levels (refer to Appendix G) and involve mentorship from SMEs across DoD, the partnership intermediary organization, or entrepreneurs and industry. Partnership intermediaries also operated structured business service or incubation programs, with some providing monetary stipends to participants.

**Box: TechPort Maryland Region Program Business Incubation**

TechPort is a business incubator that serves the Southern Maryland area, and was initiated through a partnership between the Navy, St. Mary's County, the University of Maryland, and the Maryland Technology Development Corporation (TEDCO). TEDCO serves as the partnership intermediary organization to help facilitate its establishment. A driver for the establishment of this incubator was the concept that companies that participated in the spin-out of DoD technologies would be able to use the incubator at a reduced price. Incubator services include venture assessment, business consulting, and investor relationship development. This partnership aims to facilitate the commercialization process and maturation of technologies that are of interest to DoD and may eventually be transitioned back into the DoD.

Source: TechPort. n.d. "Who We Are." https://techportsomd.org/who-we-are/

## B. Roles of Spin-In, Spin-Out, and Dual-Use

STPI found that any single partnership intermediary generally performed both spin-in and spin-out activities. For some, the portion of these activities emphasized either one or the other. In some cases, such as for business incubation services, activities focused specifically on supporting dual-use technologies. Although STPI's information collection was a current snapshot of activities under active PIAs, some interviewees mentioned that their activities had over the last few years shifted towards spin-in activities and, overall, cited less of an emphasis on spin-out activities.

## C. Evolution of Activities

Varied levels of maturity of the partnership intermediary organization influenced how activities under PIAs evolved. For example, some organizations that were inexperienced in working with DoD or not integrated into their local innovation ecosystems faced an initial learning curve that made it more difficult to engage with ecosystem stakeholders compared with partnership intermediaries already integrated within their ecosystems. In addition, as the relationship between DoD and their partnership intermediaries strengthened, in some cases, the scope of activities shifted from being reactionary to one in which DoD relied on their partnership intermediaries to provide a proactive role in identifying and advising on technology transfer and engagement opportunities. In other cases, activities shifted from being largely inactive to being fully responsive once partnership intermediaries received funding under their PIAs.

In a few cases, partnership intermediaries supported activities under multiple PIAs for more than one DoD entity. When new customers were added, the activities were generally aligned with the capabilities they provided under their initial PIA. One interviewee mentioned that the expansion of their support across multiple DoD entities was due, in part, to the raised awareness of successful outcomes from their activities under their initial PIA.

## D. Geographic Scope of Activities

Many partnership intermediaries work through innovation networks located across the Nation rather than focus solely on a local innovation ecosystem. There are a few exceptions, including specific partnership intermediaries that exist with a distinct mission to support local or State-level economic development goals. Generally, STPI found that DoD entities did not request that their activities under PIAs be focused on specific local or regional communities. Partnership intermediaries typically did not exclude participation of R&D performers or potential partners that were nationally based.

## E. Challenges

STPI identified challenges related to bureaucratic burdens, the steep learning curve to understand PIA-related roles and functions, perceptions that IP is not conducive for commercialization, and the time and effort needed to build relationships in the innovation ecosystem.

### 1. Burdensome Bureaucracy and Confusion about the Legality of Activities

Some partnership intermediaries mentioned unnecessary bureaucracies potentially limited the ability to conduct their activities and knowledge transfer to the partnership intermediaries. At least one partnership intermediary mentioned that not being able to directly communicate with DoD researchers posed barriers to accomplishing their

activities. One interviewee mentioned continuously having to speak with DoD legal counsel or contracting officers about constraints regarding hosting events, the legality of engaging with private sector organizations, and determinations about what costs were reimbursable, among other factors. Some interviewees mentioned confusion about the activities that could be performed under PIAs, in particular around prototyping and manufacturing activities, and to what extent partnership intermediaries could be involved in the development of prototypes. Other limitations involve the inability to effectively raise awareness of successes of partnership intermediary activities. For example, one interviewee mentioned difficulties working with DoD public affairs to issue press releases related to their work and on behalf of the DoD sponsors, which hampered the ability to communicate potential opportunities for small businesses to work with DoD.

**Exemplar Practice**

6. Partnership intermediaries develop strong linkages with DoD public communication staff to facilitate information sharing about and the benefits of engaging with DoD
    - Addresses one or more challenges
    - Adoption or continued implementation of a practice

Some interviews opined that a trust-based relationship was vital to remedying some of these challenges and remaining nimble to respond to unforeseen challenges. One partnership intermediary stated: “DoD’s priorities change, people change, organizations reorganize, so you have to be on your toes and be flexible and responsive.” In this way, among a partnership intermediary’s many roles is to be proactive and understand the bounds of their activities, including the legal and policy frameworks that govern DoD activities more broadly. At the same time, DoD entities in oversight roles have worked to balance the trust-based relationship with rules for the management of their PIAs. For further exemplar practices in this regard, refer to Chapter 5.H. Exemplar Practices.

**Exemplar Practice**

7. Partnership intermediaries are active partners that seek to understand the legal and policy frameworks that govern DoD activities
    - Addresses one or more challenges
    - Is logically necessary

### 2. Steep Learning Curve to Understand PIA-Related Roles and Functions

Some partnership intermediaries stated that they experienced challenges understanding the scope of activities that could be pursued under PIAs. In certain cases, a partnership intermediary may be responding to multiple "sponsors," who represent project-level DoD leads for varied activities under a single PIA. This situation can potentially create competing interests that need to be effectively managed by the partnership intermediary.

Partnership intermediaries mentioned they are effective if they work to understand the scope of their PIA and what activities they are best suited for or are appropriate for them to perform. A few interviewees mentioned that they have turned down proposals for projects that they determined not to be appropriate under their PIA. In one case, a partnership intermediary referred a DoD entity to another partnership intermediary, recognizing the other partnership intermediary had better capabilities to perform a requested activity. These anecdotes encapsulate the trust-based relationship of partnership intermediaries.

Some partnership intermediaries described the extensive preparation to understand their PIA roles in discussion with their DoD sponsor. One interviewee mentioned they typically start with a questionnaire for the customer to determine what they are trying to accomplish and their perceptions and expectation of the value of achieving the request. Then they review the identified opportunities to determine whether they are a fit for what the partnership intermediary can do and whether it falls under their PIA. Partnership intermediaries work collaboratively as team to figure out what it will take to solve DoD's problems. Once the DoD entity and the partnership intermediary are aligned on the approach, they can move forward with the activity. The DoD entity is continuously informed of progress to ensure that if deviations are needed, they are aligned with expectations. This partnership intermediary also mentioned that they conduct their own post-activity interviews to see whether they met expectations and the customer was satisfied.

**Exemplar Practice**

8. Partnership intermediaries conduct extensive preparation to understand their PIA roles
    - Addresses one or more challenges
    - Involves past, present, or planned allocation of dedicated resources

### 3. Perceptions That DoD IP May Not Be Conducive to Commercialization

For some DoD entities, the nature of their work and their IP portfolio may not be valued in the same way as for other DoD entities. This may be due to an inability to adequately assess the potential value of the portfolio or because the discoveries are too immature (at a low technology readiness level) to get interest from investors or licensees. In addition, from the perspective of partnership intermediaries supporting spin-out activities, working with relatively large IP portfolios can also be difficult and is a labor-intensive endeavor. One interviewee mentioned that IP databases can have inaccurate information about patents. Efforts to research the market potential of patents can lead to wasted effort; later it may be found that the patent was not issued by the U.S. Patent and Trademark Office.

Partnership intermediaries work to support greater understanding of linkages between DoD discoveries and non-DoD technologies or market opportunities. This can require a high level of effort to understand DoD discoveries and how to frame them to garner interest from the private sector. These efforts can be supported by activities that engage DoD researchers, in coordination with technology transfer staff, so that partnership intermediaries better understand the potential value of DoD discoveries. In some cases, partnership intermediaries support the development of patent application so patent claims can be framed and informed by a broader market perspective.

### 4. Time and Effort Needed to Build Relationships in the R&D Ecosystem

Generally, it takes time to build relationships between DoD entities and their partnership intermediaries—and to build DoD's relationship in their respective innovation ecosystems. Customer apathy or the inability to support timely decision making and provide guidance are issues experienced by partnership intermediaries that inhibit effective relationship building. One interviewee expressed that there may not be an existing local innovation ecosystem that is relevant to the nature of the work that they perform. This situation makes it difficult for partnership intermediaries to accomplish their activities as it becomes less likely that existing ecosystem networks can be leveraged. One interviewee remarked that DoD is generally not thought of by the private sector as a hub for innovations. These perceptions related to DoD's reputation can also impede the ability for partnership intermediaries to accomplish their activities.

To address some of these challenges, partnership intermediaries have worked to build their networks and contributions to those networks. One interviewee stated, "a partnership intermediary is only as good as its network," and described their work as "increasing human input to maximize organizational output." Service-wide and other DoD-wide initiatives, such as the NavalX TechBridges, aim to bolster these networks and bring together activities working towards similar goals (TechBridges is discussed further in Chapter 5.A. DoD Drivers for Establishing PIAs). Some interviewees mentioned the

fruitful coordination occurring across DoD entities and their partnership intermediaries, leading to more efficient engagement and cost-savings due to coordinating joint activities. Certain partnership intermediaries may be small organizations, and due to the uncertainties in their funding streams and lack of baseline funding from a DoD sponsor, they are incentivized to leverage capabilities across other partnership intermediaries and work closely with one another to exchange information and tools.

Other partnership intermediaries mentioned they were hindered in their activities due to negative perceptions about working with DoD from stakeholders they were targeting for potential engagement. To address this issue, partnership intermediaries worked with DoD entities to develop a communication strategy, identifying effective messaging to communicate DoD's capabilities, and facilitating information about how to engage and the benefits of engaging with DoD. One partnership intermediary remarked that to assist in developing communications, their staff has fostered close working relationships with DoD public communications staff.

Interviewees mentioned that collaboration spaces (physical and virtual) are a vital resource to conduct effective activities and highlighted their importance in terms of providing opportunities to collaborate. Partnership intermediaries use their collaboration spaces for engagement events and other interactions with their local R&D ecosystem stakeholders and other targeted communities.

**Exemplar Practice**

9. Partnership intermediaries engage with and foster relationships with other entities in the region, such as universities and regional economic development groups, continuously working to build their networks and contributions to their innovation ecosystems
    - Addresses one or more challenges
    - Adoption or continued implementation of a practice

## F. Suggestions

STPI identified several suggestions related to coordinating events and showcases, supporting information exchange, addressing engagement barriers for small businesses, and expanding certain activities under PIAs. Table 7 summarizes the suggestions and how they address the identified challenges.

**Table 5. Summary of Suggestions Related to Activities Performed by Partnership Intermediaries under Their PIAs**

| Action For | Suggestion Description | Challenges Addressed If Implemented |
|---|---|---|
| DoD Entities<br>Partnership Intermediaries | Coordinate events and showcases | Time and effort needed to build relationships in the R&D ecosystem |
| DoD Entities<br>Partnership Intermediaries | Support effective and efficient information exchange | Steep learning curve to understand PIA-related roles and functions<br>Burdensome bureaucracy and confusion about the legality of activities<br>Perceptions that DoD IP may not be conducive to commercialization |
| DoD Entities | Address specific engagement barriers for small businesses | Burdensome bureaucracy and confusion about the legality of activities |
| DoD Entities | Consider expanding certain activities under PIAs | Burdensome bureaucracy and confusion about the legality of activities |

### 1. Coordinate Events and Showcases

Some interviewees mentioned that events and showcases, such as industry days, should be coordinated across DoD entities and partnership intermediaries. Some DoD entities already do this to exploit efficiencies. One interviewee mentioned an example of this is the Navy's coordination of the Advanced Naval Technology Exercise with Coastal Trident, which is accomplished through coordination with 12 Navy entities (ANTX 2019). Coordinated events and showcases aimed at bringing together similar targeted communities could better leverage resources and avoid burdening the targeted communities with similar requests. Enhancing coordination could include organizing more joint events and providing access to those events across partnership intermediary networks, as appropriate.

**Exemplar Practice**

10. DoD entities and partnership intermediaries coordinate and develop joint activities under their PIAs to the extent possible to leverage resources and exploit efficiencies
    - Addresses one or more challenges
    - Adoption or continued implementation of a practice
    - Involves past, present, or planned allocation of dedicated resources

### 2. Support Effective and Efficient Information Exchange

Interviewees pointed out that additional efforts could be made to support effective and efficient information exchange across DoD entities that have established PIAs and partnership intermediaries. Some interviewees suggested improving data management of IP portfolios across partnership intermediaries, sharing processes and frameworks for conducting activities to enhance partnership intermediary capabilities, and sharing information about existing tools developed by partnership intermediaries that could be adapted or used by other partnership intermediaries.

### 3. Address Specific Engagement Barriers for Small Businesses

One partnership intermediary suggested specific strategies could be employed by DoD entities to address engagement barriers for small businesses. They stated that DoD entities could, for instance, address laboratory-specific organizational barriers by establishing a tiered-pricing structure for the services provided to their partners, such as access to laboratory resources and working on collaborative projects with DoD researchers.

### 4. Consider Expanding Certain Activities under PIAs

Interviewees suggested various partnership intermediary activities that should be expanded. A couple interviewees noted that industry showcases, such as the Innovation Discovery Events, should be expanded based on their perceived successes. One interviewee identified that partnership intermediary activities supporting STEM education and workforce development could enhance DoD's ability to manage relationships across many academic organizations. Establishing PIAs for this purpose could be considered as opposed to establishing agreements unilaterally with a single university.

One interviewee mentioned the enhanced role partnership intermediaries could play in helping researchers write patent applications and in entrepreneurial R&D training to support spin-out activities. For example, there may be value in DoD technology transfer staff working with external SMEs alongside DoD researchers to help them plan for dual-use approaches to their R&D and frame discoveries in a way that may be more favorable to the private sector. Partnership intermediaries could enhance DoD's patent claims in their development so that a patent can garner broad interest from potential licensees.

One interviewee mentioned that partnership intermediaries could play a greater role in providing DoD with situational awareness and supporting the development of strategic priorities for their RDT&E portfolios. Some partnership intermediaries can provide assessments of technical capabilities and industries so that DoD can posture their resources informed by their future outlook. One partnership intermediary mentioned they are well-poised to conduct economic impact studies to showcase successes of DoD's technology transfer activities.

# 5. DoD Oversight and Evaluation of the Performance of PIAs

This chapter focuses on DoD's oversight and processes to evaluate the performance of PIAs. The topics related to oversight include DoD's drivers for establishing PIAs, selection of a partnership intermediary, funding vehicles and types of funds, and management processes once PIAs are established. The topics related to evaluation of the performance of PIAs include evaluation considerations, such as the definition of success, formal and informal reviews, quantitative and qualitative evaluations, and raising awareness of successes. This chapter also provides DoD's overall satisfaction with their use of PIAs as well as challenges, suggestions, and exemplar practices related to the topics presented.

## A. DoD Drivers for Establishing PIAs

DoD interviewees described some drivers for establishing their PIAs, including:

- Partnership intermediaries can help a DoD entity to establish processes that accelerate the commercialization of DoD technologies. These improved processes can help the DoD entity provide better and low-cost solutions to advance DoD's warfighter capabilities.
- The private sector is now responsible for a larger portion of U.S. R&D spending, and some DoD entities are motivated by a need to source solutions and expertise originating in industry. A few DoD entities believed that partnership intermediaries support their interface with industry, thus allowing DoD to keep the pace of innovations suitable for acquisitions.
- The United States Air Force Science and Technology Strategy's emphasis on partnerships motivated at least one DoD entity to foster more partnerships with academia (U.S. Air Force 2019c). This DoD entity believed that partnership intermediaries were beneficial by helping to facilitate their relationships with this target community.
- The NavalX Tech Bridges initiative has motivated some Navy entities to foster partnerships with stakeholders and their innovation ecosystems, and to support the budding Tech Bridges network (Box: NavalX Tech Bridges Initiative).
- For many DoD entities, their ultimate goal is to put the necessary tools in the hands of the warfighter quickly and efficiently. Any mechanism or organization

that can help to improve that process adds value, and PIAs are one of the available options to accomplish their mission. One interview noted that any tool that helps the DoD do business better should be fully exploited. A few interviewees remarked that PIAs serve as force multipliers to achieve more with their given resources. In this vein, partnership intermediaries help amplify demand signals for new technologies to meet DoD's emerging and future needs.

- Some DoD entities specifically aimed to improve outreach efforts to their local and State communities. Partnership intermediaries were viewed as effective tools to foster partnerships with stakeholders in these communities.

**Box: NavalX Tech Bridges Initiative**

The NavalX Tech Bridges initiative is an effort to coordinate technology transfer initiatives across the Navy and build a network of partners and innovation ecosystems across the Nation. A Tech Bridge is a coordination element and innovation catalyst to connect the Navy workforce with start-ups, academia, corporations, small businesses, nonprofits, private capital, and government entities to allow for greater collaboration (Michalis 2020). There are 12 Tech Bridge locations in regions across the country.


Partnership intermediaries are an element of the Tech Bridges ecosystem. The oversight of the Tech Bridge's activities is the responsibility of a Tech Bridge Coordinator. In a few cases, a Navy entity's technology transfer office staff will serve in this role.

Source: Interviews; Michalis, K. 2020. "Promoting Collaboration and Commercialization through Department of the Navy NavalX Tech Bridges." Presentation for the Technology Transfer Forum, September 16. https://federallabs.org/events/promoting-collaboration-and-commercialization-through-department-of-the-navy-navalx-tech; NavalX. 2020. "TechBridges." https://www.secnav.navy.mil/agility/Pages/techbridges.aspx

## B. Selection of a Partnership Intermediary

When establishing a PIA, DoD entities think strategically about what they would like for the PIA to accomplish, and what motivates the agreement. DoD entities have varied motivations for establishing PIAs. These motivations largely depend on the DoD entity's technology transfer goals, the nature and maturity of the work they perform, and how the partnership intermediary's capabilities can fill perceived gaps in their ability to fulfill their goals. One interviewee mentioned that competing the PIA allowed them to ensure they are identifying potential partners and assessing which can complete their requirements most effectively. One interviewee opined that competing a PIA is especially useful if the DoD entity is not familiar with the landscape of relevant organizations that could provide the capabilities needed.

### 1. Formal Processes

The PIA authorities do not include explicit provisions related to competing PIAs, as described in Chapter 7. Nevertheless, some DoD entities have considered and implemented a selection process when establishing their PIAs. The selection process can take various forms—both formal and informal. For instance, formal routes for competing PIAs included publishing solicitations, such as a Request for Information (RFI), a Request for Proposals (RFP), and a Broad Agency Announcement (BAA).

### 2. Informal Processes

One interviewee remarked that there is a middle ground between competition and sole sourcing, where DoD "does their due diligence" to justify their choice, but does not have to go through a seemingly strenuous or formal competition process to select the partnership intermediary. Informal means to compete the selection of a partnership intermediary involved informal discussions to identify areas of alignment and capabilities that potential partnership intermediaries could offer. One DoD entity developed criteria and a process to establish a selection board to evaluate an organization based on the criteria. These evaluations have informed the ultimate selection of the partnership intermediary. Another interviewee mentioned that they competed the selection of the partnership intermediary by hosting a pitch day with participation from the DoD laboratory leadership to inform their decision. Informal discussions can progress to establishing a Memorandum of Understanding (MOU) to formalize the organization's role as a partnership intermediary under a PIA.

### 3. Sole Sourcing PIAs

Some interviewees perceived sole sourcing PIAs as an easier and more efficient option than undergoing any formal or informal process, as it does not require any informal or formal processes. Several interviewees remarked that sole sourcing was definitely an

option under the PIA authorities, given that there are no specific provisions on competing the selection of a partnership intermediary. However, in sole sourcing a PIA, DoD entities may be required to provide some justification as to why the partnership intermediary is the only organization that can provide the requested services. For example, a few interviewees remarked that sole sourcing their PIAs was justified since the partnership intermediary was the single agency of the State or local government relevant to providing the services they sought (e.g., State or local economic development agencies). In these cases, the uniqueness of their capabilities as an agency of the local and State government was not provided by other nonprofit organizations.

## C. Selection of Funding Vehicles and Types of Funds

If a DoD entity decides to fund a PIA, there a number of possible vehicles through which the funding may be provided. Some interviewees provided funding under their PIAs using collaborative project orders (CPOs). Interviewees described the CPO as a type of contract that is not based on the FAR; the FAR regulations related to competing the funding opportunity do not apply. In this case, the PIA serves as an "umbrella" agreement, and DoD entities develop the CPOs under the scope of the PIA, directing the partnership intermediary to perform specific tasks or provide specific deliverables within a specified budget and period of performance. DoD entities provide funding through the CPO. In one case, an interviewee described that they use broad CPOs to describe the partnership intermediary's efforts, and have multiple collaborative project descriptions (CPDs) under the CPOs. The CPDs are informal documents that do not typically require a burdensome approval process, rather they outline the DoD entity's expectations regarding the project plan, including the budget, to accomplish specific tasks. There are alternative vehicles as well, as in one case a DoD entity simply signs a separate contracting agreement to provide the funding for activities under their PIA. In this case, the funding and project requests tend to be ad hoc and relatively small-funded projects. One interviewee also described the use of a contract with simplified acquisition procedures (SAP) to provide funding. The SAP is a FAR-based contract designed to reduce administrative burdens and costs when contracting for relatively simple services (FAR Part 13, DoD 2014).

Selection of the budgetary accounts, or "color of money" of the funding, provided to partnership intermediaries is also a relevant decision. STPI identified two main types of funds provided under PIAs—RDT&E and Operations and Maintenance (O&M) funding. DoD entities have also provided a combination of these funds, depending on the nature of the work requested. According to the interviews and questionnaires, many PIAs are funded solely with RDT&E funds. While the PIA policies do not expressly restrict the colors of money available for use on PIAs, some local contracting offices have made the determination that only RDT&E funds are appropriate for certain PIA activities, while others do not have that same restriction.

## D. Management Processes Once a PIA is Established

Many interviewees remarked that strong communications is a key enabler to all aspects of PIA oversight and successful partnership intermediary performance. A PIA cannot be successful in the absence of active two-way communication between the DoD entity and the partnership intermediary. The value that DoD derives from the activities under PIAs, including customized solutions and potential partners to meet their specialized needs, implies that effective communication of needs is crucial.

**Exemplar Practice**

11. DoD entities enable strong, two-way and frequent communications in all aspects of oversight
    - Adoption or continued implementation of a practice

STPI identified several aspects of effective communication organized around the following elements of PIA oversight:

- Identifying the project scope under the PIA
- Initiating work
- Establishing a DoD lead[6]
- Enabling access to key stakeholders
- Monitoring activities
- Dealing with complex organizational interfaces

### 1. Identifying the Scope of Projects

Some DoD entities mentioned that they determine upfront what the PIA is envisioned to accomplish in the context of broader technology transfer activities and goals. All activities under the PIA are consistent with this strategy.

[6] The DoD lead is the person in the DoD entity that establishes a PIA and is charged with oversight of the PIA.

**Exemplar Practice**

12. DoD entities develop a well-thought out plan for the expected activities under PIAs and how they lead to expected achievements
    - Adoption or continued implementation of a practice
    - Is logically necessary

Some interviewees emphasized that the DoD entity should not be instructing a partnership intermediary what to do and how to do it. An exemplar practice is for DoD entities to make the project definition process as collaborative as possible. Specific projects identified under a PIA can be developed collaboratively, for example, by including the partnership intermediary in the dialogue to formulate a CPO or equivalent statement of work. A couple of interviewees indicated that the earlier such dialogue occurs, the better because these discussions are invaluable in providing information to clarify DoD's expectations and needs. In the case of spin-in, it is an exemplar practice to involve the ultimate customer, the warfighter, in the conversation.

**Exemplar Practice**

13. DoD entities make the project definition process as collaborative as possible, and, in the case of spin-in, involve the ultimate customer in the conversation
    - Addresses one or more challenges

Other forms of collaboration involve the proactive role of partnership intermediaries. This proactive role was highlighted in Chapter 4.C. Evolution of Activities. In this regard, partnership intermediaries may suggest possible projects that are aligned with the DoD's needs and are forward-leaning to anticipate and prepare for new projects. The close relationship and communication between the DoD entity and the partnership intermediary provides benefits in identifying projects that are informed by DoD's and any end-customer's priorities. In particular for funded PIAs, one DoD entity mentioned their role in prioritizing projects in collaboration with the partnership intermediary so that both stakeholders understand the competing priorities related to their work.

These findings are similarly applicable to PIAs that are funded or unfunded. However, the collaboration to define projects for unfunded PIAs may be less formal and potentially more collaborative than for funded PIAs because DoD has no authority to direct activities for projects in which they provide no funds. One interviewee described this process as a

"series of conversations" to align DoD's and the partnership intermediary's expectations and potential future technology transfer activities.

### 2. Establishing the DoD Lead for the PIA

Many DoD entities designate an appropriate DoD lead, who is the key enabler for effective execution of the projects under PIAs. Many interviewees indicated that the DoD entity's technology transfer office staff was the DoD lead for these projects. Some DoD entities with PIAs, however, do not have a formal technology transfer office or have technology transfer staff that have multiple responsibilities. In some cases, and in particular for spin-in activities, a DoD lead may hold another position at the DoD entity, such as a research program manager or the lead for a technology area.

Some exemplary aspects of the DoD lead include:

- Promoting a trust-based relationship between DoD stakeholders and the partnership intermediary
- Enabling transparency in communicating DoD processes, needs, and expectations
- Articulating DoD's oversight role and rules for the management of their PIA
- Effectively managing oversight responsibilities and communicating concerns or successes to other relevant DoD stakeholders, including contracting officers, legal counsel, or DoD leadership
- Providing adequate time, direction, and resources to accomplish the projects
- Facilitating contributions from other key DoD stakeholders in the process to accomplish the projects

**Exemplar Practice**

14. DoD entities identify an appropriate DoD lead that promotes a trust-based relationship, enables transparency, clearly articulates and effectively manages the oversight role, provides adequate resources, and facilitates contributions of others to accomplish the projects
    - Addresses one or more challenges
    - Adoption or continued implementation of a practice

### 3. Approving the Start of Work on a Project

Projects can be initiated from various sources depending on how a DoD entity decides to manage its PIAs. Three different project approval processes were mentioned in the

interviews beyond the direct approval of the DoD lead. In one situation, the official approval varied as a function of the dollar value of the project, e.g., relatively higher-cost projects had to be approved at a higher level than the DoD lead. In another instance, the DoD entity established a committee made up of key DoD stakeholders, including DoD leadership, to approve projects. One partnership intermediary indicated that it needed to approve certain activities that were carried out under the project.

A few interviewees managed requests from multiple DoD entities under their PIA. They mentioned that the DoD lead knows about all projects being performed under the PIA. An exemplar practice for the DoD entity is to ensure that the partnership intermediary is aware of project approval processes, their responsibilities, and what DoD personnel have the authority to approve or should know about new project requests.

Part of the process for approving a project is putting the funding in place to perform the work, as appropriate. This process involves developing the statement of work, modifying existing funding vehicles to include new projects, and establishing a schedule for deliverables. There was one related comment in the questionnaire indicating that the approval process was too slow and needed to be accelerated.

### 4. Enabling Access to Key DoD Stakeholders

The DoD lead is often not the SME for every project under a PIA, thus the partnership intermediary may need access to the appropriate SME. Such SMEs may be research program managers, senior researchers, and bench-level scientists for relevant RDT&E projects within the DoD entity or across DoD. In some situations, such as identifying potential RDT&E collaborators or potential licensees for a specific technology, this technical, scientific knowledge is necessary for partnership intermediaries to accomplish their projects. Several partnership intermediaries pointed out that access to the right DoD SMEs is critical to project success. One partnership intermediary opined that this access to DoD SMEs can shorten the timeline for the partnership intermediary to understand a technology and the requirements for their projects. A key responsibility of and exemplar practice is for the DoD lead to facilitate sufficient interactions with the pertinent DoD SMEs to support projects under the PIA. This applies equally to both funded and unfunded PIAs. DoD entities support these interactions to the maximum extent possible, including providing resources for their SMEs as needed.

**Exemplar Practices**

15. DoD leads facilitate interactions with the pertinent DoD SMEs to support projects under the PIA
    - Is logically necessary
16. DoD entities ensure that interactions between the partnership intermediary and DoD SMEs are not unnecessarily burdensome
    - Is logically necessary

## 5. Monitoring Project Activities

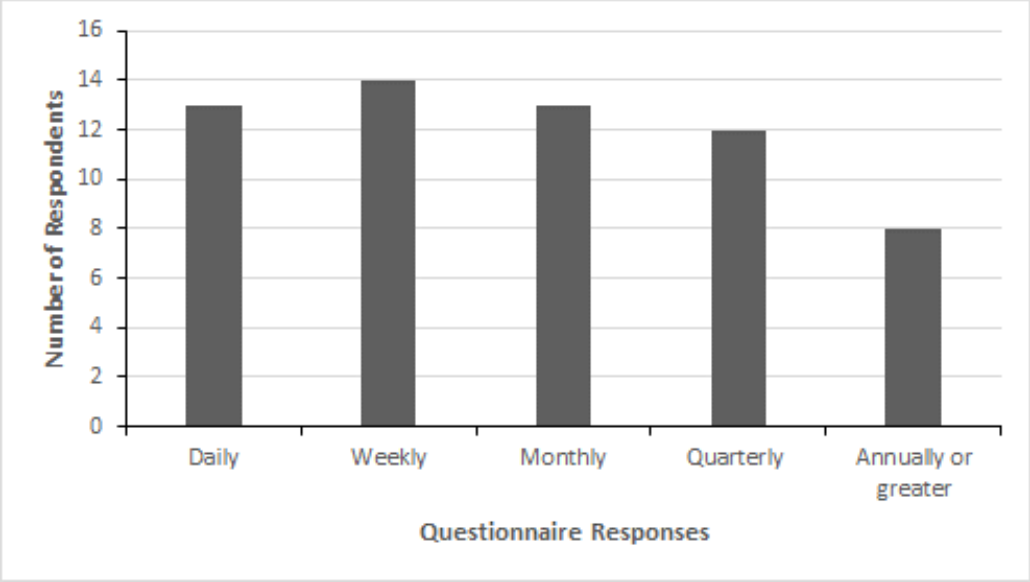
One DoD entity indicated that the level or intensity of monitoring is a function of the project's characteristics. For example, if a partnership intermediary were asked to perform an independent analysis of a technology's maturity or technological capability, frequent monitoring of activities with the DoD lead may be unnecessary. The DoD entity will be interested in progress reports and getting the results on time and within budget. These and other activities may be relatively straightforward. On the other hand, if proprietary issues were a factor in obtaining the information needed for the project, the government may need to be involved more frequently to assure confidentiality or to demonstrate national security needs.

PIA monitoring has two major components to ensure that DoD entities are informed of PIA activities and effectively managing those activities. Staying apprised of project activities also informs the qualitative and quantitative assessment of progress, which relies on formal and informal communications and reporting (for further on evaluation of PIA performance, refer to Chapter 5.E. DoD's Evaluation of PIA Performance).

### a. Keeping Informed of Activities

The DoD lead keeps informed on PIA activities through formal and informal communications and through reviews of formal and informal reporting activities. Formal communications encompass both periodically scheduled and event-driven meetings. A couple of interviewees indicated that event-driven meetings are based on project milestones. Event-driven meetings may also be associated with events, such as industry showcases, that the partnership intermediary organizes. An exemplar practice for both funded and unfunded PIAs in this regard is that the DoD lead enables strong communication with their partnership intermediaries and is accessible and encourages informal ad hoc meetings, as needed, to provide continued guidance to the partnership intermediary.

Many DoD entities indicated that there are periodic meetings with their partnership intermediaries to ensure that they stay informed of progress. The frequency of these meetings varied from daily, weekly, monthly, quarterly, and annually (Figure 6).




Source: DoD entity questionnaire

Note: DoD entities could select one or more communication frequencies.

**Figure 6. DoD Entity Responses to Frequency of Communications with their Partnership Intermediaries, n=17**

Some DoD entities specifically commented about the importance of involving senior leadership in progress updates. One interviewee met with their leadership frequently to ensure that successes were communicated (for further on communicating successes, refer to Chapter 5.E.5. Publicizing PIA success).

Some partnership intermediaries described that many of their meetings with DoD leads focused on updates to finances and the project's status. Many interviewees discussed ad hoc communications, which may be in person or by telephone. These ad hoc communications covered day-to-day occurrences on subjects that needed immediate approvals or that could not wait until a later meeting, including:

- Real-time event planning decisions immediately prior to an event
- Discussion of concerns or problems and their resolutions
- Generation of ideas through brainstorming involving the DoD lead

### b. Managing Activities

Managing activities includes providing technical redirection or altering partnership intermediary behavior, providing positive feedback, and ensuring a trust-based relationship with the partnership intermediary.

DoD entities may decide to shift the focus of or eliminate activities under the PIA altogether based on changing priorities or information on the progress of the activity. A couple of DoD entities mentioned altering partnership intermediary behaviors, including identifying behaviors in which they interceded to stop, such as those that could be perceived as performing inherently governmental functions. DoD entities can carefully manage partnership intermediary activities so that they understand the boundaries regarding these functions. In this way, both parties can agree to rules regarding this type of behavior and this agreement can occur as early as when the PIA is established. Some interviewees identified that rules they developed around partnership intermediary behaviors were informed by legal counsel and contracting officers. This exemplar practice is applicable to funded and unfunded PIAs alike, although in funded PIAs the DoD entity is likely to have greater authority regarding rules for expected behaviors than in unfunded PIAs.

**Exemplar Practice**

17. DoD entities establish rules for guiding partnership intermediary behaviors, including identifying competing relationships and how to keep all stakeholders informed about those interests
    - Adoption or continued implementation of a practice

Some DoD entities described how they provide feedback to the partnership intermediary to incentivize and guide desired behaviors. DoD entities use ad hoc meetings to communicate this feedback. Two commenters reflected that partnership intermediaries encourage this feedback, whether positive or negative. Some interviews indicated that partnership intermediaries were permitted to act independently and at times with much autonomy. This situation is in contrast with DoD entities that micromanage their activities.

**Exemplar Practice**

18. DoD entities provide frequent feedback, and partnership intermediaries encourage this feedback, whether positive or negative
    - Adoption or continued implementation of a practice
    - Is logically necessary

Many interviewees mentioned that the relationship between DoD entities and partnership intermediaries is primarily trust-based rather than transactional. Transactional relationships are typical contractual relationships in which one party acquires the services or products of another party. In these contractual arrangements, the relationships are treated as transactions and the acquirer provides the detailed requirements related to the scope of the service or product. Although this relationship was not pervasive, it does exist. For example, one interviewee noted that a partnership intermediary is "just a contractor" and was treated as such.

Some interviewees indicated that not all DoD entities may not be comfortable with such a relationship. In trust-based relationships, both parties are closer to being collaborators and equals. Some interviewees asserted that it takes time to build a trust-based relationship—it is likely not immediately in place at the start of a PIA. Many interviewees indicated that while a transactional relationship may work, a trust-based relationship leads to better results. A couple of the interviewees reported that transparency and information sharing contributes to a trust-based relationship. Some ways that DoD entities promote transparency is by inviting the partnership intermediary to relevant DoD staff meetings and interacting with the board of directors or board of trustees associated with the partnership intermediary. Some activities characterizing the trust-based relationship include:

- Enabling the partnership intermediary to be honest with the DoD entity to advise for or against pursuing activities when warranted, and
- Allowing the partnership intermediary to push the boundaries to solve problems and be fully transparent about setbacks.

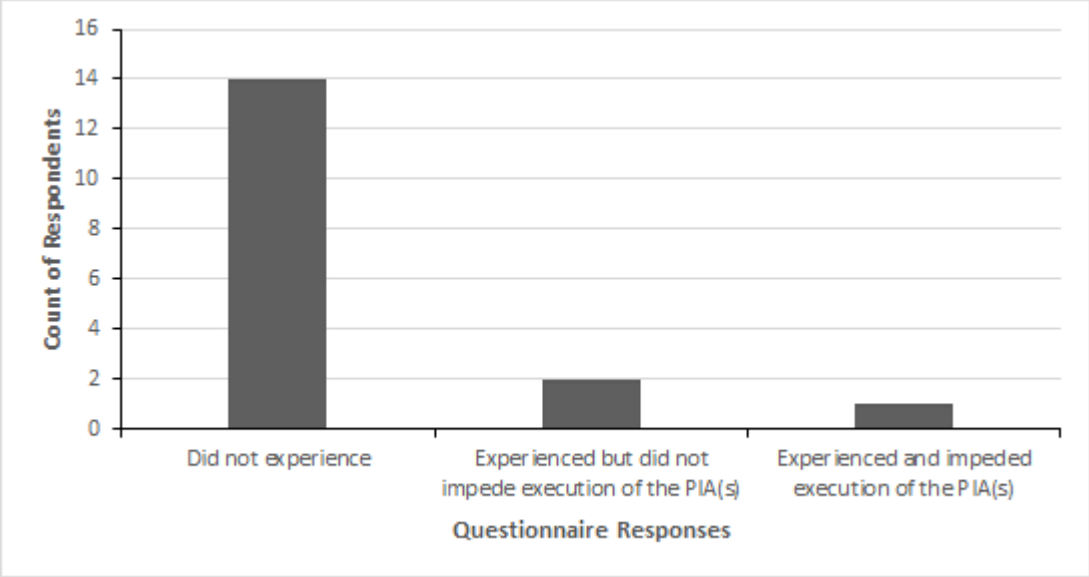
### 6. Dealing with Complex Organizational Interfaces and Conflicts of Interest

DoD entities may deal with complex organizational situations that present challenges in oversight. These situations can involve activities being performed for different DoD entities under the same PIA or partnership intermediaries with multiple PIAs for different DoD entities. The potential challenges involve the possibility of multiple, and possibly conflicting, sources of guidance across DoD being provided to the partnership intermediary. An exemplary practice to address these situations includes DoD entities establishing rules to identify competing relationships and how to keep all stakeholders informed about those interests. These processes have included DoD entities ensuring that all work done under their PIA, including those funded by other DoD entities, is consistent with the scope of activities that the PIA was created to perform and is in the interests of the DoD entity itself.

Since partnership intermediaries can have affiliations with other Federal and non-Federal entities, there are considerations regarding the risk of potential conflicts of interest

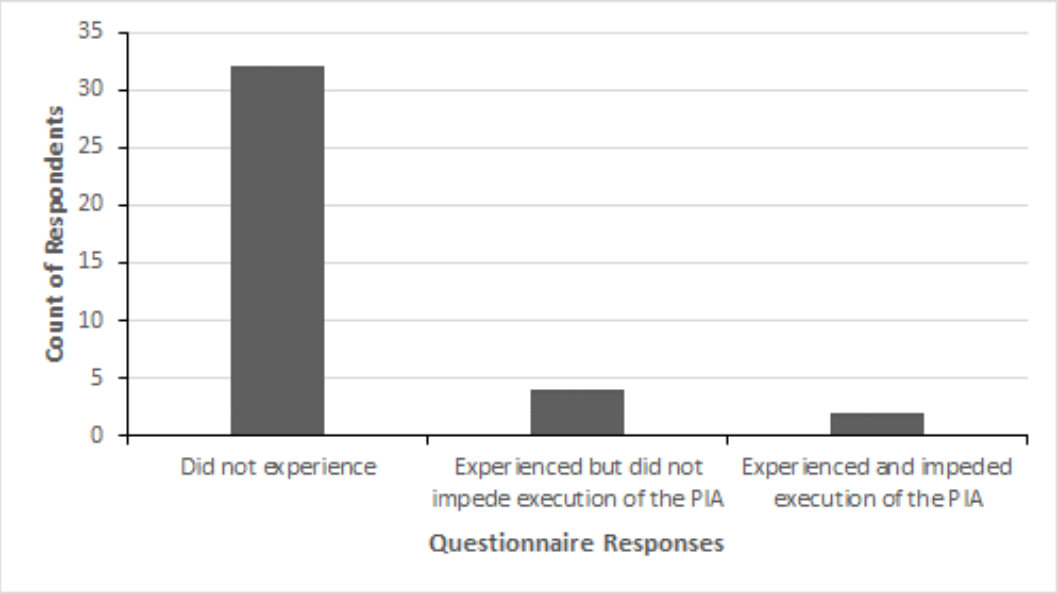
(COIs) that can arise in the process of a partnership intermediary performing their services. For example, some partnership intermediaries are a unit of a university that may receive DoD funding from the same DoD entity establishing the PIA. A partnership intermediary could also manage a business incubator that supports businesses in their role as a State or local government affiliated organization, which could create a potential COI if the partnership intermediary owns IP or ownership interests in that businesses' success, and that same business is part of engagement activities under the PIA. These and other potential COI situations are nuanced but create a need for DoD entities to manage COIs and assess other partnership intermediary affiliations for potential COIs before establishing a PIA.

While many DoD entities and partnership intermediaries stated that they did not experience difficulties managing COIs, the situation or perceived conflicts may be relevant to a few PIAs and activities (Figure 7 and Figure 8). Some questionnaire respondents identified COI as a challenge; however, only a few stated that this impeded the execution of their PIA activities. One interview respondent indicated that they occur or are perceived to occur frequently. This implies that while COIs may occur, they may be effectively managed through oversight and other organizational processes.




Source: DoD entity questionnaire

**Figure 7. DoD Entity Responses to Experiencing Difficulties Managing COIs, n=17**




Source: Partnership intermediary questionnaire

**Figure 8. Partnership Intermediary Responses to Experiencing Difficulties Managing COIs, n=38**

In part, the potential for a COI is a function of the PIA activities. As one interviewee explained, for a specific technology area, there may be a small group of companies with significant expertise. In this case, the same set of small companies may be targeted for engagement opportunities, which could raise a perception of a lack of competition or a potential for COI. Other situations based on interviews where there is a potential for a COI include:

- Expertise in a subject by a company affiliated with the partnership intermediary
- Partnership intermediaries that conduct other lines of business with another government organization
- Complex IP arrangements with companies supported by the partnership intermediary

One exemplar practice to help mitigate COI potential before the PIA is established is obtaining disclosures of affiliations and considering them when selecting a partnership intermediary. This provides the DoD entity with knowledge of possible COI situations that it should further scrutinize. Some DoD entities mentioned it was important for the PIA itself to outline processes of how the partnership intermediary will identify and resolve potential COIs.

**Exemplar Practice**

19. DoD entities obtain disclosures of affiliations for consideration when selecting a partnership intermediary and outline processes for how the partnership intermediary will identify and resolve potential COIs in the PIA
    - Addresses one or more challenges
    - Adoption or continued implementation of a practice

## E. DoD's Evaluation of PIA Performance

This section summarizes considerations identified in DoD's evaluation of PIA performance, including definitions of success, formal and informal reviews, qualitative and quantitative evaluations, dissemination of accomplishments from PIAs, and sunset of PIAs.

### 1. Definition of Success

Interviewees on the subject of how success is defined provided three categories of responses. The responses were relatively equally divided among the categories with many examples in each one. The first category involved meeting specific DoD entity tasks and needs, implying success is situational. Comments relating to this category included:

- Success is defined by the DoD entity
- Success is solving the problems posed
- Success is defined through measures identified by the DoD entity

The second category of success is related to broader impacts, such as providing benefits beyond the DoD entity's immediate needs. Comments relating to this category encompassed:

- Getting technology into the public domain
- Benefiting the innovation ecosystem
- Return on investment, including economic gains
- Getting the best equipment "in the hands of the warfighter"

The third category defined success in terms of achieving value. Dimensions of value were based on the quality of the outputs from activities under the PIAs and the value of the PIA as a mechanism to the DoD entity. Several interviewees mentioned value as the quality of the relationship between the DoD entity and the partnership intermediary. One interviewee specifically pointed out that a successful partnership relationship aids in the success of technology transfer activities, regardless of how it is defined. Another dimension of value encompassed innovative and "outside-of-the-box" thinking that partnership intermediaries provided as part of their capabilities and expertise.

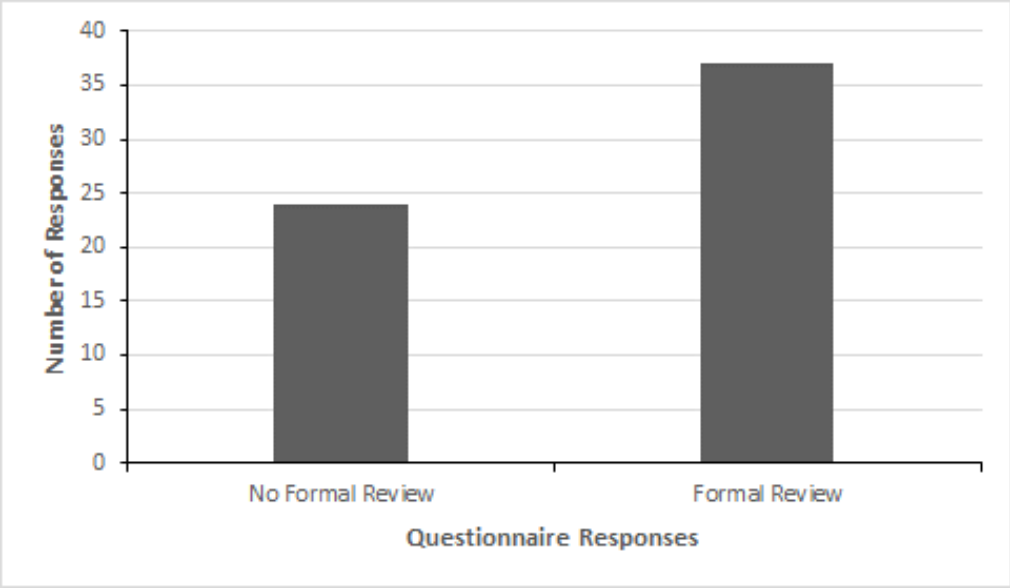
The definitions of success seemingly depend on many factors. In practice, some DoD entities define success collaboratively with their partnership intermediaries. In reference to this, one interviewee remarked that evaluations of PIAs are supported by a well-thought out plan for the expected activities and how they lead to expected achievements.

**Exemplar Practice**

20. DoD entities define success collaboratively with the partnership intermediary and other DoD customers
    - Adoption or continued implementation of a practice
    - Is logically necessary

## 2. Formal Reviews

About more than two-thirds of PIAs are formally reviewed (Figure 9). In some cases, formal reviews consist of the approval of formal contractual deliverables required under the PIA, CPO, CPD, or other agreements. Some DoD entities indicated that such reviews are conducted annually and some indicated they are quarterly. Other interviewees indicated that reviews were more frequent or based on completion of an event.




Source: DoD entity questionnaire

**Figure 9. DoD Entity Responses to Whether They Performed a Formal Review of Each of Their PIAs, n=61**

One interviewee indicated that too much reporting can get in the way of work being accomplished. There is a difference between micromanaging and being a good steward of

DoD resources. While the interviewee's response, in some cases, may be true, it remains important for DoD entities to keep informed and evaluate the progress of projects under their PIAs to hold partnership intermediaries accountable for their commitments and, for funded PIAs, ensure effective use of resources. A few partnership intermediaries also indicated the DoD reviews are justified and appropriate. For unfunded PIAs, some DoD entities took into account special considerations in evaluating performance or thought the evaluation of unfunded PIAs was inappropriate or not worthwhile. For instance, an unfunded PIA was held to a different standard for performance—according to the DoD entity, any results achieved by the partnership intermediary with zero DoD funding was a win.

### 3. Qualitative Evaluation

Reviews of the performance of PIAs can include qualitative evaluation of the outputs and outcomes of activities under the PIA. Informally, many DoD entities conduct qualitative evaluations through their periodic or ad hoc meetings to review progress on projects. A couple of DoD entities viewed deliverables, such as reports, as providing qualitative evidence and a "paper trail" of accomplishments.

Some interviewees mentioned that their qualitative evaluations involved a formal annual review with input from all key DoD stakeholders, including high-level management, contracting officers, and legal counsel. A few interviewees noted that in the past year they have begun formal reviews for the DoD-wide PIAs. This process was viewed as highly beneficial to inform all key DoD stakeholders of the outputs from the use of the PIA. One interviewee indicated that the review helped DoD entities make a decision on whether the PIA should be renewed in the following year.

### 4. Quantitative Evaluation

Metrics may be used as a quantitative measure of performance. STPI identified many metrics from interviewees, program documents, and questionnaire responses. Following the DoD PIA logic model (Appendix B), STPI categorized these metrics as activity, output, near-term outcome, mid-term outcome, and long-term impact metrics (Table 9). Following the logic model, activity, output, and near-term outcome metrics are those that can be directly attributed to the activities under a PIA. The direct attribution of PIAs to mid-term outcome and long-term impacts is more tenuous in that other factors, such as follow-on funding or the use of other technology transfer mechanisms, may support their accomplishment.

**Table 6. Select Metrics to Evaluate the Performance of PIAs**

| Activity-level metrics |
|---|
| Number of milestones met |
| Promising DoD IP identified |
| Number of market opportunities identified |
| Number of potential collaborators identified |
| Number of marketing campaigns initiated |
| Speed of identifying solutions or meeting requests |
| **Output-level metrics** |
| Number of project requirements met |
| Number projects completed |
| Number of visitors, e.g., at events |
| Number of marketing campaigns completed |
| Number of outreach activities or events |
| Number of website hits |
| Number of industries recruited to participate in projects |
| Number of people trained |
| Number of workforce development activities supported |
| Number of STEM internships supported |
| Number of STEM students or workforce participating in events |
| Number of invention disclosures supported |
| Number of SBIR proposals supported |
| Number of technologies evaluated |
| Number of prototypes facilitated |
| Square footage of real estate leased |
| **Near-term outcome metrics** |
| Customer satisfaction (according to a ranking) |
| Number of collaborative or other agreements and contracts supported |
| Number of patents licensed |
| Number of follow-on investments or funding awards, e.g., SBIR |
| Amount of follow-on investment or funding awards, e.g., SBIR |
| Number of other recognition awards |
| Number of non-traditional companies contributing to DoD programs |
| Numbers of diverse STEM interns and workers |
| Number of prototypes developed |
| Number of technology demonstrations |

| |
|---|
| Advances in the maturity of the technology (e.g, according to technology readiness level [TRL])[7] |
| Advances in the maturity of the manufacturing capabilities (e.g., according to manufacturing readiness level [MRL])[8] |
| Number of technology transitions identified during prize challenges to prototyping contracts |
| Number of technology transitions to DoD programs of record (funded acquisition program) |
| Mid-term outcome metrics |
| Employment growth |
| Growth of companies formed, including the defense industrial base |
| Growth of company revenues, including in the defense industrial base |
| Long-term impact metrics |
| Number of new products or services commercialized and available in the market |
| Economic growth in the locality, state, or region |
| Transition of technology to DoD operations and support of warfighter capabilities |

The use of quantitative metrics may not be necessary, especially if qualitative measures provide sufficient indication of or if metrics do not accurately capture progress and results. The use of metrics may depend on the scope of the project and their usefulness to the DoD entity. Collecting metrics data can pose additional burdens to both DoD entities and partnership intermediaries.

Although no interviewee stated this directly, there could be situations where the wrong metrics are unintentionally chosen. If that occurs, the partnership intermediary may be driven to perform in an inefficient way because the partnership intermediary is being evaluated on a metric that drives inefficient behavior. These two situations imply that there should be opportunities to revise or eliminate performance metrics, as necessary.

### 5. Dissemination of Successes

Many DoD entities use the results of their evaluations to disseminate information about the successes of their PIAs. One partnership intermediary mentioned that this dissemination facilitates greater understanding of the role and capabilities of partnership intermediaries across the DoD and other relevant communities. Interviewees identified other benefits including:

- Increasing management awareness and support for the use of PIAs—including familiarizing DoD leadership, in particular those in new positions, with how

[7] See Appendix G for a description of TRLs.

[8] See Appendix G for further information on MRLs.

PIAs support value to DoD's mission, which could lead to consideration of the use of PIAs in support of new strategic initiatives;

- Providing outreach to other organizations both within and external to the DoD—including providing lessons learned or exemplar practices to organizations already using PIAs or other partnership intermediaries;
- Creating greater opportunities for new projects—including generating interest in projects within or external to the DoD entity; and
- Increasing awareness of the partnership intermediary in the local innovation ecosystem—including facilitating interest in the partnership intermediary and providing legitimacy for their activities when engaging with other local businesses and relevant stakeholders.

Some interviewees offered examples of how successes are communicated including:

- Newsletters
- Open houses
- Public affairs press releases
- Consolidated project summaries prepared for senior leadership
- Formal recognition of or awards for stakeholders that contributed to success

**Exemplar Practice**

21. DoD entities keep DoD leadership informed of progress on projects under PIAs
    - Addresses one or more challenges
    - Adoption or continued implementation of a practice

### 6. Sunset of PIAs

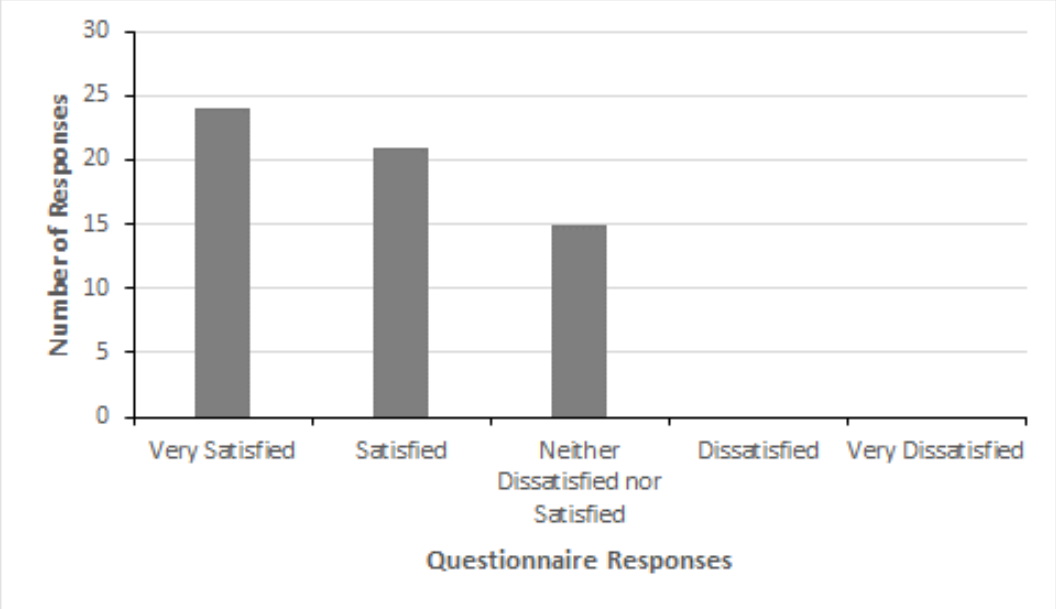
In addition to informing DoD of how to adapt their PIAs, formal reviews and other qualitative and quantitative evaluations can inform when goals have been met and whether the PIA should be sunset. A DoD entity's RDT&E needs or targeted communities can change. As such, given the specialized nature of the communities of some partnership intermediaries to a particular local innovation ecosystem, there may no longer be a need for DoD to continue the relationship with a partnership intermediary through their PIA. In addition, the DoD entity's relationships and engagements with its local innovation ecosystems can strengthen. One outcome of the partnership intermediary's work may be to help accomplish this goal. A consideration for the sunset of PIAs may be that the DoD entity's relationships with their targeted innovation ecosystems are sufficiently robust. In

this way, the DoD entity may effectively and efficiently carry out their technology transfer activities without the aid of a PIA. A DoD entity's internal capabilities may mature as do their technologies such that the value proposition for a PIA, which is situational, may adapt or go away altogether.

## F. DoD Entity Satisfaction

DoD entities that responded to the questionnaire overwhelmingly stated that they were satisfied or very satisfied with the performance of activities under each of their PIAs (Figure 10). Several DoD entities commented that there were penalties (e.g., not getting paid or the termination of the PIA) if the DoD were not satisfied. Many DoD entities boasted about the successes of their PIAs and shared other complementary remarks on the performance of their PIAs, such as:

- Partnership intermediaries do things that the DoD entities cannot do
- Partnership intermediaries operate at a much higher pace than DoD entities
- Partnership intermediaries effectively address real world issues
- PIAs are critical, not optional

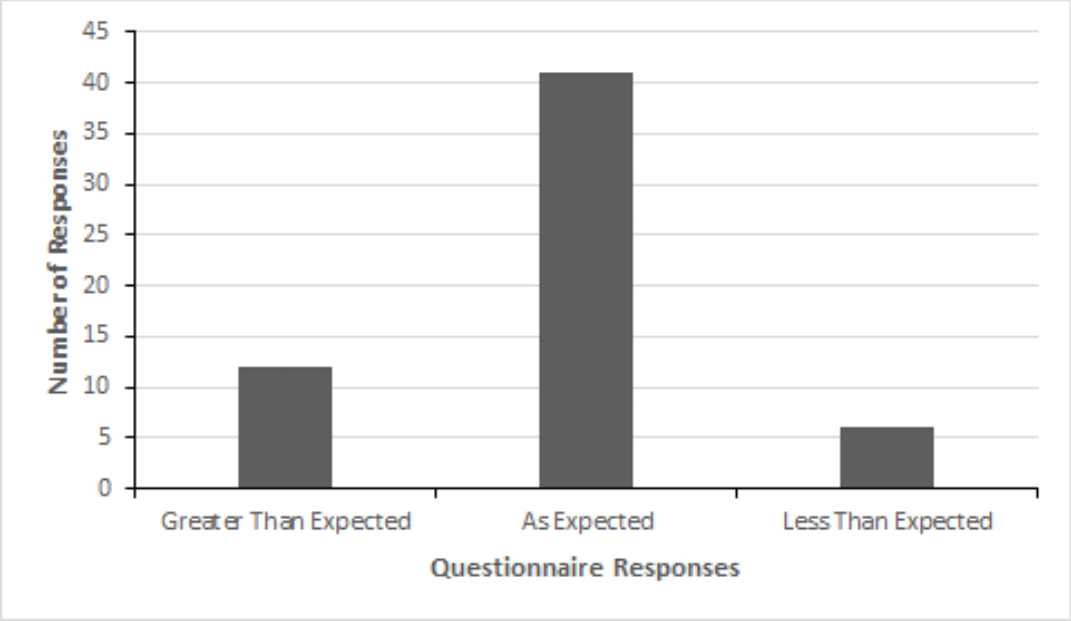



Source: DoD entity questionnaire

**Figure 10. DoD Entity Satisfaction with Each of Their PIAs, n=60**

Two other questionnaire responses provided further insights into DoD entities' satisfaction with each of their PIAs. One question asked DoD entities about the extent to which partnership intermediary activities have led to expected outputs or outcomes (Figure

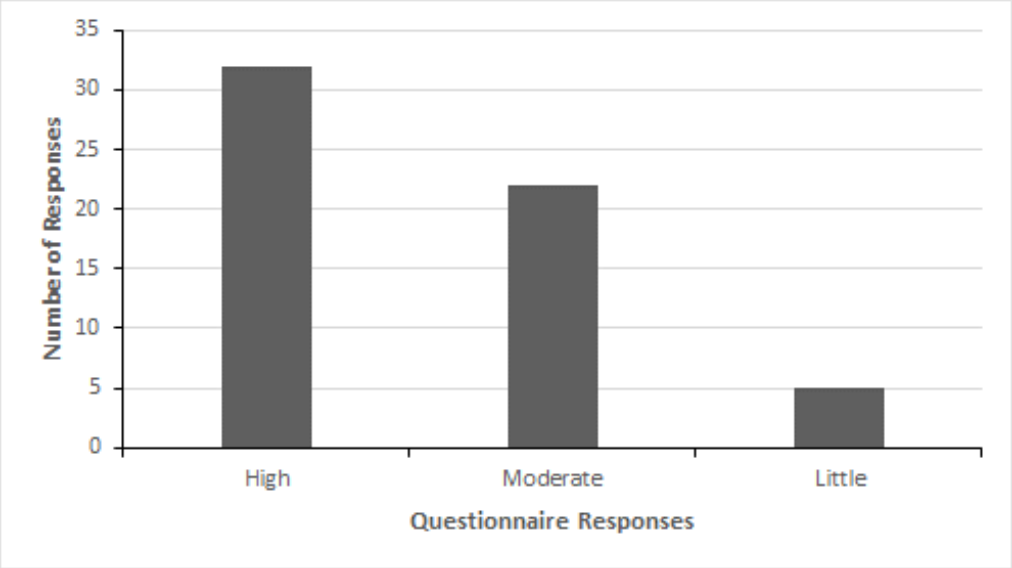
11). The overwhelming majority (55 respondents, 90%) indicated "as expected" or "greater than expected." Some comments associated with those responses identified factors outside of the partnership intermediary's control have prevented the achievement of expectations, such as administrative issues in providing funds leading to delays in the work. Based on an interview, dissatisfaction may also be rooted in organizational issues related to the partnership intermediary. For instance, one DoD entity indicated prior dissatisfaction with an inactive PIA due to the partnership intermediary experiencing high personnel turnover, which hampered their ability to provide the expected activities under the PIA.




Source: DoD entity questionnaire

**Figure 11. DoD Entity Responses to What Extent Activities under PIAs Have Led to Expected Outputs or Outcomes, n=59**

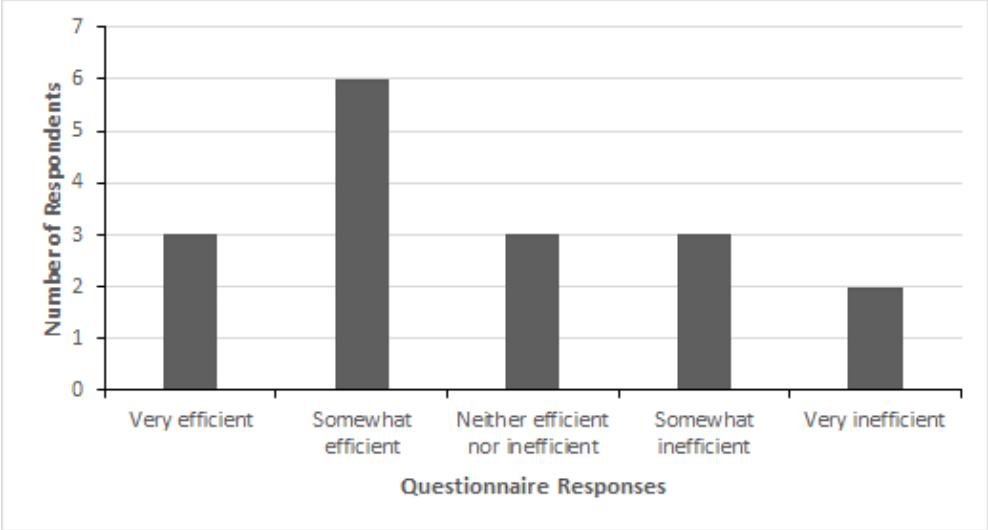
The second question examined the extent to which DoD entities believed the activities under each of their PIAs provided value to the DoD mission (Figure 12). These results were overwhelmingly positive, with the large majority of respondents answering high or moderate value. A couple comments associated with this question explicitly stated the "little value" response was because the relationship with their partnership intermediary was too new to have contributed value as of yet. In addition, another comment identified that the partnership intermediary was yet growing into their role, experiencing a steep learning curve to understand DoD's needs and build out their contributions to their local innovation ecosystems (for further on the partnership intermediary learning curve, see Chapter 4.E.2. Steep Learning Curve to Understand PIA-Related Roles and Functions).




Source: DoD entity questionnaire

**Figure 12. DoD Entity Responses to What Extent Activities under PIAs Provided Value to the DoD Mission, n=59**

DoD entities identified to what extent the process for establishing PIAs was efficient or inefficient. While many DoD entities stated they thought the process was very or somewhat efficient, several identified the process was somewhat inefficient or very inefficient (Figure 13). Interviewees mentioned several challenges that related to efficiency in the process, described in 5.G. Challenges.




Source: DoD entity questionnaire

**Figure 13. DoD Entity Responses to What Extent the Process to Establish PIAs Was Efficient or Inefficient, n=17**

## G. Challenges

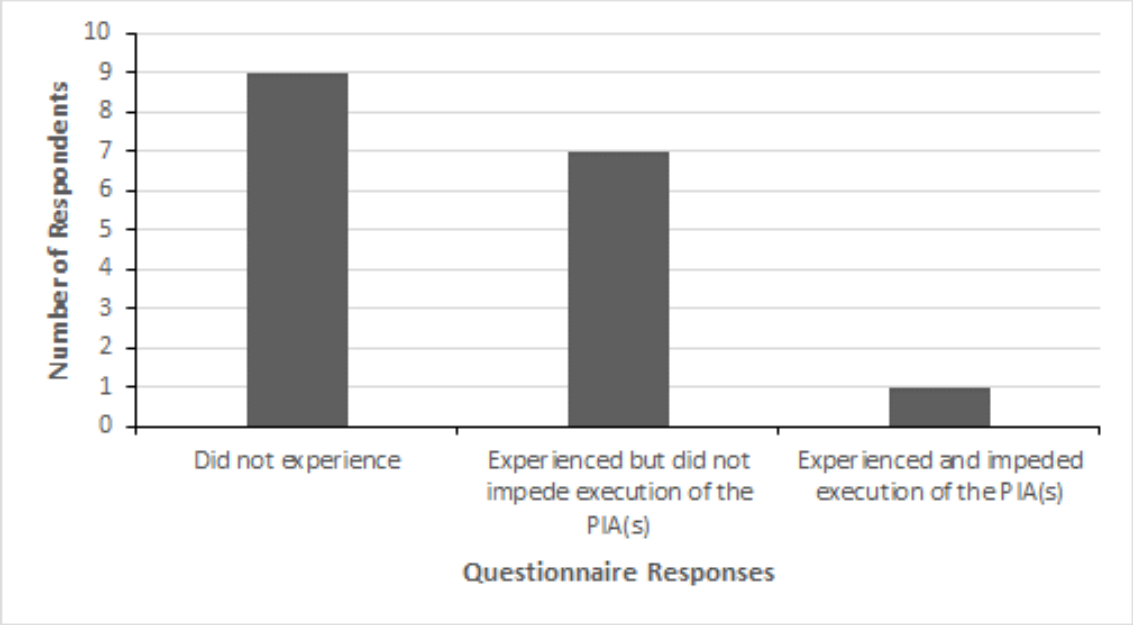
Challenges related to DoD's oversight and evaluation of PIA performance included insufficient time and effort to manage the technology transfer workload, varied understanding of the authority to use and fund PIAs, inadequate funding for PIAs, and dissatisfaction with DoD oversight processes.

### 1. Insufficient Time and Effort to Manage Technology Transfer Workload

A challenge impeding DoD's oversight is the lack of direction or bandwidth from DoD entities. This chapter pointed out the importance for the DoD lead and other key SME stakeholders to spend sufficient time interacting with and managing the activities under PIAs. One interviewee commented that contracting officers and legal counsel are among the critical stakeholders and that their involvement and cooperation is needed to establish and oversee PIAs. Another interviewee remarked that establishing a PIA should carefully consider the time and effort needed to oversee the activities under the PIA. Several interviewees noted that obtaining sufficient direction and attention from these stakeholders does not always occur. Insufficient time allocated to DoD entity oversight activities presents a challenge to the successful performance of activities under the PIA. Specific comments included the following remarks:

- Technology transfer offices may not have sufficient time to oversee PIAs because they often have a large number of responsibilities
- Limited staff to support the DoD lead's oversight efforts
- DoD personnel turnover inhibits the partnership intermediary's ability to perform its functions
- Effective and efficient technology transfer processes requires more staff than DoD makes available

One interview encapsulated the challenge by stating that oversight in itself can be a full-time job, not another duty as assigned. The DoD lead survey questionnaire also highlighted this problem. Several DoD entities claimed that they experienced a lack of time or manpower to oversee and guide the partnership intermediary (Figure 14). In one case, this situation impeded execution of the PIA. This situation can lead to sub-optimal oversight, which in turn can lead to sub-optimal outputs and outcomes from the use of PIAs. This challenge applies equally to funded and unfunded PIAs; however, the challenge may be more egregious for funded as compared with unfunded PIAs because it potentially implies a suboptimal use of DoD resources.




Source: DoD entity questionnaire

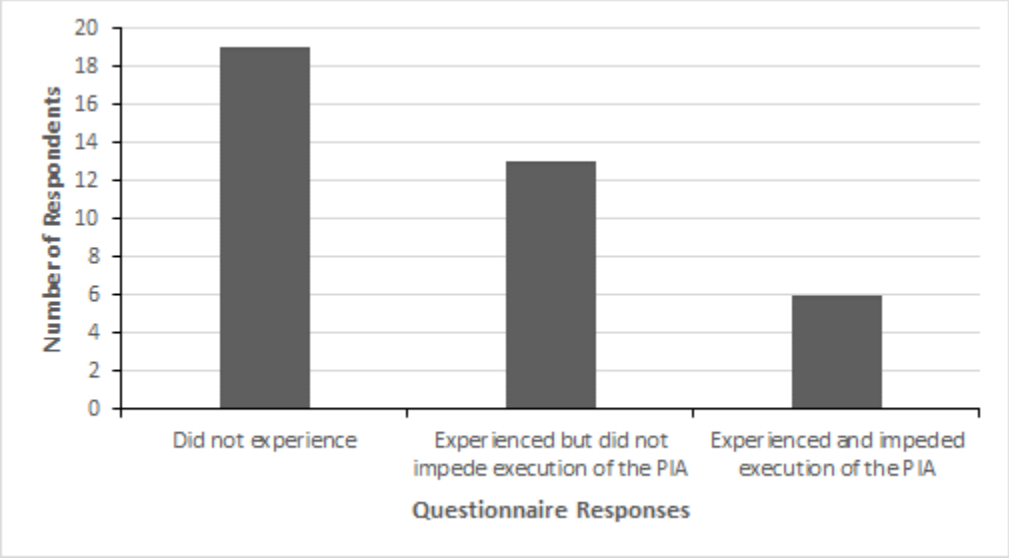
**Figure 14. DoD Entity Responses to Experiencing a Lack of Time or Manpower to Effectively Oversee and Guide PIA Activities, n=17**

Challenges may also arise when the DoD entity does not provide clear direction and information to the partnership intermediary while establishing the PIA. Many partnership intermediaries responding to the questionnaire noted that they experienced this challenge, and several of those also noted that it impeded the execution of the agreement (Figure 15).

One DoD entity stressed the importance of ensuring that a potential partnership intermediary has the correct knowledge base to understand the scope of a PIA and the type of work that can be performed under the PIA. In particular, they noted that partnership intermediaries should be aware that they are not to perform inherently governmental functions, for instance awarding government contracts and directing Federal employees, such as researchers at DoD entities (FAR Subpart 7.5).

**Exemplar Practice**

22. DoD entities ensure that a potential partnership intermediary has the correct knowledge base to understand the scope of a PIA and project approval processes
    - Is logically necessary



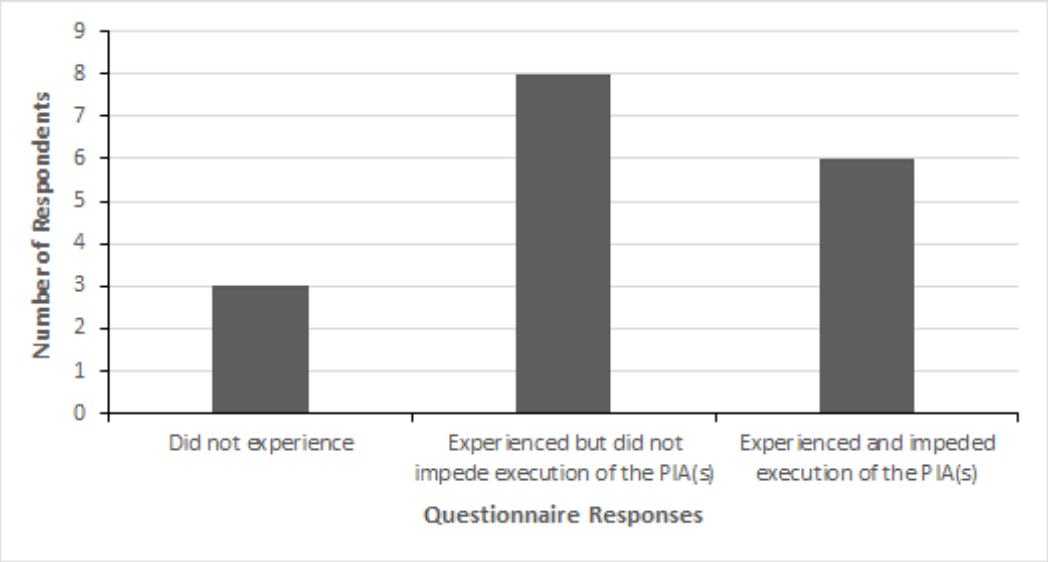

Source: Partnership intermediary questionnaire

**Figure 15. Partnership Intermediary Responses to Experiencing Challenges Related to DoD Entities Not Providing Clear Direction While Establishing Their PIA, n=38**

In theory, workload management may also be a challenge experienced by the partnership intermediaries themselves, but the interviews did not uncover much confirmation of this. The situation in which DoD is asking the PIAs to do too much was not mentioned. Rather, several partnership intermediaries described that their role could be expanded (refer to Chapter 4.G.4. Consider Expanding Certain Activities Under PIAs).

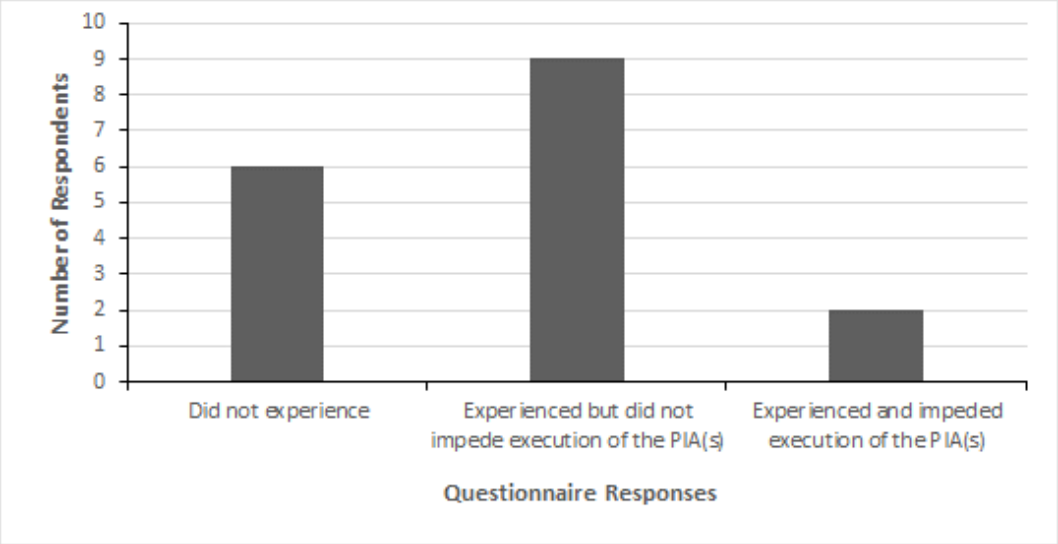
### 2. Varied Understanding of the Authority to Use and Fund PIAs

Interviewees mentioned varied interpretation of the PIA policies regarding funding and the use of different types of funds, or "colors of money," that could be used to provide funding under PIAs. Several DoD entities noted that they experienced challenges related to understanding the types of funds that were allowed to be used for PIA activities. DoD entities specifically cited difficulties in the funding process, including what contract mechanisms or appropriation to use (Figure 16), and diverse legal opinions or lengthy determinations about the use of PIAs, including the required authority for the DoD entity to establish a PIA (Figure 17). Contracting and legal offices may prohibit certain DoD entities from using a certain budget appropriation account for PIA activities, although the legislation or DoD policy may not expressly restrict the use of these funds.




Source: DoD entity questionnaire

**Figure 16. DoD Entity Responses to Experiencing Difficulties in the Process for Funding PIA Activities, n=17**




Source: DoD entity questionnaire

**Figure 17. DoD Entity Responses to Experiencing a Diverse Legal Opinions or Lengthy Determinations about the Use of PIAs, n=17**

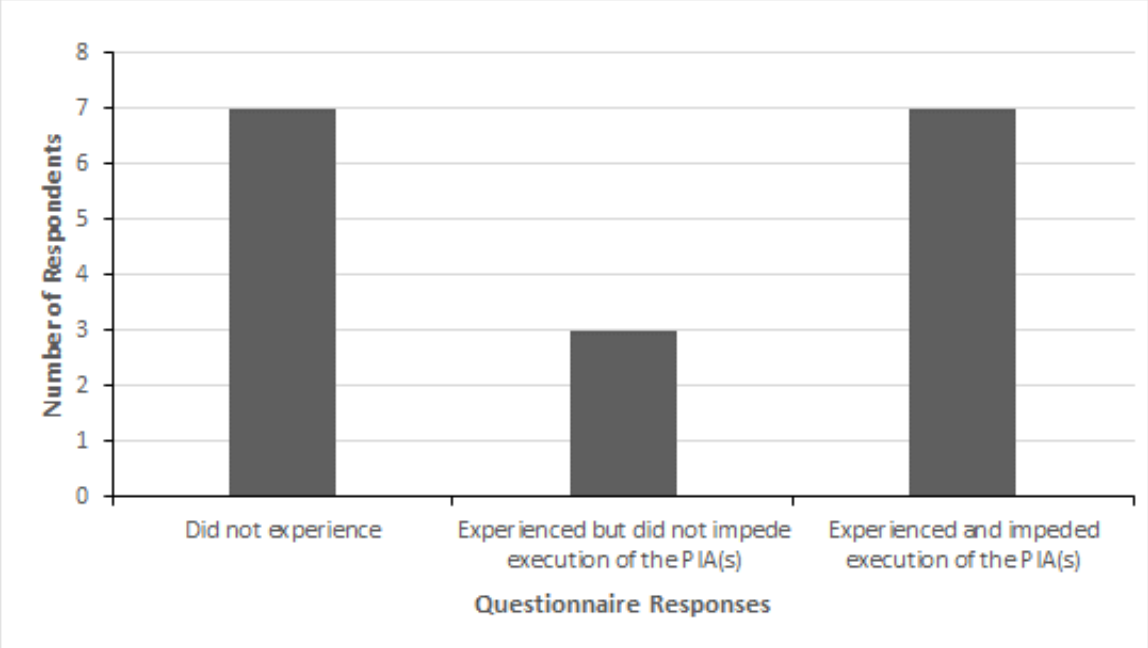
An exemplar practice noted by interviewees that directly addresses this challenge is to educate contracting officers and legal counsel about the use of PIAs and to establish clear guidelines regarding what types of funds and budgetary appropriations accounts can be used to fund PIAs.

**Exemplar Practice**

23. DoD entities work to educate contracting officers and legal counsel about the use of PIAs
    - Addresses one or more challenges

### 3. Inadequate Funding for PIAs

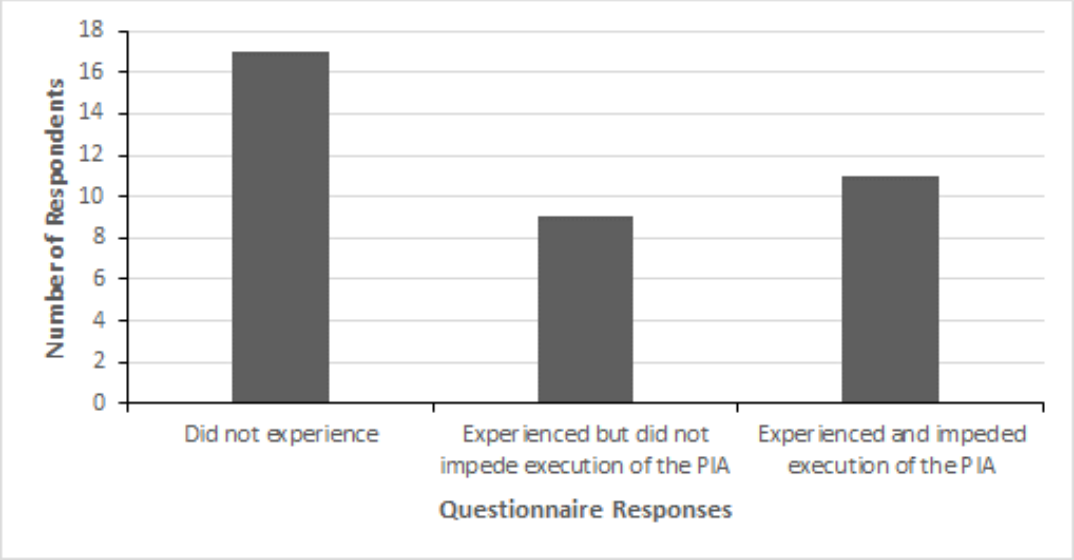
From an oversight perspective, providing funding can be a routine part of DoD's contracting procedures for existing and new projects developed under the PIA (for further on project development, refer to Chapter 5.D.1. Identifying the Scope of Projects). However, 10 of the DoD entities that responded to the questionnaire (nearly 60 percent) thought their PIAs were inadequately funded (Figure 18). In a few of those cases, funding limitations impeded execution of PIA activities. Furthermore, one comment from the same questionnaire pointed out a situation where the agreements officer did not have the proper warrant to approve and execute the funds transfer. Some other questionnaire comments indicated inexperience and personnel turnover in the contracting office hampered the funding process. There were also a couple of statements about the lack of funding to support the technology transfer office, which presented difficulties in the office's ability to fund their PIAs.




Source: DoD entity questionnaire

**Figure 18. DoD Entity Responses to Experiencing Inadequate Funding, n=17**

Partnership intermediaries also stated they experienced challenges due to lack of funding to perform their activities. More than half (54 percent) of the 37 partnership intermediaries stated that they experienced these challenges (Figure 19). For about a dozen (45 percent) of these cases, these funding shortages impeded execution.

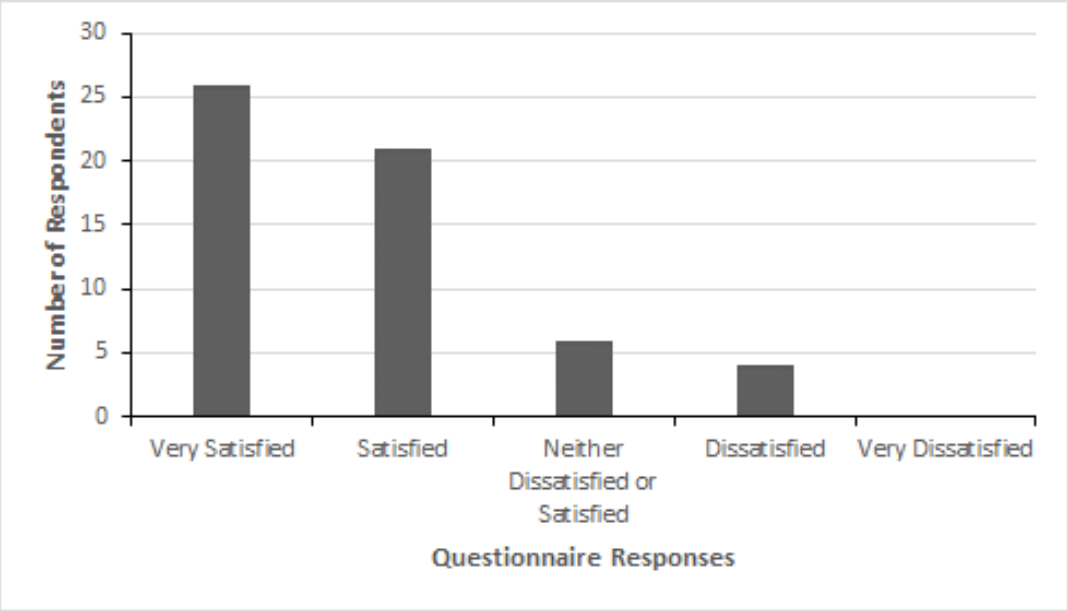



Source: Partnership intermediary questionnaire

**Figure 19. Partnership Intermediary Responses to Experiencing A Lack of Funding to Effectively Perform Their PIA Activities, n=37**

### 4. Dissatisfaction with DoD Oversight Processes

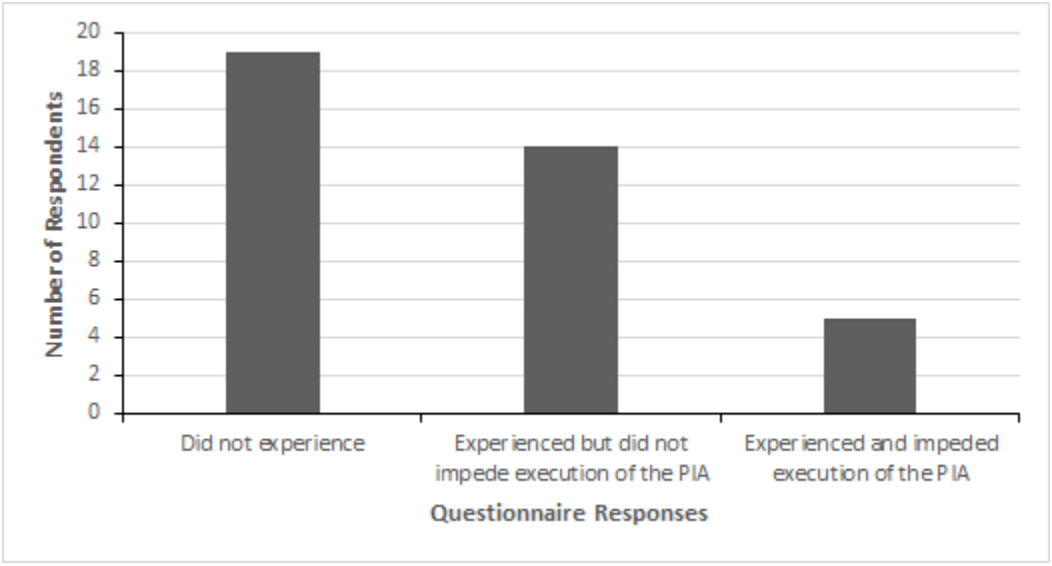
Figure 20 shows partnership intermediary responses to the survey questionnaire regarding the extent to which they are satisfied or dissatisfied with the nature of the work they were asked to perform under the PIA. Although the number of dissatisfied partnership intermediaries was relatively small, it does represent a general challenge associated with PIA oversight. Comments about the reason for dissatisfaction mentioned unreasonable timelines and DoD entities assigning work unrelated to the PIA's scope. Some other comments reflected the underutilization or partnership intermediaries and not being asked to perform services that could support the DoD entity's strategic decision making. Yet another interviewee commented on approval challenges and delays when disseminating success stories that help raise awareness of DoD and partnership intermediary capabilities in the broader innovation ecosystem.




Source: Partnership intermediary questionnaire

**Figure 20. Partnership Intermediary Responses to the Extent to Which They Are Satisfied with the Nature of the Work They Were Asked to Perform under the PIA, n=57**

Other aspects of partnership intermediary dissatisfaction related to the lack of clear direction from the DoD entity in executing activities under the PIA. Half of the 37 partnership intermediary respondents indicated that they experienced a lack of clear direction from DoD when establishing their PIA (Figure 20). Among those facing this challenge, nearly one-third of them stated that execution was impeded as a result.




Source: Partnership intermediary questionnaire

**Figure 21. Partnership Intermediary Responses to Experiencing a Lack of Clear Direction from DoD While Establishing the PIA, n=38**

## H. Suggestions

Suggestions included sufficiently funding technology transfer offices to support their involvement in PIA activities, clearly outlining the types of funds that can be provided to PIAs, identifying strategies to manage COIs, and conducting annual reviews for funded and unfunded PIAs. Suggestions are summarized in Table 10.

**Table 7. Summary of Suggestions Related to Oversight and Evaluation of PIA Performance**

| Action For | Suggestion Description | Challenges Addressed If Implemented |
|---|---|---|
| USDR&E<br>DoD Entities | Sufficiently fund technology transfer offices to support their involvement in PIA Activities | Insufficient time and effort to manage technology transfer workload<br>Inadequate funding for PIAs<br>Dissatisfaction with DoD oversight processes |
| USDR&E<br>Service leadership<br>DoD Entities<br>Contracting Officers<br>Legal Counsel | Clearly outline the types of funds that can be used to fund PIAs | Varied understanding of the authority to use and fund PIAs |
| USDR&E<br>DoD Entities<br>Partnership intermediaries | Identify strategies to manage COI | No relevant challenges identified |
| USDR&E<br>DoD Entities | Conduct annual reviews for funded and unfunded PIAs | Dissatisfaction with DoD oversight processes |

### 1. Sufficiently Fund Technology Transfer Offices to Support Their Involvement in PIA Activities

One partnership intermediary identified the need to provide sufficient funding and support to technology transfer staff so that resourcing does not hinder their ability to build relationships with partnership intermediaries and potential third-party partners. One interviewee mentioned that for their engagement events they desired that more technology transfer staff and DoD researchers attend. They opined their lack of participation was due to inabilities from a lack of funding for staff to travel to events or lack of bandwidth. They also viewed DoD entity participation as critical to the success of their activities since DoD staff can serve as effective advocates to the private sector for their discoveries, patents, and technologies.

### 2. Clearly Outline the Types of Funds That Can Be Provided to PIAs

Several interviewees also noted that there should be clear guidance on what types of funding can be used for what kinds of PIA activities, so that they organizations do not run into challenges around the color of money that can be used to support their activities. This topic is further addressed in Chapter 7.G. Suggestions.

### 3. Identify Strategies to Manage COI

Interviewees suggested that DoD entities and partnership intermediaries need to be cognizant of the potential for COI and have plans to manage them when they arise. From the partnership intermediary perspective, the interviewees identified a number of ongoing practices that are being used to address the risks associated with COI, for instance:

- Not claiming IP associated with the technical work being performed for DoD. It was pointed out that claiming IP could put the partnership intermediary in competition with its network.[9]
- Not competing for or accepting work that could be perceived as a COI
- Using nondisclosure agreements, in particular when entering into agreements with companies
- Not spinning out companies based on the work performed under the PIA
- Not accepting pass-throughs
- Utilizing financial audits
- Establishing and implementing COI policies and procedures
- Continuously informing DoD entities of concerns and requesting advice

There was a similar list of considerations from the interviews taking the perspective of the DoD entity, for instance:

- Including a specific COI clause in the PIA
- Establishing rules on how the partnership intermediary should handle proprietary data
- Establish rules on how the partnership intermediary should conduct competition
- Not requesting projects with a high potential for COIs to be provided under the PIA
- Not asking for pass-throughs

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[9] IP associated with the partnership intermediary's methodology, processes, and products for performing PIA activities does not pose risks associated with the potential for COI.

- Obtaining relevant financial, affiliation, and other disclosures when establishing a PIA
- Ensuring partnership intermediary decisions are based on what is best for DoD
- Building a trust-based relationship to minimize COI risks
- Identifying and taking relevant COI training

### 4. Conduct Annual Reviews for Funded and Unfunded PIAs

Annual qualitative or quantitative review processes should be conducted for both funded and unfunded PIAs. For the DoD-wide PIAs, all of the services and other key stakeholders outside of the services, should be involved in this review. These annual reviews should focus on value added by the PIA and ensuring that money under the PIA is being spent responsibly. This point was reinforced by questionnaire responses from partnership intermediaries that conveyed the importance of demonstrating that public funds provided under PIAs are used effectively.

**Exemplar Practices**

24. DoD entities use qualitative annual reviews with input from all key DoD stakeholders, including DoD leadership, contracting officers, legal counsel, and other DoD customers
    - Addresses one or more challenges
25. DoD entities develop metrics, as needed, tailored to the specific activities being performed to support quantitative evaluation
    - Addresses one or more challenges

# 6. PIAs in Context with the Broader DoD Technology Transfer Landscape

The use of PIAs is one initiative in the broader DoD technology transfer landscape. This chapter describes considerations for different activities supporting technology transfer across DoD, how PIAs fit within this landscape, and the ways in which PIAs can be used synergistically with other technology transfer mechanisms. It also compares the PIA mechanism for accomplishing technology transfer goals with other mechanisms that were or could be considered by DoD entities when establishing PIAs. The chapter also includes challenges, suggestions, and exemplar practices related to the topics presented.

## A. Considerations Related to DoD Technology Transfer

Technology transfer across DoD encompasses a broad landscape of activities. Technology transfer is not limited to the classic spin-out activities highlighted by the Stevenson-Wydler Act. Technology transfer activities across DoD are closely connected to spin-in of commercial and university-funded research and technologies—as well as dual-use activities that support both public and private sector uses of technologies. Technology transfer is part of a broader framework of DoD-wide activities focused on innovation, capability maturation, and acquisition strategies.

There is no single way or mechanism used to accomplish technology transfer goals or a specific technology transfer activity. Some considerations in this regard include:

- Different activities apply to different circumstances
- Different activities are used to overcome similar barriers
- Different activities achieve similar goals to accelerate the achievement of specific technology transfer goals
- Some activities work well while other similar activities may encounter unanticipated obstacles
- Similar activities may evolve in different ways

DoD entities must understand and articulate the bounds of their goals and activities in context with how these support DoD missions. They must also have working knowledge of how the varied technology transfer mechanisms can be used in parallel or in sequence to one another, adapted, and handed off to other DoD stakeholders (e.g., in the acquisition domain) to achieve their goals.

## B. Select Initiatives Supporting DoD Technology Transfer

There are numerous examples of initiatives across DoD and external to DoD that support the varied technology transfer goals and missions of DoD (Laurent 2019). Although it was out of the scope of this study to compare these other initiatives with the PIA, STPI describes some of these select initiatives because they encompass DoD's innovation ecosystem and can provide DoD entities other ways of accomplishing similar activities as those pursued under PIAs. These initiatives can also be connected to PIA activities to support broader technology transfer goals.

The following examples are DoD-wide initiatives, some administered by USDR&E:

- Defense Innovation Unit (DIU)—a program under USDR&E that aims to support rapid prototyping and fielding as well as the adoption of commercial technologies across DoD, with offices in Silicon Valley, Boston, Austin, and Washington, D.C. at the Pentagon (DIU n.d.; DoD 2018a)
- Rapid Innovation Fund—a program under USDR&E that aims to support rapid insertion of innovative technologies from small businesses (DTIC n.d.a)
- National Security Innovation Network (NSIN)—formerly called MD5, a program operated under DIU since 2019, that aims to build networks of innovators to develop new solutions that meet national security needs (NSIN n.d.)
- Procurement Technical Assistance Centers—centers operating under a program run by the Defense Logistics Agency that provide assistance in pursuing and performing contracts with DoD and other Federal agencies, among other activities (DLA n.d.)

Service-level or other DoD specific examples include:

- Air Force's AFWERX—a program run by the Air Force to engage with entrepreneurs that operates a number of activities, such as a technology accelerator, SBIR pitch days, challenge competitions, and events (AFWERX n.d.)
- Navy's NavalX TechBridges—a coordination element under the Navy, located in 12 regions across the country, to increase collaboration, knowledge sharing, and innovation with companies and innovators through events (NavalX 2020)
- Army's xTechSearch—prize competitions sponsored by the Assistant Secretary of the Army for Acquisition, Logistics and Technology involving white papers, technology pitches, and proof-of-concept demonstrations that target technologies from small businesses to meet Army needs (ARL n.d.)

STPI also identified examples external to DoD that support DoD's technology transfer function. Examples external to DoD and within the Federal Government include:

- NIST Manufacturing Extension Partnership—a national network funded by NIST through a public-private partnership that aims to provide resources for U.S. manufacturers and connect them with government agencies, trade associations, universities and Federal laboratories, among other resources (NIST n.d.)
- Business development centers—providers of informational resources, management assistance, counseling, training, and other technical assistance for small businesses, including the U.S. Small Business Administration's (SBA) Small Business Development Centers (U.S. SBA n.d.b) and the Minority Business Development Agency's (MBDA) Minority Business Centers (MBDA n.d.)

Examples external to the Federal Government and specifically identified through interviews include:

- DefTechMD—an initiative funded by the DoD Office of Economic Adjustment and the Department of Commerce Economic Development Administration to support Maryland businesses in leveraging resources provided by DoD entities also located in Maryland; also operates a patent database specifically for Maryland DoD entities (DefTech n.d., DefPatMD n.d.)
- FedTech—an organization that runs several entrepreneurial programs that connect entrepreneurs with federally funded technologies, among other activities (FedTech n.d.)
- Any number of other organizations that provide resources and services in their innovation ecosystems, in particular business incubation, technology acceleration, research parks, and support to universities and local or State governments

STPI also identified a couple relevant venture capital arms within DoD and one defunct initiative, including:

- In-Q-Tel—a nonprofit organization founded in 1999 to fund technology developments near the final stages of commercialization to meet DoD and intelligence community needs (In-Q-Tel n.d.)
- Army Venture Capital Initiative—an initiative established by Congress in 2002 that identifies, validates, and executes market and technology development opportunities and supports venture-funded companies to develop innovative dual-use technologies (U.S. Army n.d.)

- Defense Venture Capital Initiative (DeVenCI)—a now defunct DoD-wide initiative that worked alongside other venture capital firms across the United States to identify promising companies and provide seed money for experimentation (U.S. Air Force n.d.)

## C. Examples of Synergies with PIAs and Other Technology Transfer Mechanisms

This section contains two examples of technology transfer initiatives that have been coupled with PIAs—SBIR and OTAs—to create synergies. Interactions among the activities can occur for multiple reasons. In some instances, it may be because there are multiple ways to accomplish certain functions and each method has its own strengths and weaknesses. More specific to PIAs, as pointed out by one interviewee, there are limitations on what a PIA can do in terms of the transition of outputs to an acquisition program. In many cases, a PIA will be a precursor activity that provides opportunities for follow-on mechanisms to guide technology maturation, capability development, and the like. Consequently, the PIA activity may stop and another technology transfer activity and mechanism is used to further guide it towards the DoD entity's expected end goals.

### 1. PIA and SBIR

The SBIR and STTR programs are highly competitive programs that encourage domestic small businesses to engage in federally supported research with the potential for commercialization (U.S. SBA n.d.a). PIA activities may contribute to these objectives. A partnership intermediary's network of contacts, including entrepreneurs and small businesses associated with the partnership intermediary, can contribute to the potential pool of participation in these programs. The partnership intermediary SMEs can increase the likelihood of success for individual participants by guiding them through the Federal and DoD process and identifying ways to improve their proposals, informed by knowledge of DoD's needs. By providing services to support the SBIR and STTR, partnership intermediaries can grow their networks and improve access to different subject matter expertise, which can benefit accomplishment of their other PIA activities. For further description of PIA activities supporting the SBIR and STTR programs, refer to Chapter 4.A.9. Support for the SBIR and STTR Programs.

### 2. PIA and OTAs

OTAs, also referred to as Other Transactions (OTs), refer to "authorities…created to give DoD the flexibility necessary to adopt and incorporate business practices that reflect commercial industry standards and best practices into its award instruments. When leveraged appropriately, OTs provide the Government with access to state-of-the-art technology solutions from traditional and Non-Traditional Defense Contractors" (DAU

n.d.). In general, PIA activities can facilitate a path towards use of an OTA, which, in turn, can create a path towards acquisition.

How the partnership intermediary identifies the potential OTA partners may vary. One path involves PIA activities, such as prizes and challenges in which winners can be identified as potential partners for an OTA. The partnership intermediary facilitates the interactions to identify third-party individuals or organizations to participate in the prize competition and eventually to enter into an OTA. Another path involves partnership intermediaries identifying potential OTA partners, or proposals from potential partners, through their other engagement activities. For further description of how PIA activities can lead to expanding prototyping capabilities and the use of OTAs, refer to Chapter 4.A.7. Prototyping and Manufacturing Capabilities. In other instances, the partnership intermediary itself may develop or facilitate development of a prototype jointly with a third party. In this case, any related IP is fully transferred or claimed by a third-party entity that might enter into an OTA.

The synergies in using PIAs and OTAs benefit the DoD because it can lead to another route for fielding new capabilities that will enhance warfighter effectiveness. There are benefits to the partnership intermediary as well. These activities can expand a partnership intermediary's network and provide it with access to certain SMEs across the innovation ecosystem. There is also an element of "success building on success." PIA activities leading directly to OTAs and the successful spin-in of new capabilities can encourage DoD entities to conduct similar activities with that partnership intermediary or build out similar efforts with other partnership intermediaries in the future. In addition, congressional interest in OTAs, as indicated by some interviewees, and measuring successes through follow-on activities stemming from the use of both PIAs and OTAs can further enhance this effect.

## D. Comparing PIAs to Other Contracting Mechanisms

This section compares PIAs to other contracting mechanisms, in particular FAR-based contracts, OTAs, cooperative agreements, grants, and FFRDCs and UARCs.

### 1. PIAs Compared with FAR-Based Contracts

Several interviewees distinguished a PIA from a FAR-based contract because of the trusted-partnership relationship between the partnership intermediary and the DoD entity. One interviewee stated that they work closely with the DoD entity to develop innovative solutions, and can bring innovative techniques to the customer to alleviate their challenges. Another interviewee stated that the partnership intermediary was perceived as an extension of the DoD entity's technology transfer office. Yet another interviewee stated that PIAs have the ability to be a thought leader for the DoD entity, which is not the role of a normal FAR-based contractor. Generally, partnership intermediaries were acknowledged as equal

partners and part of the DoD entity, which is a different relationship than with other contractors.

Some interviewees asserted that a PIA is more flexible and agile than a FAR-based contract. This implies that the PIA can adapt based on changing DoD needs. One questionnaire comment implied that a FAR-based contract would have to be modified to achieve similar agility as a stand-alone PIA. These contract modifications usually take time to approve and process. Another respondent pointed out that is easier to add money under a PIA because the funding is not competed as would be under many FAR-based contracts. Yet another interviewee asserted that with a PIA, follow-on contracts with consultants can be more easily and quickly established as compared to FAR-based contracts. Another factor mentioned in the interviews was period of performance. The PIA is typically a 5-year agreement, while FAR-based contracts have shorter timescales and do not have a similar duration.

One partnership intermediary pointed out that there is nothing that can be done under a PIA that cannot be done under a FAR-based contract. In fact, some FAR-based contracts are used to establish PIAs. That partnership intermediary went on to say that the value of the PIA is that the partnership intermediary is a nonprofit partner and honest broker, which suggests that their trust-based relationship with DoD entities is critical. While interviewees did not state that trust-based relationships cannot occur through FAR-based contracts, discussions implied it was not a likely scenario.

### 2. PIAs Compared with OTAs

Both OTAs and PIAs focus on engagement with non-traditional defense contractors, including start-ups, small businesses, and individuals or organizations that have not previously worked with DoD. The typical outcome of an OTA is a prototype and RDT&E related to that prototype, including the development of new technologies or processes. Sometimes, OTAs involve cost sharing.

The use of an OTA to establish a PIA is likely not to be in the best interest of DoD because the partnership intermediary is supporting the identification of potential capabilities and their activities could run counter or in conflict with their interests under an OTA. Rather, PIAs are used to identify potential companies, technologies, or capabilities for the DoD entity to consider when establishing an OTA.

PIA activities are wide ranging. OTAs are likely not able to replicate all the varied activities that could be performed under PIAs. Although the PIA authority under Title 10 allows certain DoD entities to establish a PIA through an OTA, STPI did not identify any

advantages of doing so as this could potentially limit the ability of the partnership intermediary's scope of services.[10]

### 3. PIAs Compared with Cooperative Agreements

While cooperative agreements could be used to perform many PIA functions, there are limitations to their use. The Federal Grant and Cooperative Agreement Act of 1977 specifically prohibits the use of Cooperative Agreements to acquire services for the "direct benefit or use of the federal government" (2 CFR 200.24). At a minimum, this is inconsistent with spin-in activities, some DoD workforce development activities, and many analytical activities performed under PIAs.

### 4. PIAs Compared with Grants

Grants could likely not be used to fund PIA activities. Per 31 USC 6304, "substantial involvement is not expected between the…agency and the State, local government, or other recipient, when carrying out the activity contemplated in the agreement." STPI identified that this is not consistent with how PIAs are used.

### 5. PIAs Compared with FFRDCs and UARCs

FFRDCs and UARCs are part of DoD's S&T enterprise. FFRDCs are statutorily defined as nonprofit organizations that "meet some special long-term research or development need which cannot be met as effectively by existing in-house or contractor resources" (48 CFR § 35.017; DoD 2019). DoD defines UARCs as research organizations within a university or college that "provides or maintains DoD essential engineering, research, and/or development capabilities" (DoD 2010). Both FFRDCs and UARCs "operate in the public interest" with objectivity and independence and are expected to be free from organizational or personal conflicts of interest. DoD has 11 FFRDCs and 14 UARCs (DTIC n.d.b). Both FFRDCs and UARCs are sole sourced, meaning they cannot compete with the private sector to perform their activities.

There are many conceptual similarities between PIAs and FFRDCs. In particular, the trust-based relationship with DoD is a noteworthy similarity. However, both FFRDCs and UARCs are specific organizations that DoD recognizes provide a long-term strategic value with an expectation that their work will evolve based on DoD's changing requirements—and that they help maintain long-term corporate knowledge, among other activities. Partnership intermediaries, by statute, are not defined as similar in scope to be a long-term strategic relationship; although the statute does not preclude the use of PIAs for this intention. For example, the DoD-wide PIAs represent long-term relationships that have spanned two decades. FFRDCs and UARCs are also RDT&E performers. This is unlike

[10] Refer to a report by Cyberpoint International 2017 for further comparison of PIAs and OTAs.

the statutorily defined scope of the partnership intermediaries, which is to provide services that increase the likelihood of success for DoD to conduct cooperative or joint activities with potential partners, which could be RDT&E performers. In addition, PIAs can also be established by FFRDCs and UARCs.

Further analysis to compare the activities of PIAs with FFRDCs and UARCs was beyond the scope of this study. However, STPI identified at least one organization, Georgia Tech Research Institute, which is a UARC and is also affiliated with one of the partnership intermediaries under an active Navy PIA with the Georgia Tech Applied Research Corporation. Further analysis to understand the differentiating value of PIAs in the context of FFRDCs and UARCs and the degree to which their work may overlap or can be leveraged may be a worthwhile follow-on study.

## E. Strategic Role of PIAs

PIAs deliver value to the DoD entities that use them, demonstrated by the breadth of activities that they perform and the level of satisfaction expressed by DoD entities through STPI's questionnaires. STPI identified that many DoD entities consider how the value proposition of using PIAs creates synergies and complements other DoD entity technology transfer activities, mechanisms, and goals. As illustrated in the logic model (Appendix B), expected long-term goals can vary and include outcomes of spin-in, spin-out, and dual-use activities. Such outcomes include the successful wide-scale adoption of new and improved technologies applied in the performance of the DoD mission; new or strengthened innovation ecosystems and a robust industrial base; State and local economic development; and a strengthened STEM workforce.

A few DoD entities mentioned they develop strategic plans, landscape maps, or roadmaps to inform their decisions on what technology transfer activities to support or revise. One interviewee stated that through the strategic planning of activities, they select the best "tool in the technology transfer toolbox," including PIAs, based on the technology and expected goal. Another response reinforced this perspective by mentioning that the selection of a PIA or a different technology transfer tool depends on various factors, including the targeted geographical areas, innovation ecosystems, and technologies—among other aspects of targeted communities, which operate in their own unique ways.

## F. Challenges

Challenges related to the broader DoD technology transfer context include limited awareness of the value proposition for using PIAs as compared with other DoD-wide initiatives and the need for of long-term strategic approaches for using PIAs.

### 1. Need for Long-Term, Strategic Approaches for Using PIAs

The strategic role of PIAs as compared with other DoD-wide, service-level, and non-DoD initiatives is not well articulated. In addition, an interviewee identified uncertainties relating to circumstances under which DoD entities should establish a new PIA or use existing PIAs.

### 2. Limited Awareness of the Value Proposition for Using PIAs

The findings throughout this report reinforce the assertion that potential advantages of PIAs may not be realized because of a lack of familiarity with PIAs and the inability for DoD entities' procedures to match the partnership intermediary's pace of work. The strategic use of PIAs can be limited by the lack of awareness of successes from PIA activities and their value proposition to support accomplishing broader technology transfer goals.

**Exemplar Practices**

26. DoD entities develop and execute strategic plans to identify and articulate the value proposition in their use of PIAs in the context of other technology transfer activities and goals
    - Addresses one or more challenges
    - Is logically necessary
27. DoD entities understand and can articulate how the PIA as a mechanism compares with the use of other contracts to accomplish similar goals
    - Addresses one or more challenges
    - Is logically necessary

## G. Suggestions

One interviewee remarked that DoD entities should focus on developing strategic, long-term approaches for using PIAs as a mechanism. In this way, the value proposition for using PIAs will be clearly articulated to DoD and external stakeholders. PIAs can be used as a long-term strategy to support a wide-range of broader technology transfer goals. A strategic approach to using PIAs could help raise awareness across DoD stakeholders, including DoD leadership, of the value that PIAs generate through their activities and how they complement other service-level or DoD initiatives (Table 8).

**Table 8. Summary of Suggestions Related to PIAs in Context with the Broader DoD Technology Transfer Landscape**

| Action For | Suggestion Description | Challenges Addressed If Implemented |
|---|---|---|
| DoD Entities | Develop long-term strategic plans to support the use of PIAs and articulate the value proposition for using PIAs in the context of broader technology transfer activities and goals | Need for long-term, strategic approaches for using PIAs<br>Limited awareness of the value proposition for using PIAs |

# 7. Policy and Guidance Related to PIAs

Various policies and guidance govern how to establish and operate PIAs, including those at the national, agency, and service levels. This chapter discusses and compares those governing documents, including topics related to PIA activities, funding, competition, and eligibility. The chapter also describes the various trainings provided to relevant stakeholders as well as the chapter also includes challenges, suggestions, and exemplar practices related to the topics presented. For the purposes of this section, the term laboratory is used and refers to a type of DoD entity and is cited explicitly in relevant policies and guidance.[11]

## A. Legislation, Policy, and Guidance that Govern PIAs

STPI identified the following policies related to PIA authorities—legislation, DoD policies, including DoD Directives and DoDI, and service-level policies, such as instructions and other guidance understood by DoD entities as policy documents. The legislative policies provide the broadest language, while DoD-wide and service-level policies provide more detailed procedures based on their interpretation of the legislation. As a general principle, DoD-wide and service-level policy and guidance do not contradict or permit activities beyond the scope outlined in legislation. However, there is variability in their outlined procedures based on varied interpretations from DoD stakeholders.

### 1. Legislation

Within the U.S. Code, there are two sections that specifically apply to PIAs, 15 U.S. Code § 3715 ("Title 15") and 10 U.S. Code § 2368 ("Title 10"). These two authorities build on one another and form the basis for agency and service-level policies.

[11] 15 U.S. Code 3710a(d)(2) defines a laboratory as:

- A Federal agency facility that performs research, development, or engineering by employees of the government
- Government-owned, contractor-operated facilities under a common contract that perform R&D or work relating to nuclear weapons for the Federal Government
- Government-owned, contractor-operated facility that is not under a common contract, but perform R&D or work relating to nuclear weapons for the Federal Government

### a. Title 15

The use of partnership intermediaries was first codified in 15 USC § 3715, which was authorized in 1991. This authority allows the Secretary of a department or agency, the Director of a Federal laboratory, or a contract officer of a non-laboratory FFRDC the ability to enter into a contract or MOU with a partnership intermediary to increase the likelihood of success of joint activities with small business firms, institutions of higher education, or educational institutions. The costs of such a contract or MOU could be paid for out of funds available for the support of technology transfer. Of the DoD entities responding to the questionnaire, all but one cited the Title 15 authority as their justification for having a PIA.

In both authorities, the "partnership intermediary" is defined an agency of a State or local government or a nonprofit entity that is either owned, chartered by, funded, or operated on behalf of the State or local government.

### b. Title 10

In national law, 10 USC § 2368 begins by designating each science and technology reinvention laboratory within the DoD as a Center for Science, Technology, and Engineering. This authority was amended in 2018 to include section (f) on the "Use of Partnership Intermediaries to Promote Defense Research and Education." The authority allows the Director of a Center to enter into a contract, MOU, or other transaction with a partnership intermediary to increase the likelihood of success in joint activities with industry or academic institutions.

In this authority, the "partnership intermediary" is defined the same way as in the Title 15 authority: as "an agency of a State or local government or a nonprofit entity owned in whole or in part by, chartered by, funded in whole or in part by, or operated in whole or in part by or on behalf of a State or local government." The role of the partnership intermediary is to work with industry or academic institutions that need or can make use of technology-related assistance from a Center.

### c. Comparison between Title 15 and Title 10

Although the language in Title 15 and Title 10 authorities are similar, there are a few key differences. A summary comparing the two PIA authorities are outlined in Table 14. Title 15 is applicable to all Federal agencies, whereas Title 10 only applies to DoD. Title 15 can be applied to Federal laboratories and FFRDCs, whereas Title 10 is only for Centers for Science, Technology, and Engineering. The enumeration of potential partners differs between the two codes. Title 15 specifically calls out small businesses, institutes of higher education, or educational institutes. Title 10 outlines that potential partners are industry or academic institutions. It is unclear whether one set of potential partners precludes the other, as small businesses are part of industry. In addition, Title 10 does not address how PIAs should be funded, but Title 15 specifies that technology transfer funds can be used to pay

Federal costs. Title 10 specifies that PIAs can be entered into using an "other transaction," which is not mentioned in Title 15.

**Table 9. Comparison between Title 15 and Title 10 PIA Authorities**

| Categories for Comparison | Title 15 | Title 10 |
|---|---|---|
| Year Authorized | 1991 | 2018 |
| Applicable Agencies | All Federal agencies | DoD |
| Applicable Organizations | Federal laboratory, non-laboratory FFRDC | Centers for Science, Technology, and Engineering |
| Eligibility to Establish PIAs | Director of Federal laboratory or Federal employee who is a contract office for a FFRDC | Director of a Center for Science, Technology, and Engineering |
| Partnership Intermediary Requirements | Agency of State or local government, or nonprofit entity owned, charter by, funded, or operated on behalf of the State or local government | Agency of State or local government, or nonprofit entity owned, charter by, funded, or operated on behalf of the State or local government |
| Role of the Partnership Intermediary | Assist, counsel, advise, evaluate, or otherwise cooperate | Assist, counsel, advise, evaluate, or otherwise cooperate |
| Potential Partners | Small business firms, institutions of higher education, or educational institutions | Industry or academic institutions |
| Funding | Can pay Federal costs out of funds available for the support of technology transfer | Not specified |
| Mechanisms to Establish a PIA | Contract or memorandum of understanding | Contract, memorandum of understanding, or other transaction |

## 2. DoD Policy

DoD policy related to the use of PIAs is provided in the DoDI 5535.8. The DoDI was issued in May 1999 and updated in September 2018. As of September 2020, USDR&E is in the process of updating the DoDI to include further details about the use of PIAs. The DoDI provides guidance related to intermediaries that are affiliated with State or local governments. The DoDI does not explicitly provide much detail on the PIA mechanism or partnership intermediaries as defined by the PIA authorities. The types of intermediaries that are instead mentioned in the DoDI are broader than those mentioned in the PIA authorities, including professional societies, for-profit consultants, and trade associations.

Under the DoDI, DoD entities may request services from intermediaries through contracts, CRADAs, EPAs, MOUs, or agreements. The DoDI outlines several activities

that these intermediaries can provide, including facilitating "communication and understanding between defense laboratories and/or technical activities and non-Federal entities" (DoD 2018b). Other activities include "consulting services, strategic planning, military and commercial technology assessments, integration with Federal core research and/or focus and/or outreach areas, and technology marketing." Intermediaries can also provide assistance with DoD engagement activities, including with small businesses and regional stakeholders that may want to commercialize DoD technology.

A change occurred in 2018 in regard to DoD coordination of the PIAs. A 2018 amendment of the DoDI gave the responsibility of PIA coordination to USDR&E. In the 1999 version of the policy, the Under Secretary of Defense for Acquisition and Technology was designated as the party responsible for monitoring compliance with DoDI.

In addition to the DoDI, there is also DoDD 5535.03, which was updated in October 2018. The DoDD addresses DoD's domestic technology transfer program. This document directs the Secretaries of the Military Departments and Heads of the other DoD Components to "allow use of partnership intermediaries to obtain domestic T2 support," and may redelegate approval authority to the heads of DoD laboratories (DoD 2018c).

### 3. Service-Level Policy and Guidance

Service-level policies and guidance have been issued to provide further clarifications to the DoD and legal authorities. The Air Force, Navy, and Army have each released their own service-level guidance in the form of instructions, handbooks, and memoranda.

#### a. Air Force

In September 2019, the Secretary of the Air Force released Air Force Instruction 61-301, which superseded previous instructions from 2001. This instruction assigned the duty of approving PIAs to the Deputy Assistant Secretary of the Air Force for Science, Technology, and Engineering, unless otherwise delegated to the Technology Executive Office. Unlike the DoDI, the Air Force's policy cites both the Title 15 and Title 10 authorities. It defines the partnership intermediary as an "agency of a State or local government or a nonprofit entity owned in whole or in part by, chartered by, funded in whole or in part by, or operated in whole or in part by or on behalf of a State or local government, that assists, counsels, advises, evaluates, or otherwise cooperates with small business firms, and institutions of higher education," and that PIAs can be established through an MOU or a contract (U.S. Air Force 2019a). This language is consistent with the Titles 10 and 15 authorities.

A month later, on October 10, 2019, Air Force Contracting and General Counsel released a memorandum for the Air Force Acquisition Community on PIA guidance. The purpose of this memorandum to establish "a common Air Force interpretation governing

the use of partnership intermediary agreements" (U.S. Air Force 2019b). This memorandum cites both the Title 10 and 15 authorities, stating that the Air Force Research Lab, as the only Air Force Center for Science, Technology, and Engineering, is the only Air Force organization that qualifies to establish PIAs under Title 10.

Unlike other service-level documents, the Air Force memorandum addresses how nonprofits seeking to become a partnership intermediary can establish a nexus to a State or local government, and recognizes the ways in which this requirement is met can vary greatly. It also states that the differences in the types of partnerships enumerated in Title 15 versus Title 10 means that AFRL, as the only Air Force entity able to use the Title 10 authority, can engage more broadly with partners under the Title 10 authority. The memorandum addresses competition, saying that PIAs should be competed to the extent practicable, while acknowledging that there are no court decisions that directly address whether a PIA *must* be competed. The memorandum states that PIAs formed through MOUs or no-cost contracts do not require competition, since they are unfunded.

**b. Navy**

Navy guidance on PIAs comes from a number of documents, the most informative of which is the Navy Technology Transfer Handbook, published in September 2018 (U.S. Navy 2018). The Handbook lays out the process for Navy laboratories to establish PIAs, as established by the Department of the Navy (DON) T2 Program Office. The Handbook cites both the Title 15 and 10 authorities, and defines a PIA as a "contract or memorandum of understanding between a Federal laboratory and an entity known as a partnership intermediary" (U.S. Navy 2018). For funding, the Navy laboratory may pay the Federal costs of the PIA, but it is not required. It cannot receive funds under a PIA.

The Handbook also includes steps for a legal review of the PIA and procedures for obtaining signature authority (e.g., T2 personnel, point of contact for interface with the DON T2 Program Office, and 8 hours of training requirements for T2 personnel). In addition, the Handbook provides oversight steps after the PIA is established, such as including information on the PIAs in the annual T2 business plan and recording activities in the Navy Defense Technology Transfer Information System database.

The Handbook also provides a sample agreement (Appendix H). This agreement includes topics, such as definitions, parties, background, purpose, designated presentative, agreement activities, funding, and IP, among others. The sample agreement invokes only the Title 15 authority.

**Exemplar Practice**

28. Service-level leadership develop policies and guidance that clarify ambiguities and provide informational materials, such as an agreement template
    - Addresses one or more challenges
    - Involves past, present, or planned allocation of dedicated resources

The sample agreement allows for licensing inventions; submissions of research proposals under BAAs; support for outside activities, such as making Navy R&D capabilities available to small businesses; technology marketing programs and showcases; small business and educational institution technology and capabilities, such as sponsoring showcases; and other activities authorized within the scope of Title 15. Unless otherwise stated, the agreement states that each party is responsible for funding its own activities. The agreement does not convey any IP rights, which remain with the organization whose employees created the IP. The Handbook states that each partnership intermediary should submit an annual report, along with a final report at the end of the agreement.

In addition to the Handbook, the Office of the Secretary of the Navy also released SECNAV Instruction 5700.17A on January 22, 2019 about Domestic Technology Transfer (U.S. Navy 2019). This instruction provided definitions for a Standard Navy PIA (SNPIA) as one that uses the template provided in the Handbook, and a Non-Standard Navy PIA as one that deviates from the SNPIA, with additional requirements of justification for the deviation and a legal review.

The SECNAV Instruction also designates the Chief of Naval Research as the responsible party for instituting policies under which laboratories may be authorized to enter into PIAs. The authority to enter into a PIA is delegated to the head of a designated DON laboratory. In such a situation, the laboratory must have a technology transfer office representative; T2 support staff; provisions for legal, intellectual property, security, and public affairs reviews; and plans if the PIA is being entered into with foreign persons or organizations.

### c. Army

Army policy regarding PIAs is outlined in Army Regulation 70-57, "Army Technology Transfer" (U.S. Army 2018a). This 2018 regulation references and reinforces the Title 15 authority, stating that commanders or directors of Army laboratories or centers identified by the Assistant Secretary of the Army for Acquisition, Logistics and Technology may enter into PIAs and make funds available for the partnership intermediaries. This regulation defines partnership intermediaries using the language from

Title 15, stating that partnership intermediaries cooperate with small-business firms—without mention of institutions of higher education or other academic institutions (U.S. Army 2018a). One interviewee noted that the decentralized culture of the Army leads them to operate their PIAs differently than the Air Force or Navy.

## B. PIA Activities

The activities that a PIA can support were initially defined in the Title 15 authority as assisting, counseling, advising, or otherwise cooperating with small business firms, institutions of higher education, or educational institutions for technology-related assistance. This language is echoed throughout other PIA policy documents, including the Title 10 authority, the Navy T2 Handbook, and Army Regulation 70-57. However, the legislative language is vague, and can encompass a number of activities, leading to differences in interpretation and uncertainties in application of PIAs. Some policies and guidance, such as the DoDI, the Air Force Memorandum, and the Navy T2 Handbook provide clearer examples of PIA activities. These activities include technology assessments, strategic planning, marketing assistance, and technology showcases. A comparison of PIA activities described in relevant policy and guidance is shown in Table 15. Some interviewees expressed a desire to better understand the boundaries of these activities.

**Table 10. Comparison of PIA Activities Described in Relevant Policies and Guidance**

| Policies and Guidance | Description of Activities |
|---|---|
| 15 U.S. Code § 3715 | Assists, counsels, advises, evaluates, or otherwise cooperates with small business firms, institutions of higher education … or educational institutions… that need or can make demonstrably productive use of technology-related assistance from a Federal laboratory, including State programs receiving funds under cooperative agreements. |
| 10 U.S. Code § 2368 | Assists, counsels, advises, evaluates, or otherwise cooperates with industry or academic institutions that need or can make demonstrably productive use of technology-related assistance from a Center. |
| DoDI 5535.8 | Provide a number of services, including consulting services, strategic planning, military and commercial technology assessments, integration with Federal core research and/or focus and/or outreach areas, and technology marking. They also may provide coordinated media and legislative interface and assistance with DoD conversion activities. One of their attributes is their ability to interface with small business and regional economies interested in commercializing Federal technology. |
| Air Force Memorandum from October 10, 2019 | Among other things, partnership Intermediary services can include: consulting, strategic planning, military and technology assessments; facilitating transfer of technologies from the Air Force to businesses; Evaluating patents and patent applications to identify the most viable candidates for licensing to industry; marketing Air Force technology to potential industry licensees; providing support and assistance for media/legislative interactions; working with small business and regional economies interested in commercializing federal technology; arranging technical conferences, workshops and seminars; and identifying companies with innovative technologies, which matches Air Force operational needs. |
| Navy T2 Handbook | The organization's function must be to assist, counsel, advise, evaluate, or otherwise cooperate with industry or academic institutions that need or can make demonstrably productive use of technology-related assistance from a Federal laboratory.<br>Optional Agreement activities: licensing inventions, submission of research proposals, support for outside activities, technology marketing programs and showcases, and small business and educational institution technology and capabilities showcases. |
| Army Regulation 70-57 | Assists, counsels, advises, evaluates, or otherwise cooperates with small-business firms that need or can make demonstrably productive use of technology-related assistance from a Federal laboratory. |

## C. Funding and Competition

PIAs can be funded or unfunded. The way that policies and guidance elaborate on the funding of PIAs is vague and occasionally not addressed at all (Table 16). Title 15 states that the Federal costs of the PIA should come from the technology transfer funds, while Title 10 does not address funding. One interviewee remarked that the funding rules are well articulated in the Code of Federal Regulations (CFR), which outlines funding procedures for varied contracts. However, many interviewees stated they felt uncertain about various aspects of policies related to funding and competition. Some interviewees recalled that policies were revised over time and prior policies placed restrictions on funding that were not currently in place. Some interviewees cited incorrect or outdated policies on funding, implying that they were not familiar with current policies, including the legal provisions.

Competing PIAs is another ambiguous issue within PIA policy, with only the Air Force memorandum giving specific guidance regarding competition. The Air Force memorandum states that for PIAs formed through a contract, it would be "prudent" to compete the PIAs. However, for PIAs formed through MOUs and no-cost contracts, competition is not necessary.

**Table 11. Comparison of Funding for PIAs Described in Relevant Policies and Guidance**

| Policies and Guidance | Description of Funding |
|---|---|
| 15 U.S. Code § 3715 | Pay the Federal costs of such contract or memorandum of understanding out of funds available for the support of the technology transfer function pursuant to section 3710(b) of this title. |
| 10 U.S. Code § 2368 | Not specified |
| DoDI 5535.8 | Not specified |
| Air Force Memorandum from October 10, 2019 | A PIA contract contains the key elements of a procurement instrument: (1) a written agreement; (2) use of appropriated funds; and (3) the purchase of services. |
| Navy T2 Handbook | Under a PIA, the Navy laboratory and/or technical activity may, but is not required to, pay the Federal costs of the PIA out of funds available for the support of its T2 function. An appropriate, separate instrument for funding will have to be executed if money is being transferred. The Navy laboratory may not receive funds under a PIA. |
| Army Regulation 70-57 | Will make available adequate funds for support of the Office of Research and Technology Applications and related activities, and as appropriate, for services of partnership intermediaries and for in-kind contributions to CRADAs. |

## D. Stakeholder Eligibility

PIA-related policies and guidance outline requirements for the eligibility of DoD entities that can establish PIAs and for organizations that can become partnership intermediaries (Table 17).

### 1. Eligibility of DoD Entities

Eligibility for DoD and Federal entities differ between the two PIA authorities. The Tile 15 authority applies to the Secretary or head of a department of agency, the Director of a Federal laboratory, or the Federal employee who is a contract officer at a FFRDC that is not a laboratory. This eligibility extends to relevant DoD entities across DoD. However, the Title 10 authority applies only to DoD and to its Centers for Science, Technology Engineering Partnerships within the DoD. This difference is addressed in the Air Force memorandum, which states that any DoD laboratory could use the Title 15 authority, but currently AFRL is the only center under the Air Force eligible to use the Title 10 authority.

### 2. Eligibility of Organizations as Partnership Intermediaries

Title 15 outlines several types and characteristics of eligible organizations (e.g., "chartered by, funded in whole or in part by, or operated in whole or in part by or on behalf of a State or local government"). These eligibility requirements are consistent across relevant DoD policies and guidance.

Among interviewees, the requirement for affiliation with State or local government was a contentious topic. Some interviewees remarked that some partnership intermediaries were not properly meeting these requirements. They generally expressed concerns that improper affiliations can set a bad precedent for the use of PIAs.

**Table 12. Comparison of DoD and Partnership Intermediary Eligibility Described in Relevant Policies and Guidance**

| Policies and Guidance | Description of DoD Eligibility | Description of Partnership Intermediary Eligibility |
|---|---|---|
| 15 U.S. Code § 3715 | The Secretary or head of the affected department or agency, the Director of a Federal laboratory, or in the case of a federally funded research and development center that is not a laboratory (as defined in section 3710a(d)(2) of this title), the Federal employee who is the contract officer | An agency of a State or local government, or a nonprofit entity owned in whole or in part by, chartered by, funded in whole or in part by, or operated in whole or in part by or on behalf of a State or local government. |
| 10 U.S. Code § 2368 | Director of a Center for Science, Technology, and Engineering Partnership | An agency of a State or local government, or a nonprofit entity owned in whole or in part by, chartered by, funded in whole or in part by, or operated in whole or in part by or on behalf of a State or local government |
| DoDI 5535.8 | DoD laboratories | A specific type of intermediary, a "Federal Partnership Intermediary," is described in 15 U.S.C. 371 5(c) |
| Air Force Memorandum from October 10, 2019 | Currently, the Air Force Research Laboratory is the only Air Force organization that qualifies for such a designation under 10 USC 2368. In contrast, 15 USC 3715 applies to all federal laboratories. | A Partnership Intermediary can be: (1) a state or local government agency; (2) a nonprofit entity owned, operated, or funded in whole or in part by, or on behalf of, a state or local government; or (3) a nonprofit entity chartered by a state or local government…A nonprofit entity seeking to qualify as a partnership intermediary therefore must show a nexus to a state or local government. This nexus may consist of legislative sponsorship and/or (partial) funding, a defined state or local role in the operations, even if limited, or some form of government action demonstrating the organization to work on behalf of the state or local government. |
| Navy T2 Handbook | Navy laboratory | The organization's structure must be:<br>• an agency of a State or local government, or<br>• a nonprofit entity owned in whole or in part by, chartered by, funded in whole or in part by, or operated in whole or in part by or on behalf of a State or local government. |
| Army Regulation 70-57 | Army laboratories and centers | An agency of a State or local government or a nonprofit entity owned in whole or in part by, chartered by, funded in whole or in part by, or operated in whole or in part by or on behalf of a State or local government |

## E. Training

STPI did not identify any training in which the focus is specifically on PIAs. However, various training exists more broadly on technology transfer mechanisms, including PIAs and other agreements. Training occurs through participation at workshops and in the form of institutional knowledge transferred through mentorship and outreach to other technology transfer offices with experience using PIAs.

### 1. Training for the Federal and DoD Technology Transfer Community

One of the main sources for guidance and training for the Federal technology transfer community is from the Federal Laboratory Consortium for Technology Transfer (FLC) through its national and regional meetings and the online resources they provide. The FLC is a network of over 300 Federal laboratories that are broken up into regional subcategories. Each year, the FLC hosts an annual meeting to discuss technology transfer issues. While the 2020 annual meeting agenda did not list any PIA-specific workshops, the conference as a whole included training courses and networking breaks for various groups of members (FLC 2020a). Generally, FLC's meetings allow the Federal technology transfer staff to interact with one another and share their experiences, challenges, and best practices. In addition to their meetings, the FLC also collects and publishes examples of best practices in their Technology Transfer Playbook as well as other online resource. One of the "plays" is to use PIAs as a way to tap into regional networks (FLC 2020b). Although not the focal stakeholder for FLC meetings, Federal legal counsel and contracting officers also participate in these meetings.

DoD also organizes an annual DoD T2 Training Workshop. Attendees to these workshops include laboratory technology transfer personnel, legal counsel, and T2 support staff (DoD 2020). In addition to providing a forum for the DoD T2 professionals to engage with each other through panels and networking, the workshop also provides training sessions for technology transfer and legal tracks. In addition to the DoD T2 Training workshops, both the Air Force and Navy hold their own workshops.

**Exemplar Practice**

29. DoD leadership identify training opportunities for technology transfer staff, contracting officers, and legal counsel
    - Addresses one or more challenges
    - Is logically necessary
    - Involves past, present, or planned allocation of dedicated resources

### 2. Training for Legal Counsel and Contracting Officers

STPI identified few resources for training legal counsel and contracting professionals on topics related to PIAs. The Defense Acquisition University (DAU) describes PIAs on their website, but, in STPI's analysis, this information is incomplete and misleading (e.g., PIAs are listed as non-FAR agreements) (DAU 2020). At the service level, the Navy offers a T2 and Legal Workshop (U.S. Navy 2020). Legal counsel and contracting officers participate in these two workshops. However, the target audience for these workshops is not specifically legal counsel and contracting officers.

## F. Challenges

Challenges related to policy and guidance include a general lack of awareness of legal provisions and ambiguities in legal interpretations, training materials and example agreements, and lack of experience using and awareness of PIAs.

### 1. Lack of Awareness of Legal Provisions and Ambiguities in Legal Interpretations

Several interviewees expressed confusion about the distinct provisions of Title 15 and Title 10 authorities and their interpretations. Some DoD entities were not familiar with the Title 10 authority altogether. Many interviewees were not aware of the many distinctions between the two PIA authorities or the circumstances for using one over the other. For instance, several interviewees expressed confusion about interpretations for certain eligibility requirements, such as "chartered by" a State or local government.

In addition, a couple interviewees said that it was confusing how the term laboratory is cited in relevant policies and guidance, meanwhile other DoD entities that are not laboratories are using PIAs. They were confused about how the eligibility of DoD entities was determined. ODL&P's scope of its defense laboratory enterprise includes 63 military service laboratories, warfare centers, and engineering centers, and extends to DoD-sponsored FFRDCs and UARCs (DoD n.d.b). Specifically, other DoD entities—such as combatant commands, which are entities outside of the ODL&P's scope—have established PIAs.

The ambiguity in the policies also leads to a lack of widespread knowledge about PIAs and diverse, and sometimes contradictory, policy interpretations across the legal and contracting communities. One challenge stated by an interviewee is that past proposals for changes to the PIA authorities to address certain ambiguities have largely been ignored. For example, they noted that they suggested changes clarifying the use of copyright and trademarks by partnership intermediaries, and that their suggestion was never addressed.

### 2. Lack of Training Materials and Example Agreements to Establish PIAs

Many interviewees identified the need for guidance and training materials, including example agreements to establish PIAs. Only the Navy T2 handbook currently contains a sample agreement. A lack of guidance on contracting makes it difficult for contracting officers across DoD to know what clauses the agreement should contain. Furthermore, one interviewee expressed the challenge that when they were considering a PIA and had questions, there was nowhere for them to go to get a timely answer about the agreements.

### 3. Lack of Experience Using and Awareness of PIAs

Some interviewees mentioned that their contracting officers may not have experience with PIAs and that the high turnover of personnel can create a lack of institutional knowledge about PIAs. Further challenges are present within the broader DoD culture. A centralized database that documents PIAs does not exist, creating a lack of awareness of current PIAs and what functions a PIA can play. The DoD community could benefit from examples of what can be done using a PIA. This dearth of knowledge has also likely contributed to a cultural resistance to PIAs within the DoD. This could explain why some eligible DoD entities do not use PIAs.

## G. Suggestions

Suggestions to improve policy and guidance include establishing training modules specific to PIAs, developing and broadly disseminating guidance on establishing and using PIAs, developing agreement templates, and revising policies to address areas of ambiguity. These suggestions are summarized in Table 18.

**Table 13. Summary of Suggestions Related to PIA Policies and Guidance**

| Action For | Suggestion Description | Challenges Addressed If Implemented |
|---|---|---|
| USDR&E<br>Service-level leadership | Establish training modules specific to PIAs | Lack of awareness of legal provisions and ambiguities in legal interpretations<br>Lack of training materials and example agreements to establish PIAs<br>Lack of experience using and awareness of PIAs |
| USDR&E<br>Service-level leadership | Develop and broadly disseminate guidance on establishing and using PIAs | Lack of awareness of legal provisions and ambiguities in legal interpretations |
| USDR&E<br>Service-level leadership | Develop agreement templates | Lack of awareness of legal provisions and ambiguities in legal interpretations<br>Lack of training materials and example agreements to establish PIAs |

### 1. Establish Training Modules Specific to PIAs

Many interviewees mentioned the need to establish training modules specific to PIAs for contracting officers and the acquisition community. These training modules could help to close the gap in knowledge about PIAs in these communities. Such a training module could be offered by the DoD through existing workshops or by developing a PIA-specific track.

Some interviewees identified various topics that training could address:

- Working in a trust-based relationship for DoD entities overseeing PIAs, and the roles of legal counsel, contracting officers, and partnership intermediaries to build this relationship
- Understanding the appropriate scope of activities under a PIA for DoD entities, partnership intermediaries, and other DoD stakeholders
- Developing and reviewing proposed funding mechanisms, determining funds, and advising on the development of statements of work for contracting officers and legal counsel
- Outlining legal provisions of the PIA authorities to ensure that stakeholders engaging in PIAs are not confused about applicable provisions, requirements, and their interpretations

### 2. Develop and Broadly Disseminate Guidance on Establishing and Using PIAs

Many DoD entities and partnership intermediaries mentioned the need for further guidance related to PIAs. Due to the various points of confusion in funding and establishing PIAs, a guide could be helpful to delineate specific considerations for technology transfer staff, contracting officers, and legal counsel. A guide that includes detailed descriptions or a catalog of current PIAs and their capabilities would provide examples of what services could be provided to other DoD entities through existing, active PIAs and the bounds of their activities. A guide could identify best practices and showcase exemplar activities and results achieved through PIA activities.

### 3. Develop Agreement Templates

Templates for PIA agreements, such as the one included in the Navy T2 Handbook (Appendix H), could give contracting officers and technology transfer staff a sense of the bounds of activities under PIAs that are permissible and the procedures to establish PIAs. Across the Navy, several interviewees mentioned that they used the template to facilitate their contracting with the partnership intermediary. One interviewee suggested that a DoD-wide template should be developed to assist the technology transfer, contracting, and legal communities.

# 8. Summary and Recommendations

This chapter summarizes the study findings and describes STPI's recommendations for USDR&E based on these findings.

## A. Summary

For this study, STPI used multiple methods to characterize the landscape of PIAs established across DoD. These methods involved developing research questions and a logic model to guide the study; analyzing results from reviewing relevant literature, including program documents, reports, and other informational materials; conducting interviews with Federal and non-Federal stakeholders; and administering questionnaires for stakeholders involved in active PIAs.

Based on the analyses of information obtained from these methods, STPI identified 16 suggestions provided by stakeholders on ways to improve the use of DoD PIAs. Table 20 summarizes these suggestions and related identified challenges that would be addressed if the suggestions were implemented. Some suggestions are cross-cutting in that they can address more than one identified challenge. STPI also identified 29 exemplar practices, in particular those related to DoD's oversight, that could be useful references for DoD entities considering establishing new PIAs or improving the use of their existing PIAs as well as potential partnership intermediaries. Table 21 summarizes the exemplar practices identified in this study.

In general, DoD stakeholders largely view PIAs as a useful tool in the toolbox to help accomplish their technology transfer goals. There has been a rise in the number of PIAs from 2015 to 2020. PIAs are used to perform a wide span of spin-in, spin-out, and dual use activities. In particular, since 2015, non-traditional DoD entities, such as combatant commands, service-level major commends, and military education institutions, have established their first PIAs. These trends demonstrate the flexibility of the PIA and their utility in supporting varied goals across DoD entity missions. However, opportunities exist to resolve process inefficiencies; standardize and clarify inconsistencies in legislative and DoD policy, interpretations, and practices; and build out the ecosystem of partnership intermediaries to leverage their capabilities and create synergies with other relevant initiatives across DoD.

**Table 14. Summary of Suggestions and Challenges Addressed If Implemented, Organized by Relevant Chapter Categories**

| Suggestion Description | Challenges Addressed If Implemented | Action For |
|---|---|---|
| **PIA Landscape** | | |
| Establish a collaborative platform or fora to support interactions among partnership intermediaries | Perception of "too many" PIAs and unwillingness to collaborate | USDR&E<br>Services<br>DoD entities |
| Establish an information repository of all DoD PIAs | Lack of awareness and no comprehensive list of PIAs | USDR&E<br>Services |
| **Organizational and Funding Models** | | |
| Increase communication and awareness of PIAs | Lack of awareness of PIAs and of alternative contracting mechanisms to establish PIAs<br>Confusion about State or local government affiliation requirements | USDR&E<br>Service leadership |
| Consider providing baseline funding | Lack of baseline funding | DoD Entities |
| **Activities Under PIAs** | | |
| Coordinate events and showcases | Time and effort needed to build relationships in the R&D ecosystem | DoD Entities<br>Partnership Intermediaries |
| Support effective and efficient information exchange | Steep learning curve to understand PIA-related roles and functions<br>Burdensome bureaucracy and confusion about the legality of activities<br>Perceptions that DoD IP may not be conducive to commercialization | DoD Entities<br>Partnership Intermediaries |
| Address specific engagement barriers for small businesses | Burdensome bureaucracy and confusion about the legality of activities | DoD Entities |
| Consider expanding certain activities under PIAs | Burdensome bureaucracy and confusion about the legality of activities | DoD Entities |
| **DoD Oversight and Evaluation** | | |
| Sufficiently fund technology transfer offices to support their involvement in PIA Activities | Insufficient time and effort to manage technology transfer workload<br>Inadequate funding for PIAs<br>Dissatisfaction with DoD oversight processes | USDR&E<br>DoD Entities |

| Suggestion Description | Challenges Addressed If Implemented | Action For |
|---|---|---|
| Clearly outline the types of funds that can be used to fund PIAs | Varied understanding of the authority to use and fund PIAs | USDR&E<br>Service leadership<br>DoD Entities<br>Contracting Officers<br>Legal Counsel |
| Identify strategies to manage COI | No relevant challenges identified | USDR&E<br>DoD Entities<br>Partnership intermediaries |
| Conduct annual reviews for funded and unfunded PIAs | Dissatisfaction with DoD oversight processes | USDR&E<br>DoD Entities |
| **PIAs in Context with the Broader DoD Technology Transfer Landscape** | | |
| Develop long-term strategic plans to support the use of PIAs and articulate the value proposition for using PIAs in the context of broader technology transfer activities and goals | Need for long-term, strategic approaches for using PIAs<br>Limited awareness of the value proposition for using PIAs | DoD Entities |
| **Policy and Guidance** | | |
| Establish training modules specific to PIAs | Lack of awareness of legal provisions and ambiguities in legal interpretations<br>Lack of training materials and example agreements to establish PIAs<br>Lack of experience using and awareness of PIAs | USDR&E<br>Service-level leadership |
| Develop and broadly disseminate guidance on establishing and using PIAs | Lack of awareness of legal provisions and ambiguities in legal interpretations | USDR&E<br>Service-level leadership |
| Develop agreement templates | Lack of awareness of legal provisions and ambiguities in legal interpretations<br>Lack of training materials and example agreements to establish PIAs | USDR&E<br>Service-level leadership |

**Table 15. Summary of 29 Exemplar Practices and Relevant Criteria, Organized According to Relevant Chapter Categories**

| | Exemplar Practice Description | Relevant Criteria |
|---|---|---|
| | **PIA Landscape** | |
| 1. | Service-level program managers maintain centralized information about PIAs established across their organization | 1, 2 |
| 2. | DoD entities provide timely information about new or inactive PIAs to DoD leadership or service-level program managers | 1, 3 |
| | **Organizational and Funding Models** | |
| 3. | DoD entities and partnership intermediaries work to clearly identify the State and local affiliation requirement, in coordination with legal counsel, as needed | 1, 3 |
| 4. | Partnership intermediaries focus on customer needs and clearly articulate their value proposition as part of their business model | 1, 2 |
| | **Activities Under PIAs** | |
| 5. | Partnership intermediaries expend high-levels of effort, as needed, to understand DoD discoveries and how to frame them to garner interest from the private sector | 1, 3, 4 |
| 6. | Partnership intermediaries develop strong linkages with DoD public communication staff to facilitate information sharing about and the benefits of engaging with DoD | 1, 2 |
| 7. | Partnership intermediaries are active partners that seek to understand the legal and policy frameworks that govern DoD activities | 1, 3 |
| 8. | Partnership intermediaries conduct extensive preparation to understand their PIA roles | 1, 4 |
| 9. | Partnership intermediaries engage with and foster relationships with other entities in the region, such as universities and regional economic development groups, continuously working to build their networks and contributions to their innovation ecosystems | 1, 2 |
| 10. | DoD entities and partnership intermediaries coordinate and develop joint activities under their PIAs to the extent possible to leverage resources and exploit efficiencies | 1, 2, 4 |
| | **DoD Oversight and Evaluation** | |
| 11. | DoD entities enable strong, two-way and frequent communications in all aspects of oversight | 2 |
| 12. | DoD entities develop a well-thought out plan for the expected activities under PIAs and how they lead to expected achievements | 2, 3 |
| 13. | DoD entities make the project definition process as collaborative as possible, and, in the case of spin-in, involve the ultimate customer in the conversation | 1 |

| Exemplar Practice Description | Relevant Criteria |
|---|---|
| **DoD Oversight and Evaluation (cont.)** | |
| 14. DoD entities identify an appropriate DoD lead that promotes a trust-based relationship, enables transparency, clearly articulates and effectively manages the oversight role, provides adequate resources, and facilitates contributions of others to accomplish the projects | 1, 2 |
| 15. DoD leads facilitate interactions with the pertinent DoD SMEs to support projects under the PIA | 3 |
| 16. DoD entities ensure that interactions between partnership intermediary and DoD SMEs are not unnecessarily burdensome | 3 |
| 17. DoD entities establish rules for guiding partnership intermediary behaviors, including identifying competing relationships and how to keep all stakeholders informed about those interests | 2 |
| 18. DoD entities provide frequent feedback, and partnership intermediaries encourage this feedback, whether positive or negative | 2, 3 |
| 19. DoD entities obtain disclosures of affiliations for consideration when selecting a partnership intermediary and outline processes for how the partnership intermediary will identify and resolve potential COIs in the PIA | 1, 2 |
| 20. DoD entities define success collaboratively with the partnership intermediary and other DoD customers | 2, 3 |
| 21. DoD entities keep DoD leadership informed of progress on projects under PIAs | 1, 2, 3 |
| 22. DoD entities ensure that a potential partnership intermediary has the correct knowledge base to understand the scope of a PIA and project approval processes | 3 |
| 23. DoD entities work to educate contracting officers and legal counsel about the use of PIAs | 1 |
| 24. DoD entities use qualitative annual reviews with input from all key DoD stakeholders, including DoD leadership, contracting officers, legal counsel, and other DoD customers | 1 |
| 25. DoD entities develop metrics, as needed, tailored to the specific activities being performed to support quantitative evaluation | 1 |
| **PIAs in Context with the Broader DoD Technology Transfer Landscape** | |
| 26. DoD entities develop strategic plans to identify and articulate the value proposition in their use of PIAs in the context of other technology transfer activities and goals | 1,3 |
| 27. DoD entities understand and can articulate how the PIA as a mechanism compares with the use of other contracts to accomplish similar goals | 1, 3 |
| **Policy and Guidance** | |
| 28. Service-level leadership develop policies and guidance that clarify ambiguities and provide informational materials, such as an agreement template | 1, 4 |

| Exemplar Practice Description | Relevant Criteria |
|---|---|
| 29. DoD leadership identify training opportunities for technology transfer staff, contracting officers, and legal counsel | 1, 3, 4 |

Relevant Criteria: 1 = Addresses one or more challenges identified by multiple stakeholders; 2 = Adoption or continued implementation of a practice by more than one DoD entity or partnership intermediary; 3 = Is logically necessary for the successful completion of a required function; and 4 = Involves past, present, or planned allocation of dedicated resources, including time, funding, and expertise, to support the practice.

## B. Recommendations

Based on the findings, STPI suggests the following recommendations for USDR&E to advance the goal to improve the use of PIAs across DoD:

1. Revise DoD policies to clarify points of confusion in establishing and supporting activities under PIAs
2. Develop guidance and facilitate training about PIAs for technology transfer staff, legal counsel, and contracting officers to ensure that information about PIAs is unified, harmonized, and standardized
3. Encourage sufficiently funding activities that are expected to be performed under PIAs
4. Implement PIAs as a trust-based relationship between DoD entities and partnership intermediaries
5. Strengthen the PIA ecosystem to enable communication, information exchange, and coordination of PIA activities across DoD
6. Coordinate USDR&E's technology transfer initiatives with relevant initiatives across DoD
7. Work with Congress to clarify and harmonize the PIA authorities

For each recommendation, STPI proposes multiple approaches that could be pursued to implement the recommendation.

### 1. Revise DoD policies

STPI identified that, generally, stakeholders sought clarification on numerous topics related to establishing and supporting PIAs. Their confusion is promoted by the dissemination of contradictory guidance materials produced across the services and by other DoD entities supporting the use of PIAs. In particular, the DoDI provides a broad definition of partnership intermediaries that is not aligned with the relevant statutes. In addition, legal counsel lean on their interpretations of the PIA authorities to determine how PIAs can be established, funded, and competed, among other factors. STPI found that these legal interpretations differ across DoD communities. While legislative clarifications on these matters could improve harmonizing varied interpretations, in its absence, STPI recommends that DoD policy should address these challenges by clarifying policy and procedures on the use of PIAs.

Specifically, STPI recommends that DoD USDR&E revise DoDI 5535.8 "DoD Technology Transfer (T2) Program" and other relevant policies to clarify or define the following:

- PIA strategic objectives—outlining procedures for DoD entities when determining whether to establish a PIA and whether the PIA mechanism is best suited to accomplish identified strategic objectives compared with other technology transfer mechanisms
- Scope of activities under PIA—inserting language that reflects the current scope of activities pursued under PIAs and explicitly stating that allowed activities under PIAs include broadly activities supporting technology transfer, including facilitation or conduct of R&D, prototyping, and manufacturing capabilities, STEM education support, and government and non-government workforce development efforts associated with technology transfer
- Types of partnership intermediaries—referencing two PIA authorities 15 USC 3715 and 10 USC 2368 as the only legal authorities to be used to establish partnership intermediaries
- DoD entities eligible to establish PIAs—defining the DoD laboratories and science and technology reinvention laboratories (STRLs) as stated under the respective authorities that are able to establish PIAs
- Partnership intermediary eligibility—outlining procedures to determine whether partnership intermediary organizations meet eligibility requirements under the legal provisions
- Funding PIAs—clarifying policy that DoD entities establishing PIAs should ensure that commensurate funding is provided for the services requested under their PIAs; explicitly stating that funds for this effort can include RDT&E, O&M, and royalty and CRADA incomes, in accordance with relevant DoD financial management policies; and that funding mechanisms can be FAR-based or non-FAR based
- Competitive selection of partnership intermediaries—clarifying procedures for competition to include a preference for competing the selection of the partnership intermediary unless a sole source approach is determined as the best course, and that legal counsel and contracting officers should be consulted when making this determination, in particular, taking into account whether the PIA will be funded and requirements for competition based on the type of contract used to establish the PIA
- Training—outlining procedures for establishing guidance and training about PIAs, supporting that DoD entities can establish their own guidance and training in accordance with the DoDI
- Oversight of PIAs—providing procedures for determining the adequate oversight functions to manage PIAs, taking into account oversight requirements

for funded PIAs, inclusion of written terms in PIAs to manage COI, evaluation of performance, and information collection needs.

- Information collection procedures—specifying procedures for the collection and maintenance of relevant information about PIAs, such as year established and funding allocations, which are currently not being tracked in a unified way or platform
- Leveraging PIAs across DoD—outlining procedures to consider existing PIAs and their capabilities, in particular the ones funded by USDR&E (TechLink and MilTech), when establishing new PIAs

### 2. Develop Guidance and Facilitate Training about PIAs

STPI recommends that USDR&E coordinate with DoD entities to develop guidance and facilitate training about PIAs. STPI did not identify any off-the-shelf training courses specific to PIAs or that could address the myriad challenges identified by stakeholders in establishing and using PIAs. Guidance and training materials should address confusion in establishing and using PIAs as well as align with any revisions to the DoDI. This guidance and training should be offered to all stakeholders, including technology transfer staff across varied DoD communities, legal counsel, contracting officers, and partnership intermediaries. Guidance and training materials should be specific to the targeted stakeholder as it is likely there are challenges, procedures, interpretations, policies, and practices that are specific to each of these communities. Table 16 provides STPI's recommendations for developing professionally developed training courses for four stakeholder groups—DoD entities, legal counsel, contracting officers, and partnership intermediaries.

**Table 16. Recommended Training to Targeted Stakeholders**

| Training Description | DoD Entity | Legal Counsel | Contracting Officer | Partnership Intermediary |
|---|---|---|---|---|
| **Strategic Planning** | | | | |
| The use of PIAs synergistically with other technology transfer mechanisms and DoD or Service-level technology transfer initiatives | X | | | |
| The use of PIAs synergistically with acquisition authorities to meet strategic technology transfer goals | X | | | X |
| The development and use of decision frameworks for establishing PIAs including considerations for<br>**A.** the sufficiency of resources provided to PIAs,<br>**B.** partnership intermediary capabilities under | A,B,C | C | C | C |

| Training Description | DoD Entity | Legal Counsel | Contracting Officer | Partnership Intermediary |
|---|---|---|---|---|
| existing PIAs to meet their needs, and **C.** the strategic value proposition and expected role for the use of PIAs as compared with other technology transfer mechanisms | | | | |
| The advantages, disadvantages, and lessons learned from using PIAs for accomplishing various activities | X | X | X | X |
| **Processes for Establishing and Funding PIAs** | | | | |
| Preparing agreements and funding documents | X | X | X | X |
| Establishing the scope of activities under PIAs | X | X | X | X |
| Using funding appropriations | X | X | X | |
| **Oversight** | | | | |
| Balancing trust-based working relationships with rules for operation that govern activities under PIAs and interactions with DoD entities | X | | | X |
| Avoiding organizational complexities when possible, ensuring that activities under the PIA are not impeded | X | | | X |
| Avoiding and managing real or perceived COI situations | X | | | X |
| Oversight and management roles, including reviewing the performance of and considerations for the sunset of PIAs | X | | X | X |
| **Outreach** | | | | |
| The need and methods for disseminating PIA successes | X | | X | X |
| Understanding strategies for leveraging and coordinating with complementary technology transfer capabilities across DoD initiatives | X | X | X | X |

Note: There are likely to be differences in content and emphasis of a subject as a function of audience.

While guidance and training should not prescribe how DoD entities execute their activities, it should highlight common scenarios and questions to support the implementation of PIAs. For example, guidance and training could include the exemplar practices identified in this report with further information about their implementation, lessons learned, and case studies about their adoption for specific PIAs.

USDR&E, in coordination with DoD entities, should outline guidance and training goals to meet identified needs and strategies for their dissemination. These strategies should leverage existing avenues to disseminate guidance and conduct training, such as the

DoD and service-level workshops, which are mainly targeted to technology transfer staff with some participation from legal counsel and contracting officers. Coordinating the development of training with other targeted organizations, such DAU, may help USDR&E disseminate information to target stakeholder groups, in particular contracting officers. Other fora, such as FLC annual and regional meetings, provide opportunities to engage with partnership intermediaries. However, as repeatedly mentioned by interviewees, these existing fora may be insufficient. Rather, STPI recommends that DoD establish a training event focused specifically on PIAs for DoD and non-DoD stakeholders. For non-DoD stakeholders, this could involve an orientation for newly established and refreshers for existing partnership intermediaries.

This recommendation is not static. The drivers for and use of PIAs may evolve. Consequently, STPI recommends that USDR&E periodically reevaluate the information needs across the DoD community using or desiring to use PIAs, and revise guidance and training materials to reflect changing needs.

### 3. Encourage Sufficiently Funding Activities That Are Expected to be Performed under PIAs

STPI recommends that DoD entities sufficiently fund the activities that they expect to be performed under their PIAs. This recommendation should be considered at the outset when first establishing PIAs as well as throughout its implementation, understanding that needs under PIAs can evolve. USDR&E could encourage this practice through policy and training or guidance.

STPI identified that some partnership intermediaries receive baseline funding to support their activities. Many others are either unfunded, in particular across the Navy, or receive ad hoc project level funding. Project-based funding creates uncertainty in partnership intermediary organizations' business models. Unfunded PIAs can play a role in supporting important outreach and other connections that support DoD's technology transfer activities. In particular, unfunded PIAs can support activities in which the DoD entity is not the primary beneficiary, or in which DoD plays a smaller role in outreach that the partnership intermediary performs under their own organizational mission. However, STPI identified anecdotes of waning relationships or incomplete activities under unfunded PIAs, suggesting that funding provides a level of accountability for the partnership intermediaries and DoD in their oversight roles to accomplish their agreed upon commitments.

While recognizing that unfunded PIAs can provide contributions to DoD's technology transfer goals, STPI recommends that the strategic use of PIAs should involve sufficiently funding PIAs for the activities requested by DoD. DoD entities may wish to consider providing baseline funding, at least initially, so that partnership intermediaries, in particular those that are established as completely new organizations under a PIA, can more

effectively respond and achieve their goals. Other considerations for providing funding, as PIA relationships and needs evolve, include assessing the partnership intermediary's performance to determine continuation of baseline funding or renewal of the PIA altogether, the sustainability of their business model, and expectations for sufficiently growing their capabilities to meet DoD's needs, if that is the DoD entity's expectation to accomplish their technology transfer goals. In this regard, DoD entities' considerations for funding should include an articulation of the value proposition for the use of PIAs as justification for funding activities under PIAs. Additional considerations include having a strategic understanding of how funding PIAs and their value compares with the use of funds for other activities or mechanisms to accomplish similar goals.

### 4. Implement PIAs as a Trust-Based Relationship

DoD entities that establish PIAs should understand and implement a trust-based working relationship with partnership intermediaries. STPI identified that characteristics of this relationship include partnership intermediaries serving in proactive rather than reactionary roles and close communication so partnership intermediaries can continuously and effectively understand DoD's needs and identify opportunities to address them.

In many ways, STPI determined that, as a contract, a PIA is not substantially different from many other broad agreements and contracting mechanisms used to support R&D and technology transfer activities. However, a key element of the PIA is the trust-based relationship with DoD entities that guides the partnership intermediaries in the performance of their activities. A vital role of the trust-based relationship is that partnership intermediaries should be encouraged to be creative in thinking about and discussing opportunities that may not be on DoD's radar to advance DoD's technology transfer goals. STPI identified 15 exemplar practices in this study that related to DoD oversight. These exemplar practices may be a useful reference for DoD entities in developing a trust-based relationship with their partnership intermediaries in practice.

### 5. Strengthen the PIA Ecosystem to Enable Communication, Information Exchange, and Coordination of PIAs

STPI recommends that USDR&E enable pathways for strengthened communication, information exchange, and coordination of activities under PIAs. Greater information exchange and coordination can lead to improved leveraging of resources and capabilities offered through the 79 DoD PIAs. Various DoD or service-level coordination efforts, such as the NavalX TechBridges, are attempting to strengthen connections across relevant innovation ecosystems. Although partnership intermediaries are involved in some of these efforts, a DoD-wide initiative of this kind to specifically develop and leverage the PIA ecosystem could be worthwhile.

The coordinated development and conduct of training about PIAs can partially address the need for enhanced communication and coordination pathways across stakeholders. Other means to achieve these goals include formalizing coordination of PIAs through existing DoD-wide groups, such as the Laboratory Quality Enhancement Panel on Technology Transfer (LQEP-TT). The LQEP-TT periodically convenes DoD technology transfer staff across the services and other DoD entities on broad issues relevant to their community.

STPI recommends that USDR&E and the LQEP-TT establish an ad hoc working group on PIAs to make progress in the recommendations offered in this report, for instance, providing input on DoDI policy revisions. This new ad hoc working group could support coordinating and articulating guidance and training needs across DoD entities, and communicating and working with other stakeholders, such as partnership intermediaries, DAU, FLC, and others, as needed, to advance their goals. The ad hoc working group could establish a charter that outlines their short-term goals, expected objectives, and timelines for their accomplishment. The ad hoc working group could be formalized as a continued community of practice focused on PIAs or sunset after meeting their short-term goals, depending on the advocacy for and benefits achieved from these coordination activities.

In addition, STPI recommends that USDR&E collect, maintain, and share information about active PIAs, activities under those PIAs, and capabilities that partnership intermediaries provide through the ad hoc working group, or other means. This information could help DoD entities in their coordination efforts, to leverage existing relationships across DoD, and to enhance the network of partnership intermediaries already engaged across the Nation. This report provides the foundational information for USDR&E to begin these discussions across DoD. For instance, USDR&E's efforts for information collection and exchange could be informed by the list of active PIAs, the stakeholders identified across relevant organizations for outreach, and the categories described for the range of activities under PIAs.

### 6. Coordinate USDR&E's Technology Transfer Initiatives with Relevant Initiatives Across DoD

STPI identified a growing driver to connect traditional technology transfer activities, including spin-out engagement activities with the private sector, to spin-in goals, such as building capabilities to transition and mature ideas for mission needs. STPI identified that spin-in, spin-out, and dual-use approaches reinforce one another. There are numerous initiatives throughout DoD that support these broad technology transfer goals, including various initiatives under USDR&E, such as the DIU and NSIN, the services, and other DoD entities, such as the Defense Logistics Agency.

As such, STPI recommends that USDR&E pursue a concerted effort to align and coordinate the use of PIAs *and* broader domestic technology transfer program activities

with related initiatives throughout DoD. This recommendation extends beyond the scope of the PIA mechanism; nonetheless, it aligns with STPI's recommendation that the establishment of PIAs be thought of strategically, requiring DoD entities to assess the value of a PIA in context with broader technology transfer initiatives and activities that exist or could be used to achieve their goals.

### 7. Work with Congress to Clarify and Harmonize the PIA Authorities

STPI found that stakeholders generally lacked understanding between the two distinct legal authorities enabling the establishment of PIAs. The lack of consistency between the two authorities, in particular related to eligible DoD entities that can establish PIAs and how to fund PIAs, as well as ambiguities regarding their intent exacerbates this confusion. While USDR&E and the services can work within the bounds of the existent legislative frameworks and provide clarifications through DoD and service-level policy, there will continue to be a lack of clarity in the legal authorities unless inconsistencies in the PIA authorities are addressed and their intentions clarified. Continued inconsistencies and ambiguities have the potential to influence variations in policy, interpretation, and practice.

STPI analyzed the legislative intent of the PIA authorities to provide context for policy clarifications that USDR&E may wish to propose in this vein. Across DoD, there is disagreement among the stakeholders regarding the legislative intention for the use of PIAs, and specifically to what extent the focus in the use of PIAs is to achieve State or local economic development goals. The Title 15 PIA authority is grounded within the Stevenson-Wydler Technology Innovation Act of 1980, which is one of the seminal technology transfer laws passed in the 1980s. At the time the Act was enacted, Congress found that there was a need for a policy, to "enhance technological innovation for commercial and public purposes" and support "domestic technology transfer and utilization of the science and technology resources of the Federal Government" (15 USC 3701). Concerning the role of State and local governments, Congress found that "Federal laboratories and other performers of federally funded research and development frequently provide scientific and technological developments of potential use to State and local governments and private industry." In addition, Congress found that the Federal Government should "strive where appropriate to transfer federally owned or originated technology to State and local governments and to the private sector" (15 USC 3710). Based on these findings, Title 15 provided some of the foundational legislative authorities to support the transfer of federally funded technologies aimed to enhance the Nation's economic competitiveness and societal well-being. Throughout Congress' findings, the traditional role of technology transfer as spin-out activities is clearly described and emphasized.

However, this traditional notion of Federal technology transfer does not fully account for the specific technology transfer goals of mission-oriented agencies, such as DoD. It

also does not acknowledge the reinforcing roles of spin-out, spin-in, and dual-use activities for these agencies. Current day notions of Federal technology transfer recognize technology transfer goals include public sector consumption, such as Federal mission-oriented agencies as a consumer of new technologies (NIST 2019).

These nuances regarding the scope and interpretations of Federal technology transfer and differing mission contexts have important implications for the use of the PIA authorities. For instance, historically, the Title 15 PIA authority was established more than a decade after the Stevenson-Wydler Act was enacted. However, notably, 15 USC 3715 was an amendment under NDAA for Fiscal Year 1991 in Section 827, which was established alongside other acquisition policy amendments aimed at bolstering the defense industrial and technology base under Title VIII, Part C.

In contrast, the Title 10 authority under 10 USC 2368 was enacted through the NDAA for Fiscal Year 2019 in Section 231 to directly support DoD's RDT&E program requirements as stated under P.L. 115-232, Title II, Subtitle B. 10 USC 2368 targets industry and academic institutions. Whereas, initially 15 USC 3715 specifically targeted small businesses and was expanded a decade later to include potential collaborations with higher education institutions (P.L. 106-404).

Based on this analysis, STPI found that the intention of the two authorities, depending on the viewpoint, can be viewed as supporting State and local economic development and competitiveness goals as well as goals for mission-oriented Federal agencies, which are consumers of new technologies.

Due to inconsistencies and the differing historical context between Title 15 and Title 10 authorities, STPI recommends that USDR&E work with Congress to clarify the intention and language in the PIA authorities. Revisions could include a proposal to harmonize the authorities or consolidate them altogether such that a single authority reflects the broadest flexibilities available through both authorities. As written, 10 USC 2368 provides an additional value as compared with 15 USC 3715 by expanding the potential partners beyond small businesses to industry more broadly. However, STPI did not find that these legal provisions were necessarily reflected in practice, as PIAs established under 15 USC 3715 generally did not limit their engagements to small businesses.

There is an advantage for DoD to maintain 10 USC 2368 because it may make it more feasible for Congress to amend the statute in the future. If USDR&E and Congress determine STPI's findings compelling, they may consider amending 10 USC 2368 such that it outlines

1. Clarification on the intent of the authority, for instance goals expected to be achieved through the State and local affiliation requirements for partnership intermediaries,

2. DoD entities eligible to establish PIAs extend beyond Center for Science, Technology, and Engineering to align with the DoD entities that apply under 15 USC 3715,
3. the types of activities allowed under PIAs include facilitating R&D, prototyping, and STEM education and workforce development, with the intent that these and other efforts under PIAs are aligned with DoD's technology transfer goals, and
4. funds provided under PIAs can come from any funding account, including RDT&E and O&M, as appropriate, based on the requested activities.

# Appendix A.
# Study Questions

This appendix provides STPI's study questions, including study topic, high-level, and detailed study questions that guided this analysis.

**Table A-1. Study Questions**

| Study Topic | Study Questions | |
|---|---|---|
| | **High-Level** | **Detailed** |
| 1.0 DoD Policy Landscape | 1.1 What is the policy context for establishing PIAs? | 1.1.1 What is the legislative authority for PIAs? |
| | | 1.1.2 What is the historical intent of the legislative authority for PIAs? |
| | | 1.1.3 What DoD policies exist on technology transfer and PIAs? At the USDR&E-level, Service-level, and Lab- or Test and Engineering Facility-level? |
| | | 1.1.4 How has the policy landscape evolved over time? In terms of eligible DoD-entities? Etc. |
| 2.0 DoD and Other Federal PIA Landscape | 2.1 What is the PIA landscape across DoD? | 2.1.1 To what extent have DoD entities established PIAs? |
| | | 2.1.2 To what extent have DoD entities established comparable entities? |
| | | 2.1.3 For what purposes have DoD entities established PIAs or comparable entities? |
| | | 2.1.4 How has the landscape of DoD PIAs and comparable entities evolved over time? |
| | | 2.1.5 What types of activities do DoD partnership intermediaries perform? |
| | | 2.1.6 How have DoD partnership intermediary activities evolved over time? |
| | | 2.1.7 To what extent are State and local governments involved in partnership intermediary activities? |
| | | 2.1.8 To what extent are industry and other partnering organizations involved in partnership intermediary activities? |
| 2.0 DoD and Other Federal PIA Landscape (cont.) | 2.2 What is the PIA landscape across other Federal (non-DoD) agencies? | 2.2.1 To what extent have other Federal (non-DoD) agencies established PIAs? |
| | | 2.2.2 How has the landscape of other Federal (non-DoD) agency PIAs evolved over time? |
| | | 2.2.3 For what purposes have other Federal (non-DoD) agencies established PIAs? |

| Study Topic | Study Questions | |
|---|---|---|
| | **High-Level** | **Detailed** |
| | | 2.2.4 What types of activities do other Federal (non-DoD) agency partnership intermediaries perform? |
| | | 2.2.5 How have other Federal (non-DoD) agency partnership intermediary activities evolved over time? |
| | 2.3 How do PIAs across the Federal Government compare with one another? | 2.3.1 To what extent are PIAs across the Federal Government different or similar? |
| 3.0 DoD PIAs in Context with Broader Technology Transfer Activities | 3.1 What is the technology transfer landscape across DoD? | 3.1.1 What DoD entities (e.g., laboratories, Services, Defense Agencies, Combatant Commands) have science, technology, and technology transfer activities? |
| | | 3.1.2 In what types of technology transfer activities do DoD entities engage? |
| | | 3.1.3 For what purposes (including expected outputs or outcomes) do DoD entities engage in technology transfer activities? |
| | | 3.1.4 How do DoD entities expect these activities to lead to the expected outputs or outcomes? |
| | | 3.1.5 How do DoD entities expect technology transfer activities provide value to the DoD mission? |
| | 3.2 How do PIA functions compare with other similar technology transfer activities and functions? | 3.2.1 What other mechanisms exist for DoD entities to accomplish similar activities or PIA functions? |
| | | 3.2.2 To what extent have DoD entities considered other means to accomplish similar activities? |
| | | 3.2.3 Why were PIAs selected over other options available to accomplish similar activities? |
| | | 3.2.4 What are the expected benefits of PIAs compared with other options to accomplish similar activities? |
| 4.0 DoD PIA Oversight | 4.1 To what extent does DoD oversee partnership intermediaries? | 4.1.1 How does DoD oversee partnership intermediary activities? |
| | | 4.1.2 What metrics are used to evaluate performance of partnership intermediaries? |
| | | 4.1.3 To what extent are formal reviews conducted to review partnership intermediary activities? |
| | | 4.1.4 What actions are taken as a result of the reviews? |
| | | 4.1.5 How are partnership intermediary activities overseen throughout the execution of the PIA? |
| 5.0 DoD PIA in Context with Policy | 5.1 To what extent do partnership intermediary activities and processes align with those | 5.1.1 To what extent do partnership intermediary activities align with roles and processes outlined in legislation? |
| | | 5.1.2 To what extent do partnership intermediary activities align with roles and processes outlined in DoD policies? |

| Study Topic | Study Questions | |
|---|---|---|
| | **High-Level** | **Detailed** |
| | provided in policy? | |
| 6.0 DoD PIA Outputs, Outcomes, and Performance | 6.1 To what extent have PIAs and intermediary activities performed as expected? | 6.1.1 To what extent have partnership intermediary activities led to expected outputs or outcomes? |
| | | 6.1.2 To what extent have partnership intermediary activities provided value to the DoD mission? |
| | | 6.1.3 To what extent are DoD entities satisfied with the functions and performance of partnership intermediaries? |
| | | 6.1.4 To what extent are partnership intermediaries satisfied with DoD processes and oversight? |
| | 6.2 How does the performance of DoD entities with PIAs compare with those without PIAs? | 6.2.1 To what extent do DoD entities with PIAs achieve improved outputs or outcomes than those without PIAs? |
| | | 6.2.2 To what extent do DoD entities with PIAs achieve improved value to DoD mission than those without PIAs? |
| | 6.3 How does performance of partnership intermediaries compare with other similar technology transfer activities or functions? | 6.3.1 To what extent do partnership intermediaries accomplish their activities better than other options available to DoD entities to accomplish similar activities or functions? |
| 7.0 Suggestions for Improvement | 7.1 How can PIA policy, functions, performance, and evaluation be improved? | 7.1.1 What are suggestions to improve policy? |
| | | 7.1.2 What are suggestions to improve processes and practice? |
| | | 7.1.3 What are suggestions to improve overall performance in achieving expected outputs, outcomes, or value to DoD mission? |
| | | 7.1.4 What are suggestions to improve the evaluation of PIAs? |

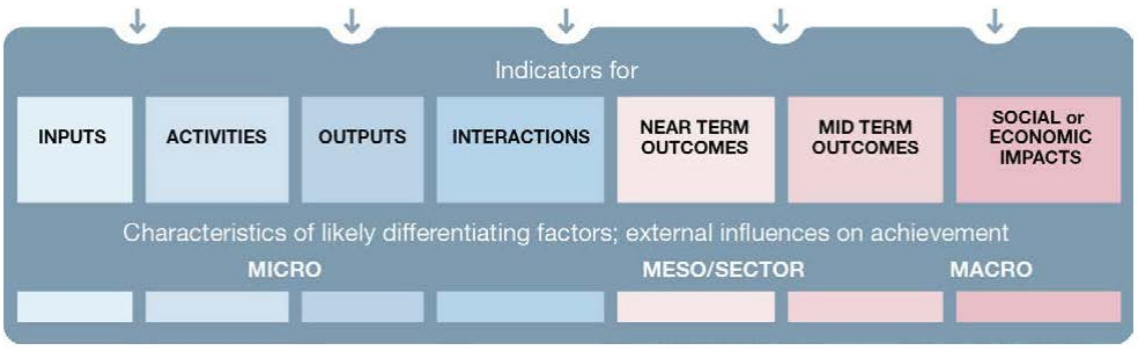
# Appendix B.
# Logic Model for DoD's PIAs

STPI developed a logic model to inform our understanding of DoD's PIAs, including the relationships among resources, activities, outputs, and outcomes derived through the use of PIAs. It provides a concise way to communicate the scope of activities pursued under PIAs. The logic model also provides a common understanding of (1) outputs achieved from the activities under PIAs and (2) how those outputs contribute to expected near-term outcomes, mid-term outcomes, and long-term impacts. This appendix provides background on logic models to provide the reader with context on its use and describes STPI's logic model for DoD's PIAs. The logic model may also provide a useful reference for DoD entities and other relevant stakeholder in providing a greater understanding of the activities and roles of partnership intermediaries and their expected near-term outcomes, considering how the PIAs contribute to strategic mid and long-term outcomes.

## Background

Classically, logic models relate inputs, resources, and activities to outputs, outcomes, and impact (Figure B-1). More specifically, a logic model can be defined as: "a systematic and visual way to present and share your understanding of the relationships among the resources you have to operate your program, the activities you plan, and the changes or results you hope to achieve" (W.K. Kellogg Foundation 2004). The logic model approach provides STPI with a framework to understand the use of PIAs, for instance, by:

- Communicating what resources, including people, facilities, and funding dedicated to the use of PIAs, are used to help achieve long-term impacts; and
- Describing the programmatic implementation of activities conducted by DoD laboratories and the PIAs to achieve those impacts.




Source: American Evaluation Association 2015

**Figure B-1. A Logic Model Framework**

## STPI's Logic Model for PIAs

Typically, logic models are developed for a specified program. In this case, the development of a logic model was challenging given that PIAs are used across many technology transfer programs implemented across DoD services, laboratories, and other DoD entities. For this reason, STPI developed a PIA logic model that represented an inclusive set of activities implemented across DoD. This means that a single DoD service or laboratory may not conduct the entire set of activities outlined in the logic model; rather, the logic model is intended to represent the entire breadth of PIA-related activities across DoD.

Defining the scope of technology transfer in context with DoD's mission was important in developing the logic model. For the purposes of the concept model, STPI broadly defined Federal technology transfer following the definition used in NIST's Green Paper (NIST 2019):

> In the context of Federal activities, technology transfer often refers to the movement of knowledge and results—such as products, techniques, tools, data, and inventions—from intramural Federal R&D out of laboratories and into practical application. Given that about two-thirds of Federal R&D expenditures support research by non-Federal scientists and engineers, technology transfer, for the purposes of this Green Paper, also encompasses the activities of these extramural partners. In addition, throughout this Green Paper, "**the process by which existing knowledge, facilities, or capabilities developed under Federal R&D funding are used to fulfill public and private need" is referred to as technology transfer.**" (emphasis added)

In the context of DoD's mission to "provide the military forces needed to deter war and to protect the security of our country" (DoD n.d.a), technology transfer activities include both spin-out and spin-in approaches. DoD's technology transfer function includes spin-off and spin-on approaches working in parallel to further mature technologies that originate within DoD entities or external to DoD in the private sector to fulfill DoD's needs.

In terms of spin-out, DoD's technology transfer objectives include strengthening and growing the capabilities of the defense industrial base, including large and small companies supplying the array of innovations and technologies to the DoD in support of its mission. In terms of spin-in, DoD's technology transfer objectives include identifying the best solutions to strengthen its RDT&E capabilities and their application to increase the effectiveness and efficiency of the DoD mission.

The logic model depicted in Figure B-2 identifies the programmatic activities related to the use of PIAs, describing the inputs, activities, outputs, near-term outcomes, mid-term outcomes, and impacts on the DoD mission. For the latter two elements—mid-term outcomes and impacts on the DoD mission—the attribution to PIAs is complex and indirect. As such, STPI focused its study, in particular its analysis of performance, on near-term outcomes recognizing that the attribution of mid-term outcomes and impacts to PIAs was limited by the lack of centralized information and complexities in achieving these mid-term outcomes and impacts.

- Inputs—include
  - DoD policies, priorities, and programs relevant to PIAs as well as those guiding the broader technology transfer programs across DoD
  - DoD funding, in particular funding for performing the technology transfer function
  - DoD laboratories, test and engineering centers, and other entities establishing PIAs, typically through a technology transfer capability such as an Office of Research and Technology Applications (ORTA), and their researchers
  - Partnership intermediary organizations and their stakeholders, including industry and small businesses, universities and other education institutions, and the State and local governments
- Activities—include
  - USDR&E activities in establishing DoD-wide policies, guidance, and oversight of the domestic technology transfer program, which includes use of PIAs
  - ORTAs and other technology transfer staff that identify the needs for and establish PIAs, provide information to PIAs related to RDT&E activities, and execute strategic technology transfer activities based on the DoD laboratory or entity's needs
  - Partnership intermediary activities, such as providing analysis, identifying potential connections between DoD laboratories and the partnership

intermediary's stakeholders, as well as providing STEM and entrepreneurial training and advice to small businesses and education institutions

  - Informal and formal sharing and networking to exchange information and best practices related to PIAs

- Outputs—include tangible and intangible results from the activities, such as
  - Analyses, including technology assessments, among other deliverables provided by the partnership intermediary
  - Generated leads to people or organizations that have the potential to result in new relationships (e.g., for licensing patents, collaborations, funding opportunities)
  - Strategies developed and executed to attract parties interested in working with DoD
  - Prototypes and other early stage products developed for further testing and validation produced from the connections made or other direct support, such as guidance and funding, provided by the partnership intermediary
  - STEM education or workforce training materials
  - Other informational materials produced through informal and formal networking
- Near-Term Outcomes—include
  - Increased ORTA and technology transfer capacity for performing spin-on and spin-off activities
  - Greater partner satisfaction and willingness to work with DoD
  - Increased relationships between ORTAs or technology transfer staff and their innovation ecosystem stakeholders
  - Successfully matched interests between the ORTA or technology transfer staff and their innovation ecosystem stakeholders
  - Increased public awareness of DoD's needs, how to work with DoD, and DoD's role in providing RDT&E resources in State and local economies and innovation ecosystems
  - Greater coordination of DoD and relevant State and local innovation ecosystem activities, for instance by leveraging partnership intermediary's activities conducted beyond the PIA as part of its broader mission to support State or local economic development
- Mid-Term Outcomes—include

  - Effective and efficient use of technology transfer mechanisms, such as collaborative agreements, follow-on technology maturation funding, and acquisition of technologies
  - Technologies that are matured sufficiently for fielding and applied in the performance of the DoD mission
  - Strengthened DoD's capabilities for rapid RDT&E to mature, develop, and acquire technologies for operational use
  - Strengthened defense industrial base and its capabilities
  - Large- and small-business development, in particular through entrepreneurial training and start-up incubation or acceleration activities
  - Increased reputation of DoD among innovation ecosystem stakeholders
  - Growth of a cadre of experts, in particular in communities local to DoD laboratories and entities, supporting RDT&E and technologies of interest to DoD
  - Attraction of new businesses and their resources to State or local communities, developed through the relationships with the DoD laboratory or entity
  - Leveraged resources across innovation ecosystem stakeholders
  - Development of the DoD science, technology, engineering, and mathematics (STEM) pipeline, including the successful attraction and hiring of the next generation STEM talent
- Impacts—include two impacts specific to DoD (first two bullets), and broader socioeconomic impacts (last three bullets):
  - Successful wide-scale adoption of new and improved technologies applied in the performance of the DoD mission
  - Effective and efficient performance of the DoD mission
  - New or strengthened innovation ecosystems, of which DoD laboratories and entities are a part
  - State and local economic growth, of which DoD benefits from the strong economic conditions that bolster a robust industrial base and attract highly qualified workers
  - Strengthened STEM education and workforce, of which DoD benefits from the production of highly qualified workers, in particular near communities local to the DoD laboratories and entities.

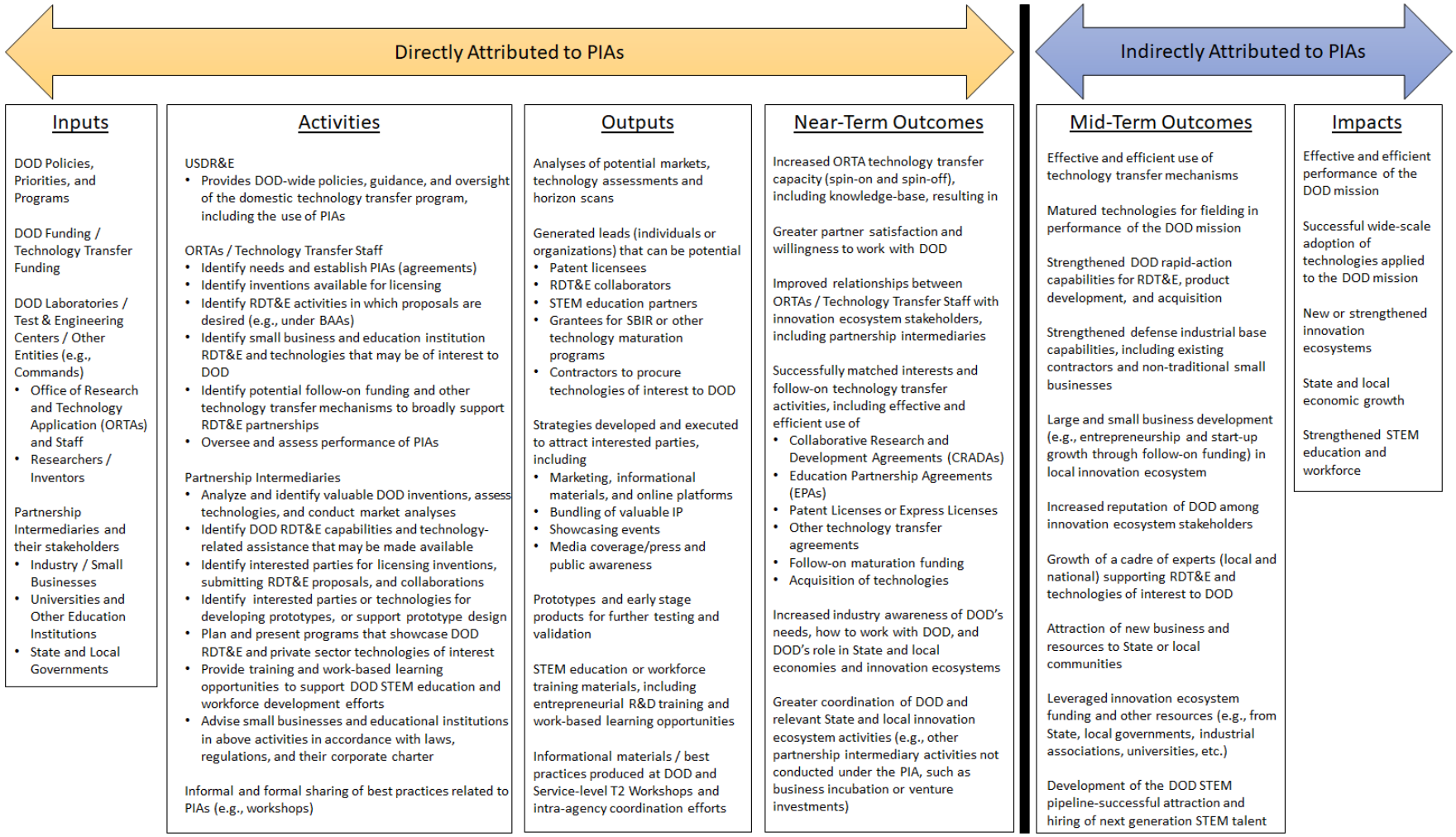



**Figure B-2. PIA Logic Model**

# Appendix C.
# Identification of Relevant Solicitations

This appendix describes the process to identify and analyze public solicitations related to PIAs. STPI used the website https://beta.sam.gov, which is an online platform for Federal agencies to publish solicitations. STPI identified this platform as a source of information to search for past and current partnership intermediaries across the Federal Government.

STPI searched the following keywords: "partnership intermediary," "partnership intermediary agreement," "15 U.S. Code § 3715," and "10 U.S. Code § 2368." STPI limited the analysis to the first 100 results for each query. STPI decided on this threshold for scoping the analysis after observing a decrease in the number of relevant solicitations identified after 100 results. STPI excluded from the analysis any solicitations from the results that did not contain the keywords.

STPI collected the following information about the solicitation: the notice identification number; title; the corresponding Federal department, agency, sub-department, and office; the date published; the date it became inactive; if active; if competitive; the recipient organization; and the description. The solicitations dataset was supplemented with other solicitations that STPI separately received from DoD staff through the interview process. Table C-1 provides the results of STPI's solicitation search, which identified 48 relevant solicitation announcement. STPI also categorized the solicitations based on the following purposes:

- To establish a PIA—including requests for information (RFIs), requests for proposals (RFPs), and broad agency announcements (BAAs) (25 solicitations)
- To support activities under a PIA—including support for events and collaboration spaces, for instance through the use of enhanced use leases (21 solicitations)
- To award sole source funding—including announcements that identified the partnership intermediary, the intent to sole source the PIA or activity under a PIA (2 solicitations)

**Table C-1. Summary of 48 Federal Solicitation Announcements Relevant to PIAs**

| Purpose | Agency | Office / Service | Announcement Title | Year Published |
|---|---|---|---|---|
| To establish a PIA | DoD | Army | R--Partnership Intermediary | 2004 |
| | DoD | Navy | R--Technology Transfer and Acceleration Support | 2011 |
| | DoD | Army | A--Request For Information: Partnership Intermediary Agreement (PIA), under the authority of 15 U.S.C. 3715, with a Partnership Intermediary to provide services for Army Research Laboratory (ARL) | 2014 |
| | DoD | SOCOM | USSOCOM Partnership Intermediary Agreement | 2015 |
| | DoD | Navy | Intent To Establish Government & Partnership Intermediary Support | 2016 |
| | DoD | Air Force | RFI - Air University (AU) USAF Collaboration for “Next Generation Technology Collaboration” | 2017 |
| | DoD | Air Force | RFI - Air University (AU) USAF Collaboration for “Next Generation Technology Collaboration” | 2017 |
| | DoD | Army | AMRDEC PIA | 2017 |
| | DoD | Army | RFI for ERDC Partnership Intermediary Agreement (PIA) | 2017 |
| | DoD | Army | RFI for ERDC Partnership Intermediary Agreement (PIA) | 2017 |
| | DoD | Army | RFI for ERDC Partnership Intermediary Agreement (PIA) | 2017 |
| | DoD | CYBERCOM | USCC Partnership Intermediary Agreement | 2017 |
| | DoD | Navy | Partnership Intermediary Agreement | 2017 |
| | DoD | Navy | Gruntworks Partnership Intermediary Agreement | 2017 |
| | DHS | Office of Procurement Operations | RFI For Technology Transfer And Commercialization | 2017 |
| | DoD | Air Force | Partnership Intermediary Agreements Concerning Improving Technology Transfer and Non-traditional Defense Industry Engagement | 2019 |
| | DoD | Army | Request For Information: Partnership Intermediary Agreement (PIA), | 2019 |
| | DoD | DARPA | Partnership Intermediary Agreements Concerning Improving Technology Transfer and Non-traditional Defense Industry Engagement | 2019 |

| Purpose | Agency | Office / Service | Announcement Title | Year Published |
|---|---|---|---|---|
| To establish a PIA (cont.) | DoD | SOCOM | Partnership Intermediary Agreement (PIA) with USSOCOM | 2019 |
| | DoD | Army | RFI for Combat Capabilities Development Command (CCDC) Data and Analysis Center (DAC) Partnership Intermediary Agreement (PIA) | 2020 |
| | DoD | Army | RFI for Combat Capabilities Development Command (CCDC) Data and Analysis Center (DAC) Partnership Intermediary Agreement (PIA) | 2020 |
| | DoD | Army | Partnership Intermediary Agreements Concerning Improving Technology Transfer and Non-traditional Defense Industry Engagement | 2020 |
| | DHS | Office of Procurement Operations | Partnership Intermediary Agreements Concerning Improving Technology Transfer and Commercialization of Technology for the Homeland Security Enterprise | 2020 |
| | DoD | Navy | NAWCAD-BAA-070314 | 2014 |
| | DoD | Navy | BAA –Establishment Of Partnership Intermediary Agreements To Support NAVAIR/NAWCAD Technology Transfer Efforts | 2017 |
| | DoD | Army | Request For Developer Applications For an Enhanced Use Leasing Initiative | 2004 |
| To support activities under a PIA | DoD | DMEA | Technology Transfer Program | 2012 |
| | DoD | Navy | R--Technology Transfer and Acceleration Support | 2012 |
| | DoD | Air Force | Basic Research-Small Business Interchange Day | 2013 |
| | DoD | Navy | NAWCAD-BAA-070314 | 2014 |
| | DOC | NIST | NIST/NCCoE FFRDC Industry Day | 2014 |
| | DoD | SOCOM | Industry Exchange Fellowship | 2016 |
| | DoD | Army | Capability Collaboration Event: Next Generation Identification And Awareness Technologies | 2018 |
| | DoD | Army | Capability Collaboration Event: Next Generation Identification And Awareness Technologies | 2018 |
| | DoD | Army | Capability Collaboration Event: Next Generation Identification And Awareness Technologies | 2018 |
| | DoD | Army | Capability Collaboration Event: Next Generation Identification And Awareness Technologies | 2018 |
| | DoD | Army | Capability Collaboration Event: Next Generation Identification And Awareness Technologies | 2018 |

| Purpose | Agency | Office / Service | Announcement Title | Year Published |
|---|---|---|---|---|
| To support activities under a PIA (cont.) | DoD | Army | Capability Collaboration Event: Next Generation Identification And Awareness Technologies | 2018 |
| | DoD | Army | Capability Collaboration Event: Next Generation Identification And Awareness Technologies | 2018 |
| | DoD | Army | Capability Collaboration Event: Next Generation Identification And Awareness Technologies | 2018 |
| | DoD | Army | Capability Collaboration Event: Next Generation Identification And Awareness Technologies | 2018 |
| | DoD | Army | Capability Collaboration Event: Next Generation Identification And Awareness Technologies | 2018 |
| | DoD | Navy | Inventions Available for Licensing | 2019 |
| | DoD | Navy | Inventions Available for Licensing | 2019 |
| | DoD | SOCOM | SOFWERX Collider Event 2019: Scouting for Industry Solutions | 2019 |
| | DoD | Navy | AIRWorks Mi2 Expeditionary UAS Technology Demonstration | 2020 |
| To award sole-source funding | DoD | Army | D--Manuf Science | 2005 |
| | DoD | Army | A--Intent to Award a Section 845 Prototype Other Transaction Agreement | 2014 |

# Appendix D.
# Semi-Structured Interviewees and Discussion Guides

This appendix provides a list of interviewee organizations and the discussion guides used to conduct semi-structured interviews. STPI conducted interviews with DoD entities establishing PIAs, partnership intermediaries, and other Federal stakeholders previously establishing PIAs. STPI interviewed more than 109 individuals: 48 from 33 DoD entities, 58 across 28 partnership intermediaries, and 3 from 3 other Federal organizations.

Interviewees from DoD entities included technology transfer staff, general counsel, contracting officers, and other program managers that were involved in establishing PIAs. Interviewees from partnership intermediaries included corporate leadership (e.g., president or founder, program managers, public affairs, and other staff related to the activities under their PIAs). Two interviewees from other Federal organizations were involved in establishing PIAs at their agencies.

**Table D-1. DoD Entities Interviewed**

| Organizations | Interview Date |
|---|---|
| **Air Force** | |
| Air Force General Counsel | 3/26/2020 |
| Air Force Global Strike Command | 5/4/2020 |
| Air Force Research Laboratory, Air Force Office of Scientific Research (AFOSR) | 4/28/2020 |
| Air Force Research Laboratory, Kirtland Air Force Base | 4/13/2020 |
| Air Force Research Laboratory, Wright Patterson Air Force Base | 6/3/2020 |
| Air Force Research Laboratory, Judge Advocate | 5/14/2020 |
| Air University, Maxwell Air Force Base | 4/28/2020 |
| United States Air Force Academy | 4/29/2020 |
| US Air Force Materiel Command, Wright Patterson Air Force Base | 5/7/2020 |
| **Army** | |
| Army Aviation and Missile Center | 5/19/2020 |
| Army Research Laboratory | 4/6/2020 |
| U.S. Army Corps of Engineers | 4/27/2020 |
| U.S. Army Corps of Engineers, Engineering Research and Development Center | 4/27/2020 |

| Organizations | Interview Date |
|---|---|
| U.S. Army Headquarters | 3/19/2020 |
| U.S. Army Medical Research and Development Command | 5/1/2020 |
| **Navy** | |
| Naval Air Warfare Center Training Systems Division | 4/14/2020 |
| Naval Air Warfare Center Aircraft Division, Patuxent River | 1/0/1900 |
| Naval Facilities Engineering and Expeditionary Warfare Center | 5/20/2020 |
| Naval Information Warfare Center (NIWC) Atlantic | 4/10/2020 |
| Naval Information Warfare Center (NIWC) Pacific | 3/10/2020 |
| Naval Surface Warfare Center (NSWC), Corona Division | 5/21/2020 |
| Naval Surface Warfare Center (NSWC), Crane Division | 3/30/2020 |
| Naval Surface Warfare Center (NSWC), Port Hueneme Division | 4/24/2020 |
| Naval Undersea Warfare Center (NUWC), Division Keyport | 3/27/2020 |
| Naval Undersea Warfare Center (NUWC), Division Newport | 4/17/2020 |
| Navy General Counsel | 5/5/2020 |
| Navy Headquarters | 3/4/2020 |
| Portsmouth Naval Yard | 5/7/2020 |
| TechBridge Keyport | 3/27/2020 |
| **Other** | |
| National Geospatial Intelligence Agency | 6/1/2020 |
| Office of the Undersecretary for Defense (Research & Engineering), Office of Defense Laboratories and Personnel | 4/15/2020 |
| U.S. Special Operations Command | 6/2/2020 |
| United States Cyber Command | 6/4/2020 |

**Table D-2. Partnership Intermediaries Interviewed**

| Organization | Interview Date |
|---|---|
| Catalyst Campus for Technology & Innovation | 5/13/2020 |
| Center for Technology, Research and Commercialization | 4/29/2020 |
| Cyber Innovation Center | 5/1/2020 |
| DEFENSEWERX | 5/11/2020 |
| DEFENSEWERX - Doolittle Institute | 4/14/2020 |
| DEFENSEWERX - ERDCWERX | 4/27/2020 |
| DEFENSEWERX - MGMWERX | 5/15/2020 |
| DEFENSEWERX - SOFWERX | 5/26/2020 |
| Energetics Technology Center | 5/4/2020 |
| FirePoint Innovations Center | 6/15/2020 |
| Georgia Tech Applied Research Corporation | 5/21/2020 |
| Griffiss Institute | 4/8/2020 |
| Maryland Innovation and Security Institute | 5/26/2020 |
| Maryland Technology Development Corporation | 5/27/2020 |
| MilTech | 4/20/2020 |
| Mississippi Enterprise for Technology, Inc. | 5/29/2020 |
| National Security Innovation Network | 6/3/2020 |
| New Mexico Tech Institute | 4/23/2020 |
| New York State Technology Enterprise Corporation | 4/30/2020 |
| Purdue Foundry | 4/22/2020 |
| RTI International | 5/22/2020 |
| TechLink | 4/7/2020 |
| Torrent Ventures | 3/10/2020 |
| University of Rhode Island | 6/1/2020 |
| Virginia Tech Applied Research Corporation | 5/11/2020 |
| Virginia Tech Applied Research Corporation - Basic Research Innovation & Collaboration Center | 4/27/2020 |
| Wright Brothers Institute | 5/12/2020 |
| Wright State Applied Research Corporation | 4/3/2020 |

**Table D-3. Other Federal Organizations Interviewed**

| Organization | Interview Date |
|---|---|
| Federal Lab Consortium for Technology Transfer | 2/27/2020 |
| US Dept. of Agriculture/Agricultural Research Service | 4/22/2020 |
| U.S. Senate, Senate Armed Services Committee | 6/16/2020 |

## Discussion Guide for DoD Laboratory or Entity Interviews

Date of interview:

Name(s) of interviewers:

Name(s)/Position(s) of interviewee:

Agency/office:

Type of interview: ____ In-person ____ Phone

STATEMENT OF INFORMED CONSENT

Thank you for taking the time to have a discussion with us about our study. Let me start out by providing you with context regarding our study and our questions for this interview.

The Office of the Undersecretary of Defense for Research and Engineering asked the IDA Science and Technology Policy Institute (STPI) to conduct a study on DoD's partnership intermediary agreements (which we are calling "PIAs"). The objectives of the study are to (1) provide a landscape of the PIAs established and partnership intermediaries engaged across DoD entities, (2) identify best practices in the processes to establish PIAs and the functions performed by partnership intermediaries, and (3) assess the value of those functions to technology transfer outcomes and DoD mission.

We will ask you some questions about your perspectives on how your organization uses partnership intermediaries, including their functions, roles, and outcomes, your experiences with the processes to establish PIAs, and general observations about how DoD uses partnership intermediaries. In our study documentation, your name and organizational affiliation will be identified. For all other purposes of our study, the information you provide us will be for non-attribution, meaning we will not quote or identify the source of the information in our findings (unless you provide us the consent to do so). Is this all right?

We plan to audio-record our conversation only for note-taking purposes and to ensure that we accurately capture and can access the information you provide to us throughout the study. We will delete all recordings after the completion of the study. If you'd like to tell us something that you would not like included in our study, feel free to do so and we will stop recording and writing until you tell us that we can start again.

**Background**

1. Can you describe your role at your organization, including how long you have been in your role?
2. For our context, could you describe in what TRL levels your organization works?
3. How large is your office supporting technology transfer? How many full time equivalents does that represent?
4. When did your organization first establish a PIA?
5. How did you learn about PIAs?
6. How has your organization's PIA landscape evolved? How many have you had? How many and which ones are active?
7. What were the drivers for establishing your PIAs?
8. Can you describe the state or local government affiliation of your PIAs?
9. To what extent are your PIAs affiliated with universities, for profit corporations, or other organizations?

**Policy Landscape**

10. How do you interpret the legislative intent of the PIA authority? What do you view to be the benefits of PIAs (as a mechanism) and why the authority was established?
11. How has the DoD policy landscape evolved over time?
12. What challenges have you experienced regarding policies generally?
13. What is your viewpoint on the eligibility of DoD entities that can establish PIAs? What other organizations do you think would like to establish PIAs? Why?
14. What suggestions might you have for improving policy?

**DoD PIA Landscape**

15. In your opinion, how has the landscape and functions of DoD PIAs evolved over time?
16. In your opinion, how do your PIAs compare with other DoD PIAs?
17. To what extent do your partnership intermediaries interact with other DoD partnership intermediaries?
    a. Which ones? How and why?
    b. What suggestions might you have for improving information exchange and building the network of PIAs across DoD? To what extent do you see value in this?
18. How do national level PIAs compare and interact with local PIAs your organization has established?

**Business Model**

19. How much funding do you provide your PIAs?
    a. Why do you fund your PIAs (vs. unfunded PIAs)?
    b. Through what mechanisms do you provide this funding?
    c. How has your funding changed over time?
    d. To what extent do you believe the PIA is sufficiently funded for its activities?
20. To what extent do your partnership intermediaries receive other funding from DoD? the Federal Government? Industry? Universities? Others?
    a. To what extent do you find value in these funding streams supporting the partnership intermediary functions?
    b. To what extent are conflicts of interest (COI) a concern? How are these managed?

**PIA Functions**

21. What are your PIAs' specific functions?
    a. Describe their role in spin out? Describe their role in spin in? What fraction of their efforts applies to each?
    b. Do PIAs fund R&D in any way?

22. To what extent do the partnership intermediaries perform activities beyond those outlined in their PIAs? How do you think these activities align with their PIA roles?

**Challenges**

23. What challenges do you face in working with your PIAs?

**Best Practices and Lessons Learned**

24. What are any best practices or lessons learned related to working with your PIAs?
25. What are your suggestions for how DoD can help improve your ability to work with your PIAs?

**Interaction with Stakeholders**

26. Do your partnership intermediaries interact with stakeholders locally in laboratory communities? Or nationally? Or both?
27. How do your partnership intermediaries interact with DoD stakeholders – e.g., ORTA staff and DoD researchers?
28. How do your partnership intermediaries interact with other stakeholders – e.g., Small businesses? Educational institutions? State and local governments? Other affiliated organizations?

**PIA Process**

29. Can you describe the process of establishing a partnership intermediary?
    a. Were the PIAs competed?
    b. How was the scope of work decided? To what extent has the scope of work changed over time?
30. To what extent was establishing the PIA an efficient process? What challenges did you experience?
31. How can the process be improved?

**Value Add and Potential**

32. Why have you pursued a PIA to perform the activities required rather than just contracting with the organization for these services (without a PIA)?
33. Why do you believe some DoD entities are NOT establishing PIAs? What do you suggest could help those entities use PIAs?
34. What activities are your partnership intermediaries NOT doing but could perform to enhance your laboratory's and DoD missions?
    a. Why are they not being asked to perform such activities?
    b. To what extent have you suggested that they could perform such activities?
35. Are you aware if your PIAs are performing services for other DoD labs or entities? Who?
36. Do you have any other suggestions for improving the use of PIAs across DoD?

**Broader Technology Transfer Landscape**

37. How do your partnership intermediaries activities fit and align with broader DoD technology transfer initiatives, such as SBIR/STTR programs?
38. As part of your broader technology transfer activities, do you collaborate with other organizations performing similar functions as a partnership intermediary?

**Oversight**

39. Can you describe your administrative and technical oversight of your partnership intermediaries' activities?
    a. How do you communicate with your partnership intermediaries?
    b. How did/do you review the partnership intermediary's eligibility (state or local affiliation)?
    c. To what extent do they operate somewhat autonomously?
40. What challenges have you experienced in performing your oversight role?
41. Do you have suggestions on ways to improve your or broadly DoD's oversight activities?

**Performance**

42. Can you describe what success looks like for a partnership intermediary?

43. In your opinion, how effective are your partnership intermediaries in achieving success? Why?
    a. What challenges do they experience?
    b. What suggestions do you have for resolving those challenges?
44. How do you evaluate performance of your partnership intermediaries?
    a. What specific deliverables are evaluated and how?
    b. How do you assess their value to DoD's mission?
    c. How do you monitor and communicate their successes?
    d. Are there any evaluation metrics, reports, and the like that you could share?
45. [If no reviews] To what extent do you suggest there should be formal reviews? Why or why not?
    a. How could DoD improve monitoring or tracking performance of partnership intermediaries?
    b. What critical information do you believe would be useful for DoD to collect to track performance of partnership intermediaries?
    c. How could DoD performance reviews be conducted to help improve partnership intermediaries activities?

**Other**

46. Do you have any other recommendations to facilitate the use PIAs or enhance partnership intermediary activities?
47. Can you suggest additional questions that would be helpful for our study to answer?
48. Is there anyone else that you suggest that we speak with?
49. What other information resources do you think would be helpful for our study?

## Discussion Guide for Partnership Intermediary Interviews

Date of interview:

Name(s) of interviewers:

Name(s)/Position(s) of interviewee:

Agency/office:

Type of interview: ____ In-person ____ Phone

STATEMENT OF INFORMED CONSENT

Thank you for taking the time to have a discussion with us about our study. Let me start out by providing you with context regarding our study and our questions for this interview.

The Office of the Undersecretary of Defense for Research and Engineering asked the IDA Science and Technology Policy Institute (STPI) to conduct a study on DoD's partnership intermediary agreements (which we are calling "PIAs"). The objectives of the study are to (1) provide a landscape of the PIAs established and partnership intermediaries engaged across DoD entities, (2) identify best practices in the processes to establish PIAs and the functions performed by partnership intermediaries, and (3) assess the value of those functions to technology transfer outcomes and DoD mission.

We will ask you some questions about your perspectives at your partnership intermediaries, including their functions, roles, and outcomes, as well as your experiences with DoD PIA processes or general observations about how DoD uses partnership intermediaries. In our study documentation, your name and organizational affiliation will be identified. For all other purposes of our study, the information you provide us will be for non-attribution, meaning we will not quote or identify the source of the information in our findings (unless you provide us the consent to do so). Is this all right?

We plan to audio-record our conversation only for note-taking purposes and to ensure that we accurately capture and can access the information you provide to us throughout the study. We will delete all recordings after the completion of the study. If you'd like to tell us something that you would not like included in our study, feel free to do so and we will stop recording and writing until you tell us that we can start again.

**Background**

1. Can you describe your role at your organization, including how long you have been in your role?
2. How large is your professional staff? How many full time equivalents does that represent?
3. When was your organization established?
4. Did your organization exist prior to being a PIA? If so, how have your mission, vision, and functions changed after becoming a PIA?
5. In what way are you affiliated with a state and local government?
6. To what extent are you affiliated with universities, for profit corporations, or other organizations?
7. For what DoD or Federal entities are you a partnership intermediary?
    a. When did you become a partnership intermediary with those organizations?
    b. Has / have the PIA(s) been renewed? Have any not been renewed, and, if so, why?
    c. What is / has been the period of performance?
8. What were the drivers for establishing your PIA(s)?

**DoD PIA Landscape**

9. In your opinion, how has the landscape and functions of DoD PIAs evolved over time?
10. How does your partnership intermediary compare with other DoD partnership intermediaries?
11. To what extent do you interact with other DoD partnership intermediaries?
    a. Which ones? How and why?
    b. What suggestions might you have for improving information exchange and building the network of PIAs across DoD? To what extent do you see value in this?

**Business Model**

12. How much funding do you receive from DoD for being a partnership intermediary?
    a. Through what mechanisms do you receive this funding?
    b. How has your funding changed over time?
13. To what extent does your organization or organizations you are affiliated with receive other funding from DoD? The Federal Government? Industry? Universities? Others?
    a. Please describe the funding provided.
    b. Through what mechanisms do you receive this funding?
    c. How are conflicts of interest managed?

**Functions**

14. What are your functions as a partnership intermediary?
    a. Describe your role in spin out? Describe your role in spin in? What fraction of your efforts applies to each?
    b. Do you fund R&D in any way?
15. To what extent do you perform activities beyond those outlined in the PIA? How do these activities align with your role as a PIA?

**Challenges**

16. What challenges do you face in performing your PIA functions?

**Best Practices and Lessons Learned**

17. Do you have any suggestions for DoD to help improve your ability to perform your functions?
18. What are any best practices or lessons learned related to performing your functions?

**Interactions with Stakeholders**

19. Do you interact with stakeholders locally in laboratory communities? Or nationally? Or both?

20. How do you interact with DoD stakeholders – e.g., ORTAs and DoD researchers?
21. How do you interact with other stakeholders – e.g., Small businesses? Educational institutions? State and local governments? Other affiliated organizations?

**Broader Technology Transfer Landscape**

22. How do you interface with other DoD technology transfer initiatives, such as SBIR/STTR programs?

**Process**

23. Can you describe the process of becoming a partnership intermediary?
    d. Was the PIA competed?
    a. How did your organization plan for or prepare to become a partnership intermediary?
    b. How was the scope of work decided?
24. To what extent was establishing the PIA an efficient process? What challenges did you encounter?
25. How can the process be improved?

**Value Add and Potential**

26. Why do you believe DoD has asked you to perform activities under a PIA rather than just contracting with you for these services?
27. Why do you believe some DoD entities are NOT using partnership intermediaries or establishing PIAs? What do you suggest could help those entities use PIAs?
28. What activities are you NOT doing but could perform to enhance what you have been asked to accomplish for DoD?
    a. Why do you believe that you are not being asked to perform such activities?
    b. To what extent have you suggested that you could perform such activities? How are the suggestions developed and proposed?
29. To what extent do you actively solicit services as a PIA throughout DoD? Other Feds?
    a. Generally, how successful are you in soliciting these services?
    b. What is the process for doing this?
30. Do you have any suggestions for improving the use of PIAs across DoD?

**Oversight**

31. Can you describe DoD's administrative and technical oversight of your partnership intermediary activities?
    a. How do you communicate with your DoD oversight office?
    b. To what extent do you operate somewhat autonomously?
32. What challenges have you experienced regarding DoD's oversight? To what extent does the DoD working relationship impact your productivity?
33. How would you recommend that DoD oversight activities be improved?

**Performance**

34. Can you describe what success looks like in your role as a partnership intermediary?
35. How does your organization evaluate its performance as a partnership intermediary?
    a. What specific deliverables are evaluated and how?
    b. How do you assess your value to DoD's mission?
    c. How do you monitor and communicate your successes?
    d. Are there any evaluation metrics, reports, and the like that you could share?
36. How does DoD evaluate your performance?
    a. What information are you required to report to the Federal Government?
    b. How are formal reviews conducted? How are the results used?
37. [If no reviews] To what extent do you suggest there should be formal reviews? Why or why not?
    a. How could DoD improve performance management of PIAs?

b. What critical information do you believe would be useful for DoD to collect to track your organization's performance?
c. How could DoD performance reviews be conducted to help improve your activities as a partnership intermediary?

**Other**

38. Do you have any other recommendations to facilitate the use PIAs or enhance partnership intermediary activities?
39. Can you suggest additional questions that would be helpful for our study to answer?
40. Is there anyone else that you suggest that we speak with?
41. What other information resources do you think would be helpful for our study?

# Appendix E. Questionnaire Design

STPI conducted two questionnaires—one for DoD entities establishing PIAs and another for partnership intermediaries. STPI administered the questionnaires through SurveyGizmo. This appendix provides the design, including prompts and response options, for both questionnaires.

## Questionnaire for DoD Entities Establishing PIAs

### Introduction

Thank you for taking part in this questionnaire conducted by the Institute for Defense Analyses (IDA) Science and Technology Policy Institute (STPI) in support of a study for the Director of Laboratories and Personnel within the Office of the Under Secretary of Defense for Research and Engineering. STPI is a federally funded research and development center that provides rigorous, independent research and analysis to the Federal Government.

### Purpose of the Questionnaire

This questionnaire solicits your perspectives on the use of Partnership Intermediary Agreements (PIAs) within the Department of Defense (DoD). Its results will be used to inform the development of DoD policy and guidance for selecting, establishing, funding, using, and evaluating PIAs in support of military technology transfer to the commercial sector and commercial technology transition to defense applications as well as any other activity consistent with the legislative authority for PIAs.

### Confidentiality Statement

STPI is independent of DoD and has been contracted to conduct this study. All responses will be kept confidential and protected to the extent possible by law. Only aggregate data will be presented to DoD. Your decision to participate is voluntary. STPI will not divulge who did or did not participate.

### Instructions for the Questionnaire

The estimated questionnaire completion time is 30 minutes. You will be able to move backward through the questionnaire to review or edit responses. Your questionnaire responses are automatically saved up to the last submitted page, so you will be able to pause and return mid-questionnaire. However, once you submit the questionnaire, you will not be able to edit your responses.

The questionnaire is divided into topics as follows:

- Background
- PIA Functions
- PIA Funding
- Planning and Oversight
- Outputs, Outcomes, and Performance
- Challenges
- Suggestions
- Effective Practices

**Follow-Up Interview**

After submission, STPI staff may call you for a short (~30 minute) phone interview to discuss your responses.

**Inquiries and Concerns**

This questionnaire was sent to one individual from your organization as a representative that can respond to information about managing PIAs. If you believe that someone else should receive this questionnaire, or have other questions or concerns about completing this questionnaire, please contact Laurie Dacus at ldacus@ida.org.

Your responses are invaluable to the study. Thank you for your participation.

## Questions

**Background**

1. Please select your organization's active PIA(s) from the following list:

For the purposes of this question your PIA is considered "active" if it was active from February 2020 to June 2020.

| |
|---|
| Academic Partnership & Engagement Experiment |
| Battery Innovation Center |
| Bloomington Economic Development Corporation |
| Catalyst Campus for Technology & Innovation |
| Center for Innovative Technology |
| Center for Technology, Research and Commercialization |
| City of Newport, Rhode Island |

| |
|---|
| College of Southern Maryland |
| CONNECT Foundation |
| Cyber Innovation Center |
| DEFENSEWERX |
| DEFENSEWERX - Doolittle Institute |
| DEFENSEWERX - ERDCWERX |
| DEFENSEWERX - MGMWERX |
| DEFENSEWERX - SOFWERX |
| Energetics Technology Center |
| FirePoint Innovations Center |
| Fredericksburg Regional Alliance at the University of Mary Washington |
| Gangplank VA |
| Georgia Tech Applied Research Corporation |
| Global Trade & Technology |
| Griffiss Institute |
| Hawaii Technology Development Corporation |
| Impact Washington |
| Indiana Innovation Institute - aka Applied Research Institute |
| Indiana University |
| Ivy Tech Community College-Bloomington, Indiana |
| King George County, Virginia |
| Maryland Department of Commerce |
| Maryland Innovation and Security Institute |
| Maryland Technology Development Corporation |
| MilTech |
| Mississippi Enterprise for Technology, Inc. |
| Missouri Technology Corporation |
| Morgan State University |
| New Mexico Explorer |
| New Mexico Tech - aka New Mexico Institute of Mining and Technology |
| New Mexico Trade Alliance |
| New York State Technology Enterprise Corporation |
| NineTwelve Institute |
| Ohio Aerospace Institute |
| OrthoWorx, LLC |
| Polaris Manufacturing Extension Partnership |
| Purdue Foundry |
| Purdue University |
| Radius Indiana |

| |
|---|
| Regional Defense Partnership for the 21st Century |
| RTI International |
| San Diego Unified Port District |
| South Carolina Manufacturing Extension Partnership |
| South Carolina Research Authority |
| State of Indiana |
| TechLink |
| The Economic Development Center-Ventura County |
| The Growth Alliance For Greater Evansville |
| The Patuxent Partnership |
| The Southeastern New England Defense Industry Alliance |
| United States Bomb Technicians Association |
| University of Rhode Island Business Engagement Center |
| University of Southern Indiana |
| Virginia Tech Applied Research Corporation |
| Wright Brothers Institute |
| Other |

2. Please indicate which year your PIA(s) was established.

| | Year (YYYY) |
|---|---|
| PIA #1 | YYYY |
| PIA #2 | YYYY |
| Pipe in other options filled in from Q1 | YYYY |

3. Please indicate under which legal authority your PIA(s) was established?

Note: 15 USC 3715 PIA authority was established October 21, 1980; 10 USC 2368 PIA authority was established in August 2018.

| | 15 USC 3715 (Check = Y) | 10 USC 2368 (Check = Y) | Unsure |
|---|---|---|---|
| PIA #1 | | | |
| PIA #2 | | | |
| Pipe in other options filled in from Q1 | | | |

4. Please indicate any other agreements (e.g., Education Partnership Agreements, Other Transaction Agreements, Cooperative Research and Development Agreements) that you have with the partnership intermediary.

| | Other agreements that you have with the partnership intermediary |
|---|---|
| PIA #1 | |
| PIA #2 | |
| Pipe in other options filled in from Q1 | |

**PIA Functions**

In the next three questions, you will be asked to select your PIA(s)' functions as they apply to spin-in, spin-out, or dual-use (both spin-in and spin-out). Before each question there will be a series of definitions to refer to as you respond.

5. Please select all **spin-in functions** that apply to your PIA(s) and provide other spin-in functions if not included:

*Spin-in activities are defined as activities that take a capability or technology from outside of the government and help transition it and integrate it into a DoD application.*

Prize Competitions – Hosts or organizes prize competition activities (either under Title 15 or Title 10) done for the purpose of spinning in technologies for which DoD could pursue further investment with the prize winners to use the technology.

Manufacturing – Performs functions to develop the technical data necessary to manufacture a product, assess manufacturing capabilities that can meet DoD needs, or provide technical assistance to improve the efficiency of manufacturing processes.

Technology Events and Showcases – Hosts or organizes technology demonstrations, showcases, or other events to articulate DoD needs to the commercial sector.

Subcontracting for Research and Development – Subcontracts with non-DoD partners who perform RDT&E or technology maturation using DoD's PIA funding.

Perform Prototyping – Prototypes technology to meet the DoD's needs by actually prototyping the technology itself, but in way that it can be utilized by a third party.

Facilitate Prototyping – Prototypes technology to meet the DoD's needs by (1) organizing prototyping events and recruiting participants in these events where third parties can demonstrate a capability to the DoD organization or (2) identifying third parties as candidates for building a prototype outside of a prototyping event and possibly providing technical support to them.

Fund Prototyping – Funds the prototyping of technology to meet the DoD's needs by identifying commercial organizations most likely to be successful in meeting DoD needs and using PIA funds to contract for the prototype development possibly providing technical support to those organizations.

Problem Solving – Solves a problem through means other than prototyping. Problems could be associated with ideas or projects from DoD military or civilian service members, improving organizational process efficiencies, or improving organizational performance.

| | PIA #1 (pipe in PIA from Q1) | PIA #2 (pipe in PIA from Q1) | Pipe in other options filled in from Q1 | This does not apply to my PIA(s) |
|---|---|---|---|---|
| Prize Competitions | | | | |
| Manufacturing | | | | |
| Technology Events and Showcases | | | | |
| Subcontracting for Research and Development | | | | |
| Perform Prototyping | | | | |
| Facilitate Prototyping | | | | |
| Fund Prototyping | | | | |
| Problem Solving | | | | |
| Other (please specify) | | | | |

6. Please select all **spin-out functions** that apply to your PIA(s) and provide other spin-out functions if not included:

*Spin-out activities are defined as activities that transfer DoD knowledge and technologies outside of the government through commercialization, licensing, and other mechanisms.*

Technology Events and Showcases – Hosts or organizes technology demonstrations, showcases, or other events to demonstrate opportunities to commercialize DoD-developed technologies or capabilities or to demonstrate DoD equipment and facilities that can be used by commercial organizations.

Prize Competitions – Hosts or organizes prize competition activities (either under Title 15 or Title 10) done for the purpose of spinning out start-ups based on DoD patents.

Licensing Assistance – Assists in licensing DoD IP to outside partners.

Patent Assistance – Assists researchers in determining patenting opportunities and applying for and obtaining patents.

IP Portfolio Management – Assists in managing a database of an organization's IP, or helps to evaluate the IP within the organization's portfolio.

Government Workforce Development – Develops or conducts work-based learning programs for the current DoD personnel within the organization to improve skills associated

with entrepreneurial activities, marketing ideas/technology to commercial organizations, or seeking ideas/technology from commercial organizations.

| | PIA #1 (pipe in PIA from Q1) | PIA #2 (pipe in PIA from Q1) | Pipe in other options filled in from Q1 | This does not apply to my PIA(s) |
|---|---|---|---|---|
| Technology Events and Showcases | | | | |
| Prize Competitions | | | | |
| Licensing Assistance | | | | |
| Patent Assistance | | | | |
| IP Portfolio Management | | | | |
| Government Workforce Development | | | | |
| Other (please specify) | | | | |

7. Please select which functions apply to your PIA(s) for **dual-use (both spin-in and spin-out)** and provide other functions if not included:

*Spin-in activities are defined as activities that take a capability or technology from outside of the government and help transition it and integrate it into a DoD application.*

*Spin-out activities are defined as activities that transfer DoD knowledge and technologies outside of the government through commercialization, licensing, and other mechanisms.*

Business Incubation – Serves as a business incubator in support of commercializing laboratory technologies and/or adapting commercial technologies to meet DoD needs as part of their PIA functions.

SBIR/STTR Recruitment – Promotes interest in SBIR/STTR opportunities.

SBIR/STTR Technical Support – Assists in the transition from Phase 1 to Phase 2.

SBIR/STTR Program Support – Provides general support to the execution of the program.

Collaboration Space – Hosts, manages, and/or operates a collaboration space outside of the DoD facilities where outside partners and researchers can come, work together, and have meaningful interactions without having to deal with the security concerns of DoD facilities.

Non-Government Workforce Development – Develops or conducts programs external to the DoD organization designed to attract talent to the region, provide training how to navigate the DoD bureaucracy to promote ideas, or identify DoD opportunities and needs.

R&D Collaborations – Assists in coordinating activities relating to R&D collaborations such as CRADAs, tech assist CRADAs, education agreements, or other agreements.

STEM Education – Assists in STEM education, which can include K-12 events, internships, and development of the workforce pipeline to train and attract high quality talent.

Technology and Market Research – Conducts technology scouting and market research activities to help understand the commercial market and potential viability activities to find out what capabilities are available in industry or academia that are relevant to DoD needs.

| | PIA #1 (pipe in PIA from Q1) | PIA #2 (pipe in PIA from Q1) | Pipe in other options filled in from Q1 | This does not apply to my PIA(s) |
|---|---|---|---|---|
| Business Incubation | | | | |
| SBIR/STTR Recruitment | | | | |
| SBIR/STTR Technical Support | | | | |
| SBIR/STTR Program Support | | | | |
| Collaboration Space | | | | |
| Non-Government Workforce Development | | | | |
| R&D Collaborations | | | | |
| STEM Education | | | | |
| Technology and Market Research | | | | |
| **Other** (please specify) | | | | |

**PIA Funding**

8. In the past three years, please indicate whether or not any of your partnership intermediaries (PIs) received funding under your PIA.

| | |
|---|---|
| At least one of my partnership intermediaries received funding under my PIA | |
| None of my partnership intermediaries received funding under my PIA | |

[If at least one selected – add three questions]

9. You indicated that in the past three years at least one your partnership intermediaries has received funding under your PIA. Please estimate how much funding you have provided or has been provided from other sources for FY 2020.

| | My organization ($) in FY 2020 | Other sources($) in FY 2020 |
|---|---|---|
| PIA #1 | | |
| PIA #2 | | |
| Pipe in other options filled in from Q1 | | |

10. You indicated that in the past three years at least one your partnership intermediaries has received funding under your PIA. Please estimate how much funding you have provided or has been provided from other sources for FY 2019.

| | My organization ($) in FY 2019 | Other sources($) in FY 2019 |
|---|---|---|
| PIA #1 | | |
| PIA #2 | | |
| Pipe in other options filled in from Q1 | | |

11. You indicated that in the past three years at least one your partnership intermediaries has received funding under your PIA. Please estimate how much funding you have provided or has been provided from other sources for FY 2018.

| | My organization ($) in FY 2018 | Other sources($) in FY 2018 |
|---|---|---|
| PIA #1 | | |
| PIA #2 | | |
| Pipe in other options filled in from Q1 | | |

12. [If at least one selected – add question] You indicated that at least one of your partnership intermediaries received funding under your PIA. Please indicate the applicable type of funding.

| | Research, Development, Test, and Evaluation | Operations and Maintenance | Unsure | Other | Not applicable |
|---|---|---|---|---|---|
| PIA #1 | | | | | |
| PIA #2 | | | | | |
| Pipe in other options filled in from Q1 | | | | | |

13. [If at least one selected – add question] You indicated that at least one of your partnership intermediary(s) received funding under your PIA. Please select what funding mechanism(s) are used to fund the PIA(s).

| | Non-Federal Acquisition Regulation-based mechanism | FAR-based mechanism | Other mechanism | Unsure | Not applicable |
|---|---|---|---|---|---|
| PIA #1 | | | | | |
| PIA #2 | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Pipe in other options filled in from Q1 | | | | | |

14. Please list, if applicable, the funding vehicles that were used for each PIA.

| |
|---|
| |

**Planning and Oversight**

15. Please select the extent to which the selection of your partnership intermediary was made competitively. Select all that apply.

| | Was not competed | Informally considered multiple organizations | Formally issued notification for the opportunity e.g., BAA, RFI, etc. | Developed criteria to assess multiple organizations | Utilized selection boards and/or other processes to assess multiple organizations | Other |
|---|---|---|---|---|---|---|
| PIA #1 | | | | | | |
| PIA #2 | | | | | | |
| Pipe in other options filled in from Q1 | | | | | | |

16. [If other was answered yes] If you selected "other" please describe the competition process.

| |
|---|
| |

17. Please describe how you oversee the activities conducted under your partnership intermediary agreements.

| |
|---|
| |

18. Please indicate the average frequency of communication that you have with your partnership intermediaries.

| | Daily | Weekly | Monthly | Quarterly | Annually or greater |
|---|---|---|---|---|---|
| PIA #1 | | | | | |
| PIA #2 | | | | | |
| Pipe in other options filled in from Q1 | | | | | |

19. In general, please indicate the level (e.g., technical director, commanding officer, etc.) at which the communications are typically held.

| |
|---|
| |

20. Please indicate if you formally review (mandated by your PIA or subordinate contracts) your partnership intermediaries.

| | Yes we formally review | No, we do not formally review |
|---|---|---|
| PIA #1 | | |
| PIA #2 | | |
| Pipe in other options filled in from Q1 | | |

You indicated that you formally review your partnership intermediaries.

21. Please describe, generally, the types of deliverables and review products your partnership intermediaries provide to you.

| |
|---|
| |

22. Please provide the level (e.g., technical director, commanding officer, etc.) at which the reviews are typically held.

| |
|---|
| |

**Outputs, Outcomes, and Performance**

23. Please describe the strategic objectives of your agreements.

| | Strategic objectives |
|---|---|
| PIA #1 | |
| PIA #2 | |
| Pipe in other options filled in from Q1 | |

24. If you have any forthcoming PIAs planned, please specify with what organizations and for what strategic objectives.

| |
|---|
| |

25. Please indicate to what extent, overall, you are satisfied or dissatisfied with the performance of your partnership intermediaries.

| | Very dissatisfied | Dissatisfied | Neither dissatisfied nor satisfied | Satisfied | Very satisfied |
|---|---|---|---|---|---|
| PIA #1 | | | | | |
| PIA #2 | | | | | |
| Pipe in other options filled in from Q1 | | | | | |

26. If you indicated, for any of your partnership intermediaries, that you were not satisfied with the functions and performance of your partnership intermediaries, please describe why you are dissatisfied. If this is not applicable, press next.

| |
|---|
| |

27. Please indicate to what extent, overall, partnership intermediary activities have or have not led to expected outputs or outcomes.

| | Less than expected | As expected | Greater than expected |
|---|---|---|---|
| PIA #1 | | | |
| PIA #2 | | | |
| Pipe in other options filled in from Q1 | | | |

28. If you indicated, for any of your PIs, that your partnership intermediary activities led to outputs that were not what you expected, please describe your experience. If this is not applicable, please press next.

| |
|---|
| |

29. Please indicate to what extent, overall, your partnership intermediary activities have provided value to the DoD mission.

| | Provided little value to the DoD mission | Provided a moderate level of value to the DoD mission | Provided a high level value to the DoD mission |
|---|---|---|---|

| | | | |
|---|---|---|---|
| PIA #1 | | | |
| PIA #2 | | | |
| Pipe in other options filled in from Q1 | | | |

30. If you indicated, for any of your PIs, that your partnership intermediary activities provided little or moderate value to the DoD mission, please describe why you say that. If this is not applicable, please press next.

| |
|---|
| |

31. Please provide the specific metrics used to evaluate performance of partnership intermediaries.

| |
|---|
| |

32. Please identify tangible and measurable (qualitative and quantitative) mid and long term outcomes you track.

| |
|---|
| |

**Challenges**

33. Please indicate to what extent establishing a PIA was an efficient or inefficient process.

| Very inefficient | Somewhat inefficient | Neither efficient nor inefficient | Somewhat efficient | Very efficient |
|---|---|---|---|---|
| | | | | |

34. Please identify whether you have experienced the following challenges and to what extent they impeded or did not impede the process of establishing, overseeing, or supporting execution of the PIA(s).

| | Did not experience | Experienced but did not impede execution of the PIA(s) | Experienced and impeded execution of the PIA(s) |
|---|---|---|---|
| **Understanding and Buy-In** | | | |
| Lack of my own understanding of the scope of the services that can be provided by PIAs | | | |

| | Did not experience | Experienced but did not impede execution of the PIA(s) | Experienced and impeded execution of the PIA(s) |
|---|---|---|---|
| Limited understanding of others in my organization (e.g., legal, contracting, leadership) about the scope of the services that can be provided by PIAs | | | |
| Lack of leadership buy-in of the potential value obtained from PIAs | | | |
| Diverse legal opinions or lengthy determinations about the use of PIAs, including authority for your organization to establish a PIA | | | |
| **Agreement Processes** | | | |
| Difficulties in the process for funding PIA activities, including what contract mechanisms or appropriation to use | | | |
| Difficulties in the process for agreeing upon the scope of work in the PIA(s) | | | |
| Difficulties in the process for agreeing upon the other terms and conditions in the PIA(s) | | | |
| Delays in contracting or funding | | | |
| **Oversight and Operations** | | | |
| Difficulties in identifying and managing conflicts of interest (COI) | | | |
| Lack of time or manpower to effectively oversee and guide PIA activities | | | |
| Inadequate funding | | | |
| **Policy and Guidance** | | | |
| Lack of policy or guidance for establishing or funding PIAs | | | |
| Conflicting policy or guidance for establishing or funding PIAs | | | |
| Other | | | |
| Other | | | |

35. Please describe other challenges that may have inhibited more effective use of PIA(s), such as impeding processes for establishing, overseeing, or supporting execution of activities under the PIA(s).

| |
|---|
| |

**Suggestions**

36. Please provide suggestions on how to better leverage PIA(s), such as improving processes for establishing PIAs, DoD oversight and evaluation of PIA performance, and PIA legislative authority or other policies.

| |
|---|
| |

**Effective Practices**

37. Please describe any effective practices you have found for establishing PIA(s) or executing the PIA functions that would be useful to share with others in this community, and why you believe they are effective.

| |
|---|
| |

38. Is there anything else you would like to share?

| |
|---|
| |

## Questionnaire for Partnership Intermediary Organizations

### Introduction

Thank you for taking part in this questionnaire conducted by the Institute for Defense Analyses (IDA) Science and Technology Policy Institute (STPI) in support of a study for the Director of Laboratories and Personnel within the Office of the Under Secretary of Defense for Research and Engineering. STPI is a federally funded research and development center that provides rigorous, independent research and analysis to the Federal Government.

### Purpose of the Questionnaire

This questionnaire solicits your perspectives on the use of Partnership Intermediary Agreements (PIAs) within the Department of Defense (DoD). Its results will be used to inform the development of DoD policy and guidance for selecting, establishing, funding, using, and evaluating PIAs in support of military technology transfer to the commercial sector and commercial technology transition to defense applications as well as any other activity consistent with the legislative authority for PIAs.

### Confidentiality Statement

STPI is independent of DoD and has been contracted to conduct this study. All responses will be kept confidential and protected to the extent possible by law. Only aggregate data will be presented to DoD. Your decision to participate is voluntary. STPI will not divulge who did or did not participate.

### Instructions for the Questionnaire

The estimated questionnaire completion time is 30 minutes. You will be able to move backward through the questionnaire to review or edit responses. Your questionnaire responses are automatically saved up to the last submitted page, so you will be able to pause and return mid- questionnaire. However, once you submit the questionnaire, you will not be able to edit your responses.

The questionnaire is divided into topics as follows:

- Background
- Funding Models
- PIA Functions
- Outputs, Outcomes, and Performance
- Challenges

- Suggestions
- Effective Practices

**Follow-Up Interview**

After submission, STPI staff may call you for a short (~30 minute) phone interview to discuss your responses.

**Inquiries and Concerns**

This questionnaire was sent to one individual from your organization as a representative that can respond to information about your PIA. If you believe that someone else should receive this questionnaire, or have other questions or concerns about completing this questionnaire, please contact Laurie Dacus at ldacus@ida.org.

Your responses are invaluable to the study. Thank you for your participation.

## Questions

**Background**

1. Please select DoD entities with which your organization has an active partnership intermediary agreement from the following list. For the purposes of this question your PIA is considered "active" if it was active from February 2020 to June 2020.

| |
|---|
| Air Force Global Strike Command |
| Air Force Research Laboratory, Air Force Office of Scientific Research (AFOSR) |
| Air Force Research Laboratory, Kirtland Air Force Base |
| Air Force Research Laboratory, Rome |
| Air Force Research Laboratory, Wright Patterson Air Force Base |
| Air University, Maxwell Air Force Base |
| Army Research Laboratory |
| Marine Corps Systems Command |
| National Geospatial Intelligence Agency |
| Naval Air Warfare Center Aircraft Division, Patuxent River |
| Naval Facilities Engineering and Expeditionary Warfare Center |
| Naval Information Warfare Center Atlantic |
| Naval Information Warfare Center Pacific |
| Naval Meteorology and Oceanography Command |
| Naval Postgraduate School |
| Naval Surface Warfare Center (NSWC), Crane Division |
| Naval Surface Warfare Center (NSWC), Indian Head Explosive Ordnance Disposal Technology Division |

| |
|---|
| Naval Surface Warfare Center (NSWC), Port Hueneme Division |
| Naval Surface Warfare Center Dahlgren Division |
| Naval Undersea Warfare Center (NUWC), Division Keyport |
| Naval Undersea Warfare Center (NUWC), Division Newport |
| Special Operations Command |
| U.S. Army Combat Capabilities Development Command Army Aviation and Missile Center |
| U.S. Army Corps of Engineers Engineer Research and Development Center |
| United States Air Force Academy |
| United States Cyber Command |
| Other |

2. Please indicate which year your PIA(s) was established.

| | Year (YYYY) |
|---|---|
| DoD Entity #1 | |
| DoD Entity #2 | |
| Pipe in other options filled in from Q1 | |

3. Please indicate whether or not your organization was established as a result of your first PIA.

| | |
|---|---|
| Yes, my organization was established as a result of my first PIA | |
| No, my organization was not established as a result of my first PIA | |
| Unsure | |

4. Please indicate whether or not your organization is a nonprofit entity.

| | |
|---|---|
| Yes, my organization is a nonprofit entity | |
| No, my organization is not a nonprofit entity | |
| Unsure | |

5. Please indicate your organization's State or local government affiliation(s).

| | Currently affiliated | Affiliated in the past (not currently) | Never affiliated | Unsure |
|---|---|---|---|---|
| An agency of a State or local government | | | | |

| | | | | |
|---|---|---|---|---|
| Chartered by the State or local government | | | | |
| Funded, in whole or in part, by the State or local government | | | | |
| Operated, in whole or in part, by or on behalf of the State or local government | | | | |
| Other (please specify) | | | | |

6. [If selected Chartered – then ask Q6] You indicated that your organization has been chartered by the State or local government, either currently or in the past. Please select if these apply to your charter, and explain how they apply.

| | This applies to my charter | This does not apply to my charter |
|---|---|---|
| The charter is a written grant or constitution provided by the State or local government through legislative power, by which your organization was founded and its rights and privileges defined | | |
| The charter is a written grant or constitution provided by the State or local government letter **not through legislative power** | | |
| The charter is my organization's articles of incorporation | | |
| Other (please specify) | | |

7. If you responded that any of the above applies to your charter, please provide further details of your organization's charter (e.g., affiliation with which State or local government). .

| |
|---|
| |

8. [If selected Operated – then ask Q8] You indicated that your PIA is operated, in whole or in part, by or on behalf of the State or local government. Please explain how the State or local government is involved in operating your organization.

| |
|---|
| |

**Funding Models**

9. Please indicate, approximately, your organization's funding sources under the PIA(s) and approximately what portion of your total annual budget these funding sources represent.

| | We do not receive funding from this source | $ of total annual budget | % of total annual budget |
|---|---|---|---|
| Under your DoD PIA(s) | | | |
| Other DoD funding (not under your PIA(s)) | | | |
| Other Federal Government funding (not DoD) | | | |
| State or local government funding | | | |
| Industry funding | | | |
| Other non-Federal funding | | | |

10. [If rows 2-6 in Q9] If you are receiving funding outside of the PIA(s), select the extent to which you agree/disagree with the following statement.

| | Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree | Not applicable |
|---|---|---|---|---|---|---|
| Our PIA activities leverage non-PIA funded activities | | | | | | |

11. [If Strongly disagree or Disagree] You indicated that you do not feel your PIA activities leverage other non-PIA funded activities. Please elaborate on why you think these other activities are not better leveraged, and how they could be better leveraged in the future.

| |
|---|
| |

12. [If Strongly agree or Agree] You indicated that your PIA activities leverage activities funded by other organizations. Please describe how these activities are leveraged.

| |
|---|
| |

**PIA Functions**

In the next three questions, you will be asked to select your functions as they apply to spin-in, spin-out, or dual-use (both spin-in and spin-out). Definitions are provided for each question for reference.

13. Please select all **spin-in functions** that apply to your PIA and provide other spin-in functions if not included:

*Spin-in activities are defined as activities that take a capability or technology from outside of the government and help transition it and integrate it into a DoD application.*

Prize Competitions – Hosts or organizes prize competition activities (either under Title 15 or Title 10) done for the purpose of spinning in technologies for which DoD could pursue further investment with the prize winners to use the technology.

Manufacturing – Performs functions to develop the technical data necessary to manufacture a product, assess manufacturing capabilities that can meet DoD needs, or provide technical assistance to improve the efficiency of manufacturing processes.

Technology Events and Showcases – Hosts or organizes technology demonstrations, showcases, or other events to articulate DoD needs to the commercial sector.

Subcontracting for Research and Development – Subcontracts with non-DoD partners who perform RDT&E or technology maturation using DoD's PIA funding.

Perform Prototyping – Prototypes technology to meet the DoD's needs by actually prototyping the technology itself, but in way that it can be utilized by a third party.

Facilitate Prototyping – Prototypes technology to meet the DoD's needs by (1) organizing prototyping events and recruiting participants in these events where third parties can demonstrate a capability to the DoD organization or (2) identifying third parties as candidates for building a prototype outside of a prototyping event and possibly providing technical support to them.

Fund Prototyping – Funds the prototyping of technology to meet the DoD's needs by identifying commercial organizations most likely to be successful in meeting DoD needs and using PIA funds to contract for the prototype development possibly providing technical support to those organizations.

Problem Solving – Solves a problem through means other than prototyping. Problems could be associated with ideas or projects from DoD military or civilian service members, improving organizational process efficiencies, or improving organizational performance.

| | This does not apply to my PIA(s) | PIA #1 (pipe in PIA from Q1) | PIA #2 (pipe in PIA from Q1) | Pipe in other options filled in from Q1 |
|---|---|---|---|---|
| Prize Competitions | | | | |
| Manufacturing | | | | |
| Technology Events and Showcases | | | | |
| Subcontracting for Research and Development | | | | |
| Perform Prototyping | | | | |

| | | | | |
|---|---|---|---|---|
| Facilitate Prototyping | | | | |
| Fund Prototyping | | | | |
| Problem Solving | | | | |
| Other (please specify) | | | | |

14. Please select all **spin-out functions** that apply to your PIA and provide other spin-out functions if not included:

*Spin-out activities are defined as activities that transfer DoD knowledge and technologies outside of the government through commercialization, licensing, and other mechanisms.*

Technology Events and Showcases – Hosts or organizes technology demonstrations, showcases, or other events to demonstrate opportunities to commercialize DoD-developed technologies or capabilities or to demonstrate DoD equipment and facilities that can be used by commercial organizations.

Prize Competitions – Hosts or organizes prize competition activities (either under Title 15 or Title 10) done for the purpose of spinning out start-ups based on DoD patents.

Licensing Assistance – Assists in licensing DoD IP to outside partners.

Patent Assistance – Assists researchers in determining patenting opportunities and applying for and obtaining patents.

IP Portfolio Management – Assists in managing a database of an organization's IP, or helps to evaluate the IP within the organization's portfolio.

Government Workforce Development – Develops or conducts work-based learning programs for the current DoD personnel within the organization to improve skills associated with entrepreneurial activities, marketing ideas/technology to commercial organizations, or seeking ideas/technology from commercial organizations.

| | This does not apply to my PIA(s) | PIA #1 (pipe in PIA from Q1) | PIA #2 (pipe in PIA from Q1) | Pipe in other options filled in from Q1 |
|---|---|---|---|---|
| Technology Events and Showcases | | | | |
| Prize Competitions | | | | |
| Licensing Assistance | | | | |
| Patent Assistance | | | | |
| IP Portfolio Management | | | | |
| Government Workforce Development | | | | |

| | | | | |
|---|---|---|---|---|
| Other (please specify) | | | | |

15. Please select which functions apply to your PIA for **dual-use (both spin-in and spin-out**) and provide other functions if not included:

*Spin-in activities are defined as activities that take a capability or technology from outside of the government and help transition it and integrate it into a DoD application.*

*Spin-out activities are defined as activities that transfer DoD knowledge and technologies outside of the government through commercialization, licensing, and other mechanisms.*

Business Incubation – Serves as a business incubator in support of commercializing laboratory technologies and/or adapting commercial technologies to meet DoD needs as part of their PIA functions.

SBIR/STTR Recruitment – Promotes interest in SBIR/STTR opportunities.

SBIR/STTR Technical Support – Assists in the transition from Phase 1 to Phase 2.

SBIR/STTR Program Support – Provides general support to the execution of the program.

Collaboration Space – Hosts, manages, and/or operates a collaboration space outside of the DoD facilities where outside partners and researchers can come, work together, and have meaningful interactions without having to deal with the security concerns of DoD facilities.

Non-Government Workforce Development – Develops or conducts programs external to the DoD organization designed to attract talent to the region, provide training how to navigate the DoD bureaucracy to promote ideas, or identify DoD opportunities and needs.

R&D Collaborations – Assists in coordinating activities relating to R&D collaborations such as CRADAs, tech assist CRADAs, education agreements, or other agreements.

STEM Education – Assists in STEM education, which can include K-12 events, internships, and development of the workforce pipeline to train and attract high quality talent.

Technology and Market Research – Conducts technology scouting and market research activities to help understand the commercial market and potential viability activities to find out what capabilities are available in industry or academia that are

relevant to DoD needs.

| | This does not apply to my PIA(s) | PIA #1 (pipe in PIA from Q1) | PIA #2 (pipe in PIA from Q1) | Pipe in other options filled in from Q1 |
|---|---|---|---|---|
| Business Incubation | | | | |
| SBIR/STTR Recruitment | | | | |
| SBIR/STTR Technical Support | | | | |
| SBIR/STTR Program Support | | | | |
| Collaboration Space | | | | |
| Non-Government Workforce Development | | | | |
| R&D Collaborations | | | | |
| STEM Education | | | | |
| Technology and Market Research | | | | |
| Other (please specify) | | | | |

16. Please indicate the frequency with which you interact with other partnership intermediary organizations across DoD.

| | Never | Rarely | Sometimes | Often |
|---|---|---|---|---|
| I interact with other partnership intermediary organizations across DoD | | | | |

17. [If answer Often in Q16] You indicated that you interact often with other partnership intermediary organizations across DoD. Please select whether the following apply. These communications were/are spearheaded by

| | Check = Y |
|---|---|
| DoD entity that established my PIA | |
| DoD entity that established the other partners' PIA | |
| My organization | |
| The other partnership intermediary | |
| Unsure | |
| Other (write in) | |

18. Please estimate what portion of your total activities is spent interacting with stakeholders (universities and commercial entities) from the following geographies.

| | Approximate portion of total activities (%) |
|---|---|
| Stakeholder within the local or State region in which your organization is located | |
| Stakeholder within the local or State region in which the DoD entity establishing your PIA is located (if different than above location of your organization) | |
| Other locations within the United States | |
| Other locations internationally | |
| Unsure of geographic location | |

**Outputs, Outcomes, and Performance**

19. Please share examples of specific metrics used by your organization to evaluate its performance as a partnership intermediary.

| |
|---|
| |

20. Please indicate to what extent you are satisfied or dissatisfied with the nature of the work that you are asked to perform under the PIA.

| | Very dissatisfied | Dissatisfied | Neither dissatisfied nor satisfied | Satisfied | Very satisfied |
|---|---|---|---|---|---|
| DoD Entity #1 | | | | | |
| DoD Entity #2 | | | | | |
| Pipe in other options filled in from Q1 | | | | | |

21. If you indicated that you were not satisfied with the nature of the work that you were asked to perform under any of your PIAs, please describe why you are dissatisfied. If this is not applicable, please press next.

| |
|---|
| |

22. If applicable, please identify what deliverables you feel best communicate your successes to DoD.

| |
|---|
| |

**Challenges**

23. Please indicate whether you agree or disagree with the following statement:

| | Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree |
|---|---|---|---|---|---|
| Establishing a PIA is an efficient process | | | | | |

24. [If Strongly disagree or Disagree] You indicated that establishing a PIA is an inefficient process. Please describe why.

| |
|---|
| |

25. Please identify whether or not you have experienced the following challenges and whether they impeded or did not impede the process of establishing your PIA or executing your functions as a partnership intermediary.

| | Did not experience (Check = Y) | Experienced but did not impede execution of the PIA | Experienced and impeded execution of the PIA |
|---|---|---|---|
| **Understanding and Agreement Processes** | | | |
| My own limited understanding of the scope of the services that can be provided by a PIA | | | |
| Difficulties in the process for agreeing upon the scope of work in the PIA | | | |
| Difficulties in the process for agreeing upon the other terms and conditions in the PIA | | | |
| Delays in DoD contracting or funding | | | |
| **Oversight and Operations** | | | |
| Lack of clear direction from DoD while establishing the PIA | | | |
| Lack of clear direction from DoD in executing PIA functions | | | |
| Lack of funding to effectively perform PIA activities | | | |
| Difficulties identifying and managing conflicts of interest (COI) | | | |
| Other | | | |
| Other | | | |

**Suggestions**

26. Please describe what suggestions you may have to overcome challenges that have inhibited the effective use of your PIA such as improving processes of establishing

PIAs, DoD oversight and evaluation of PIA performance, and PIA legislative authority or other policies.

**Effective Practices**

27. Please describe any effective practices you have found to better leverage PIAs in areas such as processes for establishing PIAs or execution of your functions, and indicate why you think they are effective.

28. Is there anything else you would like us to know?

# Appendix F. Qualitative Analysis Codebook

This appendix provides STPI's qualitative codebook consisting of major themes and topics from the interviews. The major themes include:

- PIA Landscape
- PIA Functions
- PIA Organizational and Business Models
- PIA Performance
- PIA Policy
- PIAs in the Broader Technology Transfer Context
- Other comments and cross-cuts for the responses including whether the comments were descriptive, evaluative, an exemplar practice, a suggestion, or a challenge

## PIA Landscape

Comments on what the Federal and DoD landscape of PIAs looks like, how that landscape has changed, and how the different organizations that make up that landscape interact with one another.

- **Global Evolution** – Comments regarding the evolution of the PIA landscape. These comments can deal with the number of PIAs as they have grown over time, or how the functions of PIAs as a whole have changed over time.
- **Comparison to other PIAs** – Comments on how the partnership intermediary compares to other DoD PIAs. This can encapsulate the partnership intermediary's functions, business model, or affiliations and how they might be different or the same when compared to other intermediaries.
- **Activities With Other PIAs** – Comments regarding a partnership intermediary's joint activities or events with other PIAs, both local and with the DoD-wide PIAs. These can encapsulate how much they interact with other PIs and what sort of activities or projects they would collaborate on.
- **DoD Coordination of PIAs** – Comments regarding how the activities between PIAs are coordinated or facilitated by their government counterparts, and how the DoD organizations may have learned about PIAs.

- **Value of Partnership Intermediary to Partnership Intermediary Interactions** – Comments regarding the value or potential value of interactions between DoD PIAs. These comments can also encapsulate whether the interviewee sees value in more interaction or the establishment of a PIA network.
- **Partnership Intermediary Information Sharing –** Comments regarding the amount of information sharing that is done between PIs, and what methods or avenues they have to share information between each other. This can also include if a partnership intermediary referred a customer to another partnership intermediary.
- **Other PIA-Like Entities** – Comments on interactions with other PIA-like entities that may perform similar functions.
- **Other PIA Landscape** – Comments relating to the PIA landscape that may not have clearly fallen into the above codes.

**PIA Type**

Comments on the objective characteristics of the PIA.

- **DoD Command** – *Which DoD Command is the PIA under?* Army, Navy, Air Force, Other. If government entity is not a lab, indicate what it is in parentheses)**. Status** – *What is the status of the PIA?* Active, Inactive, Unspecified
- **National or Regional** – Comments on the geographic focus of the PIA.
  - What is the geographic focus of the PIA? National, Regional, Unspecified

**PIA Location**

Data on the geographic location of the organization.

- **City** – Which city is the organization in? City Name
- **State –** Which state is the organization in? State Abbreviation
- **Region –** Which region is the organization in? Northeast, Southeast, Midwest, Southwest, West

## PIA Functions

Comments regarding the different kinds of functions that PIAs perform, and for what purpose.

- **Local Evolution –** Comments on whether the functions of a specific partnership intermediary have changed over time, how they might have changed, and what the drivers were for those changes.
- **Spin-in vs. Spin-out** – Comments regarding the breakdown of PIA activities between Spin-in and Spin-out activities. Spin-in activities in this case are defined as activities meant to take a capability or technology from outside of the government and help transition it and integrate it into the government. Spin-out activities are meant to take Federal knowledge and technologies and transfer it to outside of the government through commercialization, licensing, and other mechanisms.
- **Prize Competitions** – Comments on prize competition activities done for a) spin-in: Hosts or organizes prize competition activities (either under Title 15 or Title 10) done for the purpose of spinning in technologies for which DoD could pursue further investment with the prize winners to use the technology; or b) spin-out: Hosts or organizes prize competition activities done for the purpose of spinning out start-ups based on DoD patents. In parentheses after the quote, qualify whether the comment is *spin-in, spin-out, both (dual use)*, or *neither*
- **Collaboration Space** – Comments on partnership intermediaries hosting, managing, and operating a collaboration space outside of the DoD facilities where outside partners and researchers can come, work together, and have meaningful collisions without having to deal with the security concerns of DoD facilities.
- **Technology and Market Research –** Technology scouting and market research activities to help understand the commercial market and potential viability activities to find out what capabilities are available in industry or academia that are relevant to DoD needs.
- **Technology Events and Showcases –** Comments on whether the partnership intermediary hosts or organizes technology demonstrations, showcases, or other events for a) spin-in: to articulate DoD needs to the commercial sector, or b) spin-out: to commercialize DoD-developed technologies or capabilities to DoD organizations to demonstrate DoD equipment and facilities that can be used by commercial organizations. In parentheses after the quote, qualify whether the comment is *spin-in, spin-out, both (dual use)*, or *neither*.
- **Perform Prototyping –** Comments on whether the partnership intermediary is involved in prototyping technology to meet the DoD's needs by actual performing the prototyping the technology itself, but in way a that it can be utilized by a third party that the partnership intermediary identifies to meet DoD needs.

- **Facilitate Prototyping –** Comments on whether the partnership intermediary is involved in prototyping technology to meet the DoD's needs by organizing prototyping events and recruiting participants in these events where third parties can demonstrate a capability to the DoD organization.
- **Fund Prototyping –** Comments on whether the partnership intermediary is involved in prototyping technology to meet the DoD's needs by identifying commercial organizations most likely to be successful in meeting DoD needs and using PIA funds to contract for the prototype development possibly providing technical support to those organizations.
- **Problem Solving** – Comments on whether the partnership intermediary assists by solving a problem through means other than prototyping. Problems could be associated with DoD military or civilian service members and other employee projects, improving organizational process efficiencies, and improving organizational performance.
- **Manufacturing Capability** – Comments on whether a partnership intermediary is involved in functions to manufacture a product, assess manufacturing capabilities that can meet DoD needs, and provide technical assistance to improve the efficiency of manufacturing processes.
- **Subcontracting for RDT&E** – Comments on whether a partnership intermediary subcontracts with non-Federal partners to do RDT&E or technology maturation using DoD's PIA funding.
- **Licensing Assistance** – Comments on whether the partnership intermediary assists in licensing DoD IP to outside partners.
- **Patent Assistance** – Comments on whether the partnership intermediary assists researchers in determining patenting opportunities and applying for and obtaining patents.
- **IP Portfolio Management** – Comments on whether the partnership intermediary assists in managing a database of an organization's IP, or helps to evaluate the IP within the organization's portfolio.
- **STEM Education –** Comments on whether the partnership intermediary assists in STEM education, which can include K-12 events, internships, and development of the workforce pipeline to train and attract high quality talent.
- **Government Workforce Development –** Comments on whether the partnership intermediary assists in workforce development internal to the DoD organization. This includes all work-based learning programs for the current DoD personnel within the organization to improve skills associated with

entrepreneurial activities, marketing ideas/technology to commercial organizations, seeking ideas/technology from commercial organizations.

- **Non-Government Workforce Development** – Comments on whether the partnership intermediary assists in workforce development external to the DoD organization. This includes attracting talent to the region, training how to navigate the Federal bureaucracy to promote ideas, and identifying Federal opportunities and needs.
- **Non-PIA Functions –** Comments regarding the functions or activities that the intermediary organization may perform beyond their role as a Federal partnership intermediary, for example, serving as a business incubator of economic development organization in their region.
- **SBIR/STTR Recruitment –** Comments on whether the partnership intermediary promotes interest in SBIR/STTR opportunities.
- **SBIR/STTR Technical Support –** Comments on whether the partnership intermediary assists in the transition from Phase 1 to Phase 2.
- **SBIR/STTR Program Support –** Comments on whether the partnership intermediary provides general support to the execution of the SBIR/STTR program.
- **Business Incubation –** Comments on whether a partnership intermediary serves as a business incubator in support of commercializing laboratory technologies and/or adapting commercial technologies to meet DoD needs as part of their PIA functions.
- **RDT&E Collaborations –** Comments on whether the partnership intermediary assists in coordinating activities relating to RDT&E collaborations such as CRADAs, tech assist CRADAs, EPAs, or other agreements.
- **Other Spin-in –** Comments on other spin-in activities that may not have clearly fallen into one of the previous function codes.
- **Other Spin-out –** Comments on other spin-out activities that may not have clearly fallen into one of the previous function codes.
- **Other PIA Functions** – Any other comments regarding PIA functions, pertaining to both spin-in and spin-out (dual-use). Add potential new topics in parentheses after the quote.

## PIA Organizational and Business Models

Comments on how the PIA is organized, how it is funded or maintained, what other organizations it is affiliated with, and how it became a partnership intermediary.

- **Partnership Intermediary Organization Origin –** Comments on the genesis of the organization that serves as the partnership intermediary. These organizations could have existed prior to the establishment of the agreement, or they may have been stood up in order to serve as an intermediary.
- **Year Established –** the year the PIA was established (YYYY)
- **DoD Drivers –** Comments on the drivers that led the DoD organization to stand up or enter into a PIA. This should also include what needs they see that their PIA is able to fill.
- **State Established** – Comments on whether the partnership intermediary was established by the State or local government.
- **State or Local Funding –** Comments on whether State or local entities contribute funding.
- **DoD Baseline Funding –** Comments on whether the partnership intermediary receives baseline funding to cover overhead, or they operate on a "work-for-food" model. Includes comments about core funding and project-based funding.
- **Other Funding –** Comments on whether the partnership intermediary receives funding from any other sources.
- **Other Affiliation –** Comments on any additional affiliation the partnership intermediary may have (e.g., university affiliation), and the organization structure between the intermediary organization and an entity they may be affiliated with.
- **Funding Vehicle** – Comments on the funding vehicle used to fund a PIA. These could be CPOs established under the umbrella agreement, congressional earmarks or some other agreement.
- **Color of Money** – Comments on the color of money that the PIA is currently being funded with, and whether O&M funds can be used in addition to or in place of RDT&E money.
- **Conflicts of Interest** – In the case of affiliations or funding outside of the DoD partner organization, comments on how COI issues are resolved and managed.
- **Other PIA Organization and Business Model** – Comments relating to the PIA organizational and business models that not have clearly fallen into one of the above codes. Add potential new topic areas (e.g., working with confidential information) after the quotation in parentheses.

## PIA Performance

Comments on how the PIA is managed, how it is evaluated, and how it tracks its performance.

- **DoD Oversight –** Comments on the level of DoD oversight over the PIA and its activities, including who is responsible for the oversight and how often they meet with their counterparts.
- **Deliverables –** Comments on the formal deliverables required in the agreement, which can include monthly, quarterly, or annual reports. Deliverables that are not required but are prepared by the partnership intermediary also apply.
  - *What formal deliverables are required?* None, Monthly reports, Quarterly reports, Annual reports, Unspecified, Other (specified)
  - *What informal deliverables are provided?* None, Monthly reports, Quarterly reports, Annual reports, Unspecified, Other (specified)
- **Defining Success –** Comments on how the DoD or partnership intermediary organization defines what long-term success looks like for them.
- **Measures for Success –** Comments on how the DoD organization or intermediary measures its success and what metrics it tracks to attempt to quantify it.
- **Satisfaction –** Comments on how satisfied the organization is with the PIA and their current arrangement.
- **Other PIA Performance –** Comments relating to PIA performance that may not have clearly fallen into the above codes.

## PIA Policy

Comments on the legal authority and policy dealing with the PIA. These comments can include what the current policy on a subject is, what the interviewee thinks about the current policy, and suggestions for what the policy should be.

- **Legal Interpretation –** Comments on the interviewee's legal interpretation of the statute and how that may differ from Congress' original intent when the statute was put in place.
- **Policy and Functions –** Comments on how the PIA policy relates to the functions that a PIA can perform, and which functions may be or should be prohibited.
- **Title 15 vs. Title 10 –** Comments on the difference between the Title 15 statute and the Title 10 statute, and why one may use one authority over the other.

- **Office of the Secretary of Defense (OSD) Policy vs. Service Policy –** Comments on the difference between OSD policy surrounding PIAs and the service or lab level policy.
- **Funding –** Comments on the policy regarding funding of PIAs, including whether they should be funded, what kind of funding they can receive, and who should make that determination.
- **Competition –** Comments regarding the policy on competing PIAs, including whether PIAs should be competed, and in what situations competition is appropriate as compared to sole sourcing.
- **DoD Eligibility –** Comments on what DoD organizations are eligible to enter into PIAs, whether there are organizations that don't meet that eligibility, or whether there are other organizations that can benefit from PIAs but aren't currently eligible to have one.
- **Partnership Intermediary Eligibility –** Comments on what organizations are eligible to serve as partnership intermediary under the statute, including whether there are organizations that currently should not be eligible or if the interpretation should be broadened to include other organizations.
- **Guidance and Training –** Comments on the guidance or training received regarding the PIA statute and the policies surrounding it. This would also include suggestions regarding new training events or modules to help facilitate the process of entering into and managing a PIA. Also includes lack of knowledge about PIAs.
- **Other PIA Policy –** Comments relating to the PIA policy that may not have clearly fallen into the above codes.

## PIAs in the Broader Technology Transfer Context

Comments on how the PIA relates to other technology transfer mechanisms, including how they are similar or different, and how PIAs may be utilized in conjunction with or to complement other mechanisms.

- **PIAs and SBIR** – Comments on the use of PIAs in conjunction with SBIR, and how those mechanisms are coordinated together, especially in regard to DoD's strategic plan.
- **PIAs and OTAs –** Comments on the use of PIAs in conjunction with OTAs in the acquisition process, and what role the partnership intermediary serves.

- **Strategic Role of PIAs –** Comments on the strategic use of PIAs with other mechanisms, and how they can be used in conjunction with and to complement other technology transfer activities.
- **PIAs vs. Other Mechanisms –** Comments on how the PIA compares to other technology transfer, transition, and acquisition mechanisms, and why an organization may decide that the PIA is the best mechanism for a certain job.
- **Other PIAs in Broader T2 Context –** Comments relating to PIAs in the broader technology transfer context that may not have clearly fallen into the above codes.

## Other

- **General Other –** Any other relevant comments from the interviews that do not fall clearly into any of the above codes.
- **Cross-Cuts –** A secondary set of codes that can be crosscutting along the initial set of codes:
  - **Descriptive –** Comments that convey information about the current situation, or models in place regarding the PIAs.
  - **Evaluative –** Comments that evaluate or give the interviewee's opinion on PIAs, and suggestions for how things should be different.
  - **Exemplar Practice –** Comments where the interviewee denotes that one of their practices is an exemplar practice.
  - **Suggestions –** Comments where the interviewee suggests a certain practice or change to the current PIA situation.
  - **Challenges –** Comments where the interviewee denotes a challenge that they faced relating to PIAs.

# Appendix G. Technology Readiness Level Descriptions

This appendix provides descriptions of the technology readiness levels (TRLs) for hardware and software (DoD 2009). Manufacturing readiness levels (MRLs) are more tenuous and include various threads and sub-threads throughout the acquisition life cycle. Similar to TRLs, MRLs are on a scale of 1 through 10 (DoD 2011).

| Level | Description for Hardware (TRL) | Description for Software (TRL) |
|---|---|---|
| 1 | Lowest level of technology readiness. Scientific research begins to be translated into applied research and development (R&D). Examples might include paper studies of a technology's basic properties. | Lowest level of software technology readiness. A new software domain is being investigated by the basic research community. This level extends to the development of basic use, basic properties of software architecture, mathematical formulations, and general algorithms |
| 2 | Invention begins. Once basic principles are observed, practical applications can be invented. Applications are speculative, and there may be no proof or detailed analysis to support the assumptions. Examples are limited to analytic studies. | Once basic principles are observed, practical applications can be invented. Applications are speculative, and there may be no proof or detailed analysis to support the assumptions. Examples are limited to analytic studies using synthetic data. |
| 3 | Active R&D is initiated. This includes analytical studies and laboratory studies to physically validate the analytical predictions of separate elements of the technology. Examples include components that are not yet integrated or representative. | Active R&D is initiated. The level at which scientific feasibility is demonstrated through analytical and laboratory studies. This level extends to the development of limited functionality environments to validate critical properties and analytical predictions using non-integrated software components and partially representative data. |
| 4 | Basic technological components are integrated to establish that they will work together. This is relatively "low fidelity" compared with the eventual system. Examples include integration of "ad hoc" hardware in the laboratory. | Basic software components are integrated to establish that they will work together. They are relatively primitive with regard to efficiency and robustness compared with the eventual system. Architecture development initiated to include interoperability, reliability, maintainability, extensibility, scalability, and security issues. Emulation with current/legacy elements as appropriate. Prototypes developed to demonstrate different aspects of eventual system. |

| Level | Description for Hardware (TRL) | Description for Software (TRL) |
|---|---|---|
| 5 | Fidelity of breadboard technology increases significantly. The basic technological components are integrated with reasonably realistic supporting elements so they can be tested in a simulated environment. Examples include "high-fidelity" laboratory integration of components. | Level at which software technology is ready to start integration with existing systems. The prototype implementations conform to target environment/interfaces. Experiments with realistic problems. Simulated interfaces to existing systems. System software architecture established. Algorithms run on a processor(s) with characteristics expected in the operational environment. |
| 6 | Representative model or prototype system, which is well beyond that of TRL 5, is tested in a relevant environment. Represents a major step up in a technology's demonstrated readiness. Examples include testing a prototype in a high-fidelity laboratory environment or in a simulated operational environment. | Level at which the engineering feasibility of a software technology is demonstrated. This level extends to laboratory prototype implementations on full-scale realistic problems in which the software technology is partially integrated with existing hardware/software systems. |
| 7 | Prototype near or at planned operational system. Represents a major step up from TRL 6 by requiring demonstration of an actual system prototype in an operational environment (e.g., in an aircraft, in a vehicle, or in space). | Level at which the program feasibility of a software technology is demonstrated. This level extends to operational environment prototype implementations, where critical technical risk functionality is available for demonstration and a test in which the software technology is well integrated with operational hardware/software systems. |
| 8 | Technology has been proven to work in its final form and under expected conditions. In almost all cases, this TRL represents the end of true system development. Examples include developmental test and evaluation (DT&E) of the system in its intended weapon system to determine if it meets design specifications. | Level at which a software technology is fully integrated with operational hardware and software systems. Software development documentation is complete. All functionality tested in simulated and operational scenarios. |
| 9 | Actual application of the technology in its final form and under mission conditions, such as those encountered in operational test and evaluation (OT&E). Examples include using the system under operational mission conditions. | Level at which a software technology is readily repeatable and reusable. The software based on the technology is fully integrated with operational hardware/ software systems. All software documentation verified. Successful operational experience. Sustaining software engineering support in place. Actual system. |

Source: DoD. 2009.

# Appendix H. Navy PIA Template

This appendix provides an example template for PIAs developed by the Navy.

PARTNERSHIP INTERMEDIARY AGREEMENT (PIA) BETWEEN
[NAVY ACTIVITY full name then acronym]

AND

[PARTNERSHIP INTERMEDIARY full name then acronym]

PREAMBLE

Under authority of the U.S. Federal Technology Transfer Act of 1986 (Public Law 99-502, 20 October 1986, as amended), (hereinafter referred to Title 15 U.S. Code § 3715) [NAVY ACTIVITY full name then acronym], located at [supply appropriate address], and [Partnership Intermediary full name then acronym], whose headquarters are located at [supply appropriate address], (hereinafter referred to individually as a “Party” or collectively as the “Parties”) enter into this Partnership Intermediary Agreement (PIA), which shall be binding upon the Parties according to the clauses and conditions hereof and for the term and duration set forth.

The Parties agree as follows:

Article 1. DEFINITIONS

1.1. The term “Agreement” as used herein shall mean a PIA as authorized by Title 15 U.S. Code § 3715 for performance of partnership intermediary services. This Agreement is neither a procurement contract subject to the Federal Acquisition Regulation, nor a support agreement subject to the DoD Grant and Agreement Regulations.

1.2. The term "Data" means recorded information of any kind regardless of the form or method of recording.

1.3. The term "Federal Laboratory" means any organization defined in Title 15 U.S. Code § 3703(6), as amended.

1.4. The term “Government” refers to the United States Government.

1.5. The term "Invention" means any discovery or invention that is or may be patentable or otherwise protected under Title 35, U.S. Code, or any novel variety of plant that is or may be patentable under the Plant Variety Act (Title 15 U.S. Code § 3703(9)).

1.6. The term “License Agreement” shall mean an agreement to license a federally-owned invention under Title 35 U.S. Code §§ 207-11 and 37 C.F.R. Part 404.

1.7. The term "Proprietary Information" shall mean information that embodies trade secrets developed at private expense or business, commercial, or financial information that is privileged and confidential provided that such information: is not known or available from other sources without obligations concerning its confidentiality; has not been made available by the owners to others without obligation concerning its confidentiality; is not already available to the Government without obligation concerning its confidentiality; or has not been developed independently by persons who have had no access to the information.

Article 2. PARTIES

2.1. The [Navy Activity] [provide description].

2.2. The [Partnership Intermediary] [provide a description that includes a citation to the legal authority establishing the Partnership Intermediary and its mission statement].

Article 3. BACKGROUND AND PURPOSE

3.1. Title 15 U.S. Code § 3715 (Use of Partnership Intermediaries) specifically authorizes the Director of a Federal Laboratory to enter into memoranda of understanding and contracts with State and local governmental agencies and nonprofit entities owned, chartered, funded, or operated by or on behalf of a State or local government to perform partnership intermediary services that increase the likelihood of success in the conduct of cooperative or joint activities with small business firms and educational institutions that need or can make demonstrably productive use of technology-related assistance from a Federal Laboratory. These services include the promotion of cooperative or joint

activities with small business firms and educational institutions that need or can make demonstrably productive use of technology-related assistance from Federal Laboratories.

3.2. The purpose of this Agreement is to promote cooperative activities between [Navy Activity] and small business firms and educational institutions served by [Partnership Intermediary]. The services to be provided by [Partnership Intermediary] as hereinafter described are intended to [insert purpose as authorized under the Statute].

Article 4. DESIGNATED REPRESENTATIVES

4.1. The [Navy Activity] designated representative responsible for coordination of activities under this Agreement is [insert name and position of representative]. The [Navy Activity]'s representative will coordinate directly with the designated [Partnership Intermediary] representative.

4.2. The [Partnership Intermediary]'s designated representative responsible for coordination of activities under this Agreement is [name and position of the representative]. The [Partnership Intermediary] representative will coordinate directly with the designated [Navy Activity] representative.

Article 5. AGREEMENT ACTIVITIES

5.1. To accomplish the purposes of this Agreement, the Parties' representatives will engage in discussions and use their best efforts to identify activities under which small business firms and educational institutions can make demonstrably productive use of technology-related assistance from [Navy Activity]. The Parties will use their best efforts to accomplish the purpose of this Agreement.

5.2. [Optional] Licensing [Navy Activity] Inventions. [Navy Activity] will identify to [Partnership Intermediary] such of its Inventions that are available for licensing. [Partnership Intermediary] will attempt to locate and identify to [Navy Activity] small businesses and educational institutions within its area of responsibility that have an interest in licensing [Navy Activity] Inventions. [Navy Activity] will engage in discussions with such interested businesses and educational institutions as are identified to it with a view toward reaching a patent license agreement. Such discussions and any resulting license agreement will be accomplished in full accordance with all applicable Federal laws and regulations. [Partnership Intermediary] may choose to participate in the license discussions and provide such other assistance to interested small businesses or educational institutions as is consistent with its corporate charter.

5.3. [Optional] Submission of Research Proposals to [Navy Activity]. [Navy Activity] will identify to [Partnership Intermediary] areas of [Navy Activity] research and development activities where the submission of proposals are desired under the [Navy Activity] Broad Agency Announcement (BAA). The [Navy Activity] BAA is issued under the provisions of paragraphs 35.016 and 6.102(d)(2) of the Federal Acquisition Regulation (FAR). These provisions provide for the use of BAA's by agencies to fulfill requirements for scientific study and experimentation directed toward advancing the state-of-the-art or increasing knowledge or understanding rather than focusing on a specific system or hardware solution. [Partnership Intermediary] will attempt to locate small businesses and educational institutions interested in submitting proposals, advise those interested in proposal requirements, and provide such other assistance as is within its charter to perform. All proposals received will be considered by [Navy Activity] in accordance with applicable Federal laws and regulations.

5.4. [Optional] [Navy Activity] Support For Outside Activities. [Navy Activity] will identify to [Partnership Intermediary] research and development capabilities of [Navy Activity] that may be made available to small businesses and educational institutions that need or can make use of technology-related assistance from [Navy Activity]. [Partnership Intermediary] will attempt to locate and advise such small businesses and interested educational institutions of the availability of such capabilities and the related procedures and conditions. In the preparation and submission of proposals, [Partnership Intermediary] may choose to participate and provide such other assistance to interested small businesses or educational institutions as is consistent with its corporate charter. [Navy Activity] will fully consider all requests submitted for such support. All support will be provided as appropriate in accordance with applicable Federal laws and regulations.

5.5. [Optional] Technology Marketing Programs and Showcases. [Navy Activity] and [Partnership Intermediary] will cooperate in planning and presenting various programs that showcase [Navy Activity] technology and research and development areas of interest.

5.6. [Optional] Small Business and Educational Institution Technology and Capabilities. [Partnership Intermediary] will sponsor activities and programs that showcase the technology and capabilities of small businesses and educational institutions within its area of responsibility that may be of interest to [Navy Activity] in connection with its research and development mission.

5.7. [Optional] [Navy Activity] [may describe other activities that are authorized within the scope of Title 15 U.S. Code § 3715].

Article 6. FUNDING

6.1. Other than as expressly provided herein, no funds of either Party are in any way committed or obligated for any purpose whatsoever by virtue of entering into this Agreement. This Agreement does not identify or require the transfer of funds between the Parties. This Agreement shall not be construed to authorize or guarantee funding for any proposals submitted in response to any solicitation, nor shall it be construed as a guarantee of future funding. Nor shall this Agreement be construed as an endorsement of any proposal submitted by any Party or non-Party.

6.2. Each Party shall be responsible for funding its own activities under this Agreement, except as expressly provided herein. Each Party is individually responsible for assuring that its funding commitments are fully in accordance with all fiscal requirements and restrictions applicable to it by law and regulation.

## Article 7. INTELLECTUAL PROPERTY

7.1. In the event that employees of the Parties make an Invention or produces technical Data while performing the Agreement activities, each Party shall have title to the Data or Invention made or produced by its employees. Inventions made and Data produced jointly by those employees, shall be jointly owned by the Parties in the form of an equal and undivided interest in the title.

7.2. Rights in intellectual property created under a separate agreement resulting from this Agreement shall be determined in accordance with the terms of the separate agreement.

7.3. No rights in any intellectual property are conveyed or granted by or under this Agreement.

## Article 8. PROPRIETARY OR PROTECTED INFORMATION

8.1. During performance of activities under this Agreement, the Parties may require access to Proprietary Information of each other and non-Party small businesses and educational institutions identified by [Partnership Intermediary]. Likewise, such non-Party small businesses and educational institutions may require access to information about patentable [Navy Activity] Inventions that are exempted from disclosure under Title 35 U.S. Code § 205 (Confidentiality). The Parties agree to use their best efforts to enter into agreements with each other and any non-Party entities as may be necessary to protect such information from unauthorized use or disclosure and to refrain from using such information for any purpose other than that for which it was furnished.

8.2. No exchange of information under this Agreement is intended to convey to the receiving Party any license or other rights in such information unless otherwise expressly provided in writing by the disclosing Party.

Article 9. GENERAL PROVISIONS

9.1. Relationship of the Parties. The relationship of the Parties is that of independent parties and not as agents of each other, partners, or participants in a joint venture.

9.2. Security. Performance of work under agreements with small businesses and educational institutions established as the result of this Agreement may require access to classified information and secure facilities. Performers of such work may be required to qualify in accordance with applicable security regulations.

9.3. Export Control. Work on certain [Navy Activity] research projects may involve militarily critical technology or information the export of which is restricted by statute, executive order, or regulation (including, but not limited to, the Arms Export Control Act, the International Traffic in Arms Regulation, the Export Administration Act). The Party desiring to export shall ensure full compliance with all applicable requirements and restrictions before it makes any disclosure that may be deemed an export of such information. Nothing in this article is intended to waive any requirements imposed by any other U.S. Government agency with respect to disclosure of export controlled information or militarily critical technology to foreign nationals.

9.4. Liability.

9.4.1. Government Liability. [Navy Activity] is an activity of the U.S. Government. As such, the sovereign immunity of the United States applies to the activities of [Navy Activity]. The Government shall be liable for the negligent or wrongful acts of its officers and employees to the extent provided for in the Federal Tort Claims Act (Title 28 U.S. Code § 2671 et seq.) and other applicable laws and regulations of the United States that specifically waive sovereign immunity. Nothing in this Agreement shall be construed as a waiver of the sovereign immunity of the United States.

9.4.2. [Partnership Intermediary] Liability. [Partnership Intermediary] is a state chartered corporation and public instrumentality of the [indicate State or Commonwealth]. [Partnership Intermediary] and the [indicate State or Commonwealth] shall be solely responsible for the actions of [Partnership Intermediary] employees and the actions of those acting for it in the performance of this Agreement to the extent provided for under the applicable provisions of the State law. Nothing in this Agreement shall be construed

as a waiver of the sovereign immunity of the [indicate State or Commonwealth] in accordance with [provide citation].

9.4.3. Force Majeure. Neither Party shall be liable for the consequences of a force majeure that (1) is beyond its reasonable control; (2) is not caused by the fault or negligence of such Party; (3) causes such Party to be unable to perform its obligations under this Agreement; and, (4) cannot be overcome by the exercise of due diligence. In the event of the occurrence of a force majeure, the Party unable to perform shall notify the other Party. The Parties shall suspend performance only for such period of time as is necessary to overcome the result(s) of the force majeure and shall use their best efforts to resume performance as quickly as possible.

9.5. Savings Provision. The illegality or invalidity of any provisions of this Agreement shall not impair, affect, or invalidate the other provisions of this Agreement.

9.6. Applicable Law. The Parties agree that the laws of the United States of America shall govern this Agreement for all purposes. In the absence of governing Federal law, the laws of the [identify State or Commonwealth] shall apply.

9.7. Termination of the Agreement.

9.7.1. Termination by Mutual Consent. The Parties jointly may elect to terminate this Agreement at any time by mutual consent.

9.7.2. Unilateral Termination. Either Party may elect to terminate this Agreement at any time by giving to the other Party not less than thirty (30) days advance written notice of the intent to terminate and the effective date of termination.

9.7.3. Survivability. Article I. DEFINITION, Article VI. FUNDING, Article VII. INTELLECTUAL

PROPERTY, Article VIII. PROPRIETARY OR PROTECTED INFORMATION, Article IX. GENERAL PROVISIONS, Article X. PUBLICATIONS, shall survive the completion, termination or expiration of this Agreement. [Other articles may be added to this list if deemed desirable].

9.8. Duration of the Agreement. This Agreement shall remain in effect for [insert number] months from its effective date unless previously terminated or extended as

provided by this Agreement. The Parties may by mutual written agreement extend the term of the Agreement.

9.9. Property. Each Party shall retain title to all tangible property that it has acquired by purchase or gift and used in performance of tasks under this Agreement.

9.10. Titles and Headings. Titles and headings of the sections and subsections of this Agreement are for convenience of reference only and do not form a part of this Agreement and shall in no way affect the interpretation thereof.

9.11. Agreement Not An Exclusive Agreement. The rights granted by [Navy Activity] to [Partnership Intermediary] under this Agreement to perform the services of this Agreement are not exclusive. The Government may grant permission to other entities to perform the same or similar services at any time.

9.12. Entire Agreement. This Agreement constitutes the entire Agreement between the Parties concerning the subject matter hereof and supersedes any prior understanding or written or oral agreement relative to said matter.

9.13. Reports.

9.13.1. Annual Report. [Partnership Intermediary] shall submit to [Navy Activity] an annual report summarizing its efforts in furtherance of this Agreement. The report should provide a concise and factual discussion of the results of its efforts to include: a listing of small businesses and educational institution contacts; agreements entered by [Navy Activity] with small businesses and academic institutions that it identified; significant accomplishments resulting from those agreements (publications, technological developments, inventions, patents, product development and sales, etc.); any measurable effect upon community business and employment; lessons learned and recommendations for improvement; and such other information deemed pertinent by [Partnership Intermediary].

9.13.2. Final Report. [Partnership Intermediary] shall submit a final report summarizing the entire effort during the term of the Agreement in the same topic areas required for the annual report.

9.14. Disputes. The Parties agree to use reasonable efforts to reach a fair settlement of any dispute. If such efforts are unsuccessful, remaining issues in dispute will be referred to the signatories or their successors for resolution.

9.15. Waivers. No provision of this Agreement shall be considered waived by any Party hereto unless such waiver is given in writing to the other Party. The failure of any Party to insist upon strict performance of any of the terms and conditions hereof, or failure or delay to exercise any right provided herein or by law, shall not be deemed a waiver of any right of any Party hereto.

9.16. Amendments. The Parties shall, upon reasonable notice of the proposed modification by the Party desiring the change, confer in good faith to determine the desirability of such modification. Such modification shall be effective upon the date of the last signature of the authorized representatives of each of the Parties.

9.17 Use of Name or Endorsements. Neither Party shall use the name of the other Party on any product or service which is directly or indirectly related to this Agreement without the prior approval of the other Party. By entering into this Agreement, neither Party directly or indirectly endorses any product or service provided, or to be provided, by the other Party, its successors, assignees, or licensees. Neither Party shall imply in any way that this Agreement is an endorsement by the other Party of any product or service.

9.18 Notices. All notices are to be sent to the PIA administrators.

Article 10. PUBLICATIONS

10.1. Publication of Results. [Partnership Intermediary] is encouraged to publish results of the Agreement. Each article planned for publication shall be submitted to the [Navy Activity] designated representative for review and approval prior to submission for publication.

10.2. Governmental Use. Any publication based on or developed under this Agreement will reflect that the U.S. Government is licensed to reproduce and distribute the article for Governmental purposes notwithstanding any copyright or other restrictive legends.

10.3. Disclaimer. Published articles shall contain the statement that "the views and conclusions contained herein are those of the authors and should not be interpreted as necessarily representing the official policies or endorsements, either expressed or implied, of the Department of the Navy or the U.S. Government."

Article 11. EFFECTIVE DATE

11.1 This Agreement shall become effective upon the date of the last signature of the authorized representatives of each of the Parties.

Article 12. SIGNATURES

For [Partnership Intermediary]:

I, the undersigned, am duly authorized to bind [Partnership Intermediary full name] to this Agreement and do so by affixing my signature hereto.

Entered into this day of 20__.

(month)

By: Name:

Title:

Address:

For [Navy Activity]:

I, the undersigned, am duly authorized to bind [Navy Activity full name] to this Agreement and do so by affixing my signature hereto.

Entered into this day of 20__.

(month)

By: Name:

Title:

Address:

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# Abbreviations

| | |
|---|---|
| ATIP | Agriculture Technology Innovation Partnership |
| BAA | Broad Agency Announcement |
| CCTI | Catalyst Campus for Technology and Innovation |
| CFR | Code of Federal Regulations |
| COI | conflict of interest |
| CPD | collaborative project description |
| CPO | collaborative project order |
| CRADA | collaborative R&D agreements |
| CYBERCOM | United States Cyber Command |
| DAU | Defense Acquisition University |
| DHS | Department of Homeland Security |
| DLA | Defense Logistics Agency |
| DOC | Department of Commerce |
| DoD | Department of Defense |
| DoDD | DoD Directive |
| DoDI | DoD Instruction |
| DON | Department of the Navy |
| DTIC | Defense Technical Information Center |
| EPA | educational partnership agreement |
| ETC | Energetics Technology Center |
| FAR | Federal Acquisition Regulation |
| FFRDC | federally funded research and development center |
| FLC | Federal Laboratory Consortium for Technology Transfer |
| FTE | full time equivalent |
| GAO | Government Accountability Office |
| IDA | Institute for Defense Analyses |
| IP | intellectual property |
| LQEP-TT | Laboratory Quality Enhancement Panel on Technology Transfer |
| MIPR | Military Interdepartmental Purchase Request |
| MOU | Memorandum of Understanding |
| MRL | manufacturing readiness level |
| N-STEP | NIST Science and Technology Entrepreneurship Program |
| NGA | National Geospatial Intelligence Agency |
| NIST | National Institute for Standards and Technology |
| NIWC | Naval Information Warfare Centers |
| NSF | National Science Foundation |
| NSWC | Naval Surface Warfare Center |

| | |
|---|---|
| NUWC | Naval Undersea Warfare Centers |
| O&M | Operations and Maintenance |
| ODL&P | Office of Defense Laboratories and Personnel |
| OTA | Other Transaction Authority |
| PIA | partnership intermediary agreement |
| R&D | research and development |
| RDT&E | research, development, test, and evaluation |
| RFI | Request for Information |
| RFP | Request for Proposal |
| S&T | science and technology |
| SAP | simplified acquisition procedure |
| SBIR | Small Business Innovation Research |
| SME | subject matter expert |
| SNPIA | Standard Navy PIA |
| SOCOM | U.S. Special Operations Command |
| STEM | science, technology, engineering, and mathematics |
| STPI | Science and Technology Policy Institute |
| STRL | science and technology reinvention laboratory |
| STTR | Small Business Technology Transfer |
| T2 | technology transfer |
| TEDCO | Maryland Technology Development Corporation |
| TRL | technology readiness level |
| UARC | university-affiliated research center |
| USDA | U.S. Department of Agriculture |
| USDR&E | Undersecretary of Defense for Research and Engineering |

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**14. ABSTRACT**

In February 2020, the Office of Defense Laboratories and Personnel (ODL&P) under the DoD's Office of the Undersecretary of Defense for Research and Engineering (USDR&E) asked the Institute for Defense Analyses (IDA) Science and Technology Policy Institute (STPI) to analyze and characterize the landscape of DoD's PIAs. This study includes analyzing the PIAs established across DoD, the organizational and funding models of partnership intermediaries involved in PIAs, activities performed under PIAs, and DoD's oversight role. ODL&P's need to understand this landscape is driven by the perceived growth in interest to use PIAs, for example from Combatant Commands and other DoD entities external to the traditional defense laboratory enterprise. ODL&P also perceived this interest translated to a growth in the use of PIAs and the breadth of activities under existing PIAs. ODL&P also asked STPI to identify exemplar practices and recommendations for improving the use of PIAs. In parallel to STPI's study, ODL&P has undertaken plans to revise its overarching policy regarding PIAs thru DoD Instruction (DoDI) 5535.8 "DoD Technology Transfer (T2) Program." The study findings are intended to inform ODL&P's DoDI revisions and provide recommendations for other guidance and activities to support the use of PIAs across DoD.

**15. SUBJECT TERMS**

commercialization; defense laboratory enterprise; Department of Defense (DOD); exemplar practices; legal authorities; partnership intermediary agreement; policy; technology transfer; technology transition

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