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Best Practices for Federal Research and Development Facility Partnerships

Vanessa Peña
Ryan M. Whelan
Susannah V. Howieson

June 2014

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IDA Paper P-5148

Log: H 14-000676

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POLICY INSTITUTE
1899 Pennsylvania Ave., Suite 520
Washington, DC 20006-3602



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About This Publication

This work was conducted by the IDA Science and Technology Policy Institute under contract NSF01A0408601, Task TP-20-1000.00.CK, "Executive Guidance for Funding Federal Facilities and Infrastructure," for the Office of Science and Technology Policy. The views, opinions, and findings should not be construed as representing the official positions of the National Science Foundation or the Office of Science and Technology Policy in the Executive Office of the President.

Acknowledgments

We would like to acknowledge the valuable input from staff across the Federal Government, including the Office of Science and Technology Policy and the Office of Management and Budget (OMB), laboratories, and others involved in the facility partnerships that were interviewed for this study. We would also like to acknowledge the members of the Federal Security Laboratory Facility and Infrastructure Interagency Working Group under the National Science and Technology Council Committee on Homeland and National Security for their feedback and review of this document.

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Executive Summary

The Office of Science and Technology Policy (OSTP), in conjunction with the Office of Management and Budget (OMB), requested that the IDA Science and Technology Policy Institute (STPI) establish a best practices document concerning Federal partnerships for research and development facilities, infrastructure, and large instrumentation (herein referred to as “facility” or “facilities”). Included in the investigation were entire buildings, such as research centers and laboratories; related supportive infrastructure, such as central utility plants; and large instrumentation in which the facility is largely composed of the instrument itself, such as a wind tunnel, synchrotron, or high-performance computing laboratory. These partnerships represent a mix of co-funding, co-location, and cooperation in planning, management, and operations to support a facility’s life cycle.

Federal facility partnerships can be used to leverage the resources of two or more Federal departments or agencies to develop a project of mutual interest. Although opinions on Federal facility partnerships are mixed, these partnerships may help agencies realize a project of a scope that is difficult or impossible for a single agency to pursue. However, Federal facility partnerships can be complicated due to coordinating two or more agency processes, policies, cultures, communication channels, funding streams, and budget cycles, among other factors.

This document describes several best practices and examples that Federal agencies could consider in the planning and implementation of facility partnerships. The best practices described here are derived from discussions with stakeholders and documentation related to nine Federal facility partnerships pursued across the Federal government.

The best practices are not intended to serve as a singular, prescriptive, or comprehensive set of actions that ensure success; rather, they illustrate some of the ways that departments, agencies, and laboratories have effectively planned and implemented previous facility partnerships. The success of each practice depends on the implementation of other practices and on other factors that can influence the project, such as policies, processes, communication, and culture, among others. Documented here are 12 best practices grouped into 6 areas that departments, agencies, and laboratories could consider integrating into their own practices, as appropriate:

- Coordination
 - Practice 1: Identify a lead agency to simplify coordination and management.

- Practice 2: Consider early engagement with the Executive Office of the President, including OSTP or OMB, for assistance in convening facility project stakeholders.
- Planning Processes
 - Practice 3: Outline roles for each partner based on their expertise and intellectual contribution.
 - Practice 4: Agree upon a single facility life-cycle management process by either using one agency’s process or a single, hybrid approach of the most stringent policies and processes across partners.
 - Practice 5: Outline project dependencies and risks in each partner’s budget.
- Funding Commitments
 - Practice 6: Establish agency cost shares based on the scope of facility capabilities that align with the roles and responsibilities of and benefits to the partners.
 - Practice 7: Streamline the transfer of funds to support facility planning, construction, management, and operations.
- Project Agreements
 - Practice 8: Establish multiple levels of agreement to support various aspects of the partnership.
 - Practice 9: Develop flexible policies and procedures to address changing needs and opportunities as the partnership evolves.
- Governance and Communication
 - Practice 10: Develop formal and informal mechanisms to communicate ideas, concerns, and feedback across local and agency executive leadership.
 - Practice 11: Establish governance structures to work through unanticipated challenges.
- Culture and Trust
 - Practice 12: Create relationships to effectively understand complementary program activities and needs as well as improve confidence in partner commitments.

Partnerships that adopt the practices presented here, as appropriate, can appreciate the benefits of effective Federal facility partnerships while avoiding the challenges they pose.

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1. Introduction

A. Purpose

This document presents best practices concerning Federal partnerships for research and development (R&D) facilities, infrastructure, and large instrumentation. For the purposes of this document, the terms “facility” and “facilities” denote buildings, infrastructure, and large instrumentation that support R&D activities.

Federal partnerships can leverage the resources of two or more Federal departments, agencies, or laboratories to develop a project of mutual interest. This document presents lessons learned and strategies derived from interviews and documentation on the development and implementation of nine Federal facility partnerships. (Refer to the appendix for descriptions of the partnerships investigated.) Included in the investigation were entire buildings, such as research centers and laboratories; related supportive infrastructure, such as central utility plants; and large instrumentation in which the facility is largely composed of the instrument itself, such as a wind tunnel, synchrotron, or high-performance computing laboratory. This document is intended to provide departments, agencies, and laboratories with practices that have proven to be successful in the past.

There are many ways to achieve an effective Federal facility partnership, and this document is not intended to provide a singular, prescribed framework or a comprehensive set of methods to realize a partnership. Rather, it presents a range of options that departments, agencies, and laboratories could undertake, if appropriate. This document is envisioned to allow Federal departments, agencies, and laboratories considering or currently undertaking a facility partnership to benefit from the collective learning of past experiences. Others contemplating how to sustain and modernize Federal facilities, such as the Executive Office of the President (EOP) and Congress, may also find the information useful.

B. Origins

The Federal Security Laboratory Facilities and Infrastructure Interagency Working Group (hereafter referred to as the Working Group) was established under the Committee on Homeland and National Security of the National Science and Technology Council (NSTC) in 2013. The Working Group served under a one-year charter to analyze multiple pressing topics related to R&D facilities, including interagency partnerships. The Working Group reviewed previous studies on Federal facility partnerships, which have

found that while partnerships could enable projects that otherwise would not be completed, significant challenges were involved (Peña, Howieson, and Shipp 2013; Howieson et al. 2013). These studies report that agencies experience barriers related to coordination, planning, joint funding, management, and communication. The Working Group discussed these and other partnership barriers. They acknowledged that a critical gap was the lack of previous knowledge and understanding or lessons learned from past projects that could be used by departments, agencies, and laboratories interested in forming an interagency facility partnership.

As such, the Working Group recommended that the Office of Science and Technology Policy (OSTP) and the Office of Management and Budget (OMB) develop and publish a best practices document that describes options for departments, agencies, and laboratories to identify opportunities, plan, and implement Federal facility partnerships. The Working Group envisioned that the resulting document could assist agencies in overcoming a range of challenges associated with Federal facilities partnerships, including coordination, planning, and communication challenges that may deter or delay a project. In response to the Working Group's recommendation, OSTP, in conjunction with OMB, requested that the IDA Science and Technology Policy Institute (STPI) develop this best practices document. The Working Group was composed of representatives from departments and agencies with national security missions. Although the Working Group focused on issues specific to national security science and technology laboratory facilities, members were of the opinion that many of the recommendations were relevant to science and technology and general facilities more broadly.

C. Federal Facility Partnerships

A Federal facility partnership may involve any combination of co-funding, co-location, and cooperation and integration of planning, management, and operations. Federal facility partnerships may be pursued for new facilities, replacement facilities, or augmentation of existing facilities. Partnerships for existing facilities may help enhance an agency's current capabilities by leveraging the expertise from multiple agencies. Table 1 provides a description of the various types of Federal facility partnerships.

Table 1. Facility Partnership Types

Partnership Type	Description
Co-funding an entire facility	Includes co-funding by more than one agency to fund construction or renovations of one facility
Co-funding large instrumentation within a facility	Includes co-funding by more than one agency to fund the development of large instruments within one facility
Co-funding supportive infrastructure or utilities	Includes co-funding by more than one agency to support infrastructure or utilities necessary for the construction or renovations of one or more agency's facilities
Co-location	Includes co-location of more than one agency's facilities in one centralized campus
Cooperation and integration of planning, management, and operations	Includes integration of design, requirements, management, operations, and services for one or more facilities under one agency's chain of command

Source: Adapted from Peña, Howieson, and Shipp (2013).

D. Sources of Information

The best practices in this document stem from discussions with stakeholders, a review of the literature, and analysis of documentation related to Federal facility partnerships that were effectively implemented as well as those that were not ultimately realized. A best practice may be based on lessons learned from failed partnerships and factors that interviewees thought would have benefited the planning and implementation of the facility project. The partnerships investigated are primarily research and development facilities but also include other types of facilities, such as a health care center. See the appendix to this document for a list of Federal facility partnerships reviewed.

Interviewed stakeholders included facility-level or laboratory staff, department- and agency-level program managers and leadership, and EOP staff from OSTP and OMB involved in these partnerships. In discussions, these stakeholders described their experiences in facility partnership projects at various stages of the facility life cycle, from planning to operations. Another main resource was a previous STPI study on Federal facility partnerships, which highlighted findings on challenges and lessons learned from five Federal facility partnerships. These five partnership are included in the nine partnerships reviewed for this document. Refer to Peña, Howieson, and Shipp (2013) for details about the previous STPI study.

2. Background

A. Drivers

Federal facility partnerships can be driven from the top down or the bottom up. Top-down drivers can stem from Congress or the President directing two or more agencies to collaborate on a specific project or to advance a particular national priority. Research communities or facility directors may also initiate partnerships by recognizing synergies between two agencies and encouraging collaboration. No matter the instigator, effective partnerships appear to need both high-level buy-in and local support.

B. Benefits and Challenges

The viewpoints related to Federal facility partnerships are decidedly mixed and depend on individual experiences and partnership outcomes. Agency representatives that have attempted to realize a project that ultimately failed may have a negative bias about partnerships, while those that have effectively realized projects may paint a more positive picture.

The primary benefit of a Federal facility partnership is the ability to leverage funding from multiple agencies, enabling a project of a scope that would be difficult or impossible for a single agency to pursue. Initially, shared funding results in cost savings to each agency, though this may be negated by the added time and resources required to manage the partnership. Many partnerships bring together the complementary capabilities of two or more agencies. Moreover, partnerships that are based on common interests can enhance research and provide synergy through coordination of research programs.

The main challenge of a Federal facility partnership is the added complication of coordinating two or more agencies' processes, policies, priorities, cultures, communication channels, funding streams, and budget cycles. Partnerships can lead to increased fiscal uncertainties, particularly if two congressional appropriation committees are involved (as is often the case). Partnerships can add a level of complexity and layers of difficulty to any project, but they may be worth pursuing if they enable capabilities and discoveries that could not have otherwise been realized.

3. Best Practices and Select Examples

This chapter describes 12 best practices and provides examples that Federal agencies, departments, and laboratories could consider in planning and implementing interagency facility partnerships. The success of each practice generally depends on the implementation of other practices and on other factors that can influence the project, such as policies, processes, communication, and culture, among others. The practices accordingly span the following aspects of Federal facility partnerships: (1) coordination, (2) planning processes, (3) funding commitments, (4) project agreements, (5) governance and communication, and (6) culture and trust.

The best practices illustrate some of the ways that agencies have effectively planned and implemented facility partnerships.

A. Coordination

Suggestions from stakeholders involved in previous interagency facility partnerships revealed two main practices for coordination.

Practice 1: Identify a lead agency to simplify coordination and management

Typically, facility partnerships that involve two or more agencies are more burdensome with respect to coordinating:

- Communication among staff within and across each partnering agency;
- Alignment of budget requests with priority given the project across the agencies, possibly including interactions with multiple OMB offices and congressional appropriations committees; and
- Agency project review and management policies and processes.

The funding uncertainties present in any Federal capital project may pose a greater risk to Federal facility partnerships. For instance, changes in an agency's leadership could result in a priority shift that can impede an agency's partnership commitments. This can add significant costs to a project and may ultimately prevent the project from moving forward since the partners are dependent on each other's annual funding commitments.

Partnerships that identify a lead agency to serve as the primary manager in developing or implementing the facility project may realize benefits in (1) streamlining the project review process, (2) easing the distribution of funds to operate the facility, and (3) avoiding potential delays, such as in the life-cycle management of the project, that

may result from additional review and funding processes. Below are examples of benefits of a lead agency to partners. Also, refer to Practice 3 for considerations on identifying a lead agency as well as partner roles and responsibilities throughout a facility's life cycle.

Example of Practice 1: Identifying a Lead Agency—Experiences from the Department of Energy

The Department of Energy (DOE) Office of Science (SC) serves as the lead for the development and implementation of the National Synchrotron Light Source (NSLS) I and II located at Brookhaven National Laboratory and the Physical Science Facility (PSF) at the Pacific Northwest National Laboratory.

DOE-SC's NSLS I and II are managed as user facilities with a growing life sciences user community funded primarily by the National Institutes of Health (NIH). Planning for the NSLS-II as a next-generation facility to the NSLS I began in 2005. In planning for the NSLS-II, DOE-SC recognized the significant role of the NIH-supported user community in a future facility (supporting experimental stations, beamlines, research, and researchers). DOE-SC included NIH program staff in the facility planning to ensure that the needs of the NIH-supported user community were considered in the design of the NSLS II. However, DOE-SC serves as the lead agency in managing these aspects of the facility, and NIH was not formally involved in the construction or management of the NSLS-II. In addition, DOE's role as the steward of the facilities provides a clear source of funding and stability in operations.

DOE-SC's PSF involved the Department of Homeland Security (DHS) and the National Nuclear Security Administration (NNSA) in scoping and funding the construction of the facility. DOE-SC was the principal agency managing the facility construction, while DHS provided input into the scope and design requirements necessary for its core research capabilities of interest for the agency. Interviewees remarked on significant difficulties in coordinating the partnership across three different department, agency, and administration processes. The identification of a lead agency streamlined the reviews and simplified decision-making throughout the project.

Sources: Interviews and Peña, Howieson, and Shipp (2013).

To implement a partnership with a lead agency, agencies could consider their willingness to give up some control in managing the project. This situation has inherent sensitivities for departments, agencies, and laboratories that may be wary of depending solely on one partner to develop the facility. This requires a great deal of trust among the partners to effectively manage the project. Reassurance and trust among agency partners could be facilitated by drafting agreements outlining expectations and commitments (see Practices 8 and 9), ensuring the process is transparent and decisions are well communicated (see Practices 10 and 11), and strengthening relationships across agencies (see Practice 12), among other practices presented in this document.

Practice 2: Consider early engagement with the Executive Office of the President, OSTP or OMB, for assistance in convening facility project stakeholders

As previously mentioned, facility projects are more complicated to coordinate when they involve multiple agencies. It is not common practice for agency partners to involve Executive-level offices, such as OSTP or OMB, in the conceptual and early planning

phases of a project. In addition, not all partnerships may warrant discussions with OSTP and OMB. However, when early involvement from Executive-level offices has occurred, it has helped stakeholders address management, budgetary, and other concerns before the project is fully developed. The involvement of Executive offices can facilitate neutral discussions among partners and other Executive-level stakeholders when ideas are sufficiently developed and vetted by department, agency, and laboratory leadership. These discussions encourage interagency dialogue through the early planning and implementation phases of a facility project that can help agencies coordinate and align priorities. Continued dialogue among partners and Executive offices also promotes accountability, transparency, and effective progress through development and implementation of a facility project. See the example below.

Example of Practice 2: Interagency Dialogue to Improve Coordination

The Large Synoptic Survey Telescope (LSST) agency partners, DOE and the National Science Foundation (NSF), meet periodically throughout the year with staff from OSTP and OMB. The meetings provide a venue for agencies to discuss the progress in planning for the facility. These meetings are in addition to others held between DOE and NSF on a regular basis. Executive office staff offer feedback and raise concerns about any aspect of the project's development. Although not a formal process, the informal meetings help the agencies incorporate the guidance and input from OMB examiners into their project proposal. The process has led to a better understanding across stakeholders of how the project meets each agency's mission requirements. It also facilitated the justifications for each agency's annual budget request.

Source: Interviews.

B. Planning Processes

Stakeholders involved in previous interagency facility partnerships suggested three practices related to improving the planning process across Federal departments, agencies, and laboratories.

Practice 3: Outline roles for each partner based on expertise and intellectual contribution

Not every department, agency, and laboratory has experience developing, managing, and implementing an interagency facility partnership or a particular type of facility project. There can be a steep learning curve to effectively coordinate joint activities throughout a facility's life cycle, including planning, construction, and operations. In some partnerships, agencies have taken on responsibilities in areas in which a partner has more experience, such as in facility project management. In these situations, the agencies may not take full advantage of the specific expertise of each agency, which can negatively affect the facility project.

Agencies may benefit from selecting agency partners that have a unique set of core competencies and defining clear responsibilities throughout the project based on each

agency's proficiencies and intellectual contribution. (Refer to Practices 6, 8, and 9 for strategies to outline roles and responsibilities in a Federal facility partnership). Agencies may select these responsibilities based on technical and project management expertise as well as research and mission needs. For example, departments, agencies, and laboratories may have previous experiences that gives them particular strengths in areas such as managing and building large high-energy physics facilities, large telescopes, or satellites. Specifying roles based on expertise promotes efficiency and reinforces accountability as responsibilities are then well-defined.

Practice 4: Agree upon a single facility life-cycle management process by either using one agency's process or a single, hybrid approach of the most stringent policies and processes across partners

Agencies have different policies, processes, and cultures that can present additional burdens to a partnership. When partners each use their own life-cycle management processes throughout a facility's development, it may lead to conflicting requirements, delays, and duplication. Each agency's facility life-cycle management process will typically have its own milestones and requirements that may require a variety of approvals. These checkpoints can create risks throughout the management of a project, particularly if one partner's progress depends on another agency's approval.

To simplify the process, agencies can agree to use either a single agency's life-cycle management processes or a single approach that is a hybrid of multiple agencies' processes. Some partnerships used a hybrid process that was a blend of the most stringent aspects of each agency's processes. Agencies that have used these approaches have both simplified the process and improved the ability to meet intended milestones during planning and implementation. Using one agency's or a single, hybrid process may also streamline the operation and management of a project while reducing the risks that using multiple processes present. See the example below.

Example 1 of Practice 4: Streamlining Processes for Facility Operations

The Hollings Marine Laboratory (HML) is a Federal, State, and academic partnership involving the National Oceanic and Atmospheric Administration (NOAA) and the National Institute for Standards and Technology (NIST). Although NIST and NOAA are agencies within the Department of Commerce, each has its own facility life-cycle management processes. In the collaboration, NIST manages HML and provides laboratory space for NOAA researchers. The agencies agreed upon a streamlined operations process whereby NIST manages the operations of the facility and bills NOAA for the share of their costs for operating the space. They also agreed to use the most stringent elements of each partner's security and safety procedures to make clear the responsibilities across the agencies and researchers.

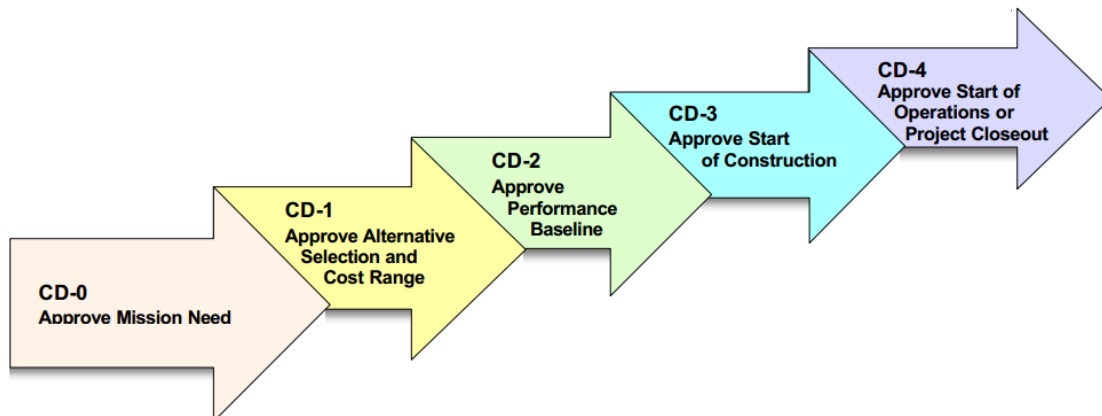
Source: Peña, Howieson, and Shipp (2013).

Not taking a deliberate life-cycle management approach can create momentum that makes it difficult for agencies to halt a project. The irreversible momentum, in some cases, has dramatically increased a project's total costs as agencies continue to allocate funds to the project when it has already overrun its initial budget. Agencies may also perceive that if a large amount of funding has already been invested, it would be imprudent to stop or delay a project for more thorough evaluation even though the initial cost projections no longer apply. In some cases, unanticipated costs eventually forced agencies to withdraw from a partnership.

In some of these cases, the agencies did not necessarily employ the most rigorous review processes available among the partnering agencies to ensure that certain milestones were met before distributing further funding for the design or implementation of a facility project. *Capital Programming Guide* (OMB 2013) a supplement to OMB Circular A-11, Part 7, provides guidance for the capital programming process, which is consistent with a phased approval review process for real property acquisitions used by several agencies that have undertaken Federal facility partnerships. In particular, the early checks by leadership across partners throughout the planning and design of a facility project provide opportunities to raise concerns and maintain awareness of issues that could lead to cost overruns. See the example below.

Example 2 of Practice 4: DOE's Phased Facility Life-Cycle Management Review Process

DOE's Critical Decision (CD) review process for the program and project management of capital asset acquisitions has five approval steps, which also serve as the major milestones for the project (see the figure below). Each CD step addresses requirements that must be met before a project can continue. For example, CD-2 is required before including the project funding in the DOE budget request and allows the design phase to continue once the funds are appropriated.



Incorporating multiple reviews into the project life cycle helps provide clarity and accountability. The review process assists the project with staying on schedule; controlling costs; communicating progress across the agency; and meeting performance, safety, security, environmental, and health requirements. The CD process is tailored to the type of project being pursued as the requirements for environmental restoration, facility disposition, or contracting activities may be different.

Source: DOE (2010).

Cost estimating approaches may also differ across departments, agencies, and laboratories. Successive Government Accountability Office (GAO) studies show that many Federal programs and projects overrun their budgets because the initial cost estimates were too ambitious and unrealistic (GAO 2005, 2006, 2009). The additional complexity of facility partnerships creates additional challenges to assessing costs. Agencies that improperly estimate costs increase the project's risks and stymie the partnerships' ability to accomplish its objectives.

Comprehensive quantitative cost-estimating techniques exist to determine probabilities of different risks and their potential effects on cost of a project. Partners could assess and use the most rigorous cost estimating approaches among the partners. GAO (2009) provides extensive guidance for agencies relevant to developing cost estimates for capital acquisitions, such as facility projects. See the example below.

Example 3 of Practice 4: Cost Estimation Approaches

GAO (2009) considers a work breakdown structure (WBS) to be the cornerstone of every program because it defines the steps necessary to reach a program's goals. A WBS is a valuable communication tool that explains the project needs and how it will be accomplished.

There are product-based and functional WBSs. GAO (2009) considers use of product-based WBSs to be a best practice. A product-based WBS breaks the project down into multiple levels of deliverable components and estimates the costs of each deliverable. This allows a program to track costs and schedules by deliverables and determine what deliverables may impede the project. In contrast, a functional WBS examines the number of workers needed, the number of work hours, the rate of pay, and the cost of materials for an entire project to create a cost estimate. This approach does not provide the level of detail gained from a product-based WBS.

Once agencies decide on a WBS approach, they may consider three common methods used for cost estimating:

- (1) **Analogy:** This approach makes use of actual costs from similar projects and estimates any additional costs from differing scopes. It is a low-cost method although highly dependent on single data points, which presents difficulties when estimating costs for potential design changes.
- (2) **Engineering build-up:** This approach creates a cost estimate by adding up the costs of labor, material, and overhead needed for the project. It is customizable to a given project, but it is more expensive and time consuming and allows for few changes to plans.
- (3) **Parametric:** This approach creates a statistical relationship between physical and performance characteristics of former projects and their costs, including drivers. This technique is typically used when there is insufficient knowledge about the project. It is quick and objective but lacks detail.

Beyond estimating the cost of a project's components, uncertainty analysis can be performed to properly account for risk. GAO (2009) recommends using a Monte Carlo simulation to evaluate uncertainties and the impact to a project's cost estimate. This is a statistical technique that evaluates the probability of defined outcomes by running simulations of a probability distribution many times. The simulation approach allows agencies to examine the probability of achieving a project's cost goals and other outcomes. This data can help agencies make decisions on the project based on an acceptable range of risk and cost variance.

Source: GAO (2009), Chapters 6, 8, and 11.

Practice 5: Outline project dependencies and risks in each partner's budget

Agencies often enter into partnerships without sufficiently considering project dependencies across each partner's budget. For example, agencies may have different annual budget appropriations that dictate when and how they receive funds. In addition, agencies that are funded through a continuing resolution may be legally unable to distribute funds for a new facility project. Such conflicts can lead to delays and additional costs.

Agencies in facility partnerships could improve project management by conducting a thorough analysis of budget risks and dependencies during planning and implementation of their projects. Once known risks and uncertainties are well understood, the agencies could develop mitigation strategies. See the example below.

Example of Practice 5: Assessing and Managing Risks

GAO (2009) suggests that a process to manage project risks involves five steps: identifying possible risks, analyzing the severity of and prioritizing the risks, planning for risk mitigation, implementing a risk mitigation plan, and tracking the risks. This is an iterative process that is continuous throughout the planning and implementation of a facility project. Effective risk management requires identifying, analyzing, and mitigating the risk early enough in the process to remedy it and ameliorate its impacts.

GAO (2009) outlines the following possible sources of risks that could be considered in addition to others when agencies pursue interagency facility partnerships:

- **Business or economic:** These can include changes in labor rate assumptions or economic and market conditions, which impact procurement costs.
- **Cost estimating:** These can include using poor historical data that impact assumptions, limitations of available data, and a lack of time to complete a thorough estimate.
- **Program and organization:** These can include uncertainties in the Federal budget climate as well as political or organizational issues (e.g., critical staff leave Federal service).
- **Requirements:** These can include changes to the design specifications, which require additional engineering, architecture, or program management time, leading to increased costs.
- **Schedule:** These can include factors that delay milestones, such as omitting project approvals and optimistic planning for task durations.
- **Software and Technology:** These can include dependencies on software or technology and optimistic costs or schedules for integrating essential technology, particularly when planning for the use of new or unproven software or technology.

Source: GAO (2009), Chapter 14 and Table 21.

Outlining project dependencies and risks requires a thorough understanding of each partner's processes and needs as well as internal and external expertise in managing and implementing Federal facility projects. Departments, agencies, and laboratories could facilitate this process by involving various perspectives across partners, including individuals in real property management, legal counsel, and project management, among others, that could facilitate identifying and assessing risks. Standardizing this process and

establishing a database of common general risk areas relevant to planning and implementing interagency facility projects could also be useful for future partnerships.

C. Funding Commitments

Two main practices are relevant to establishing and distributing funding commitments based on suggestions from stakeholders involved in previous interagency facility partnerships.

Practice 6: Establish agency cost shares based on the scope of facility capabilities that align with the roles and responsibilities of and benefits to the partners

In many partnerships, agencies decide on their commitments and cost shares, which can include in-kind contributions, by specifying an approximate percentage of total funding or costs for discrete segments of a facility that each partner is willing to fund. These frameworks make it difficult for agencies to properly assess the value of the facility and how its capabilities support each agency's missions and programs. This may also be an ineffective means for agencies to make proper trade-offs among investments.

Some agencies establish funding commitments by, first, identifying the core capabilities that the facility will ultimately provide and, second, assessing the importance and value of each capability to the agency. This exercise allows agencies to discuss their primary interests, willingness to fund certain capabilities, and their respective roles and responsibilities (refer to Practice 3 for further on roles and responsibilities of partners). It also helps agencies understand how critical their contribution is to the success of the project as a whole. This process is typically iterative and can take several months to more than a year, based on past experience. Nonetheless, it could help improve justifications for funding requests and reveal gaps or unnecessary capabilities that can influence the scope of a project. See the example on the next page.

Example of Practice 6: Agencies Identify Core Capabilities to Define Funding Commitments

To establish an agreement on cost-shares at Pacific Northwest National Laboratory's Physical Sciences Facility (PSF), DOE-SC, NNSA, and DHS convened a workshop to identify the requirements for the facility. The agencies defined the core capabilities that the facility would include as those research areas that were necessary and essential for performing each agency's work. The partners used this outline to determine the eventual scope of the facility and assess whether there was sufficient interest in a capability to effectively scope the facility design. Agencies agreed upon the costs for providing each capability and each agency's cost-share was determined based on the costs of the capabilities selected as being of interest to the respective agency. This process was a transparent method of assessing and agreeing upon cost-shares.

Sources: Interviews and Peña, Howieson, and Shipp (2013).

Practice 7: Streamline the transfer of funds to support facility planning, construction, management, and operations

Some facility partnerships have found it useful to transfer funds among partners to aid the integration of capabilities and services. The ease of transferring funds across agencies largely depends on the specific authorities available to each agency. Other factors that can inhibit fund transfers across agencies include agency-level rules and policies governing transfers and the economic and budgetary environment that influences an agency's congressional appropriations.

Agencies may use a variety of mechanisms to transfer funds to other agencies for a facility project's development and implementation, including establishing:

- A Memorandum of Understanding (MOU) or other interagency agreement, which has been used to transfer funds for the design and construction of facilities and large instrumentation (see Practice 8 for benefits and limitations of MOUs), pursuant to the authority provided to agencies through the Economy Act of 1935 (31 U.S.C. §1535);¹
- A joint Treasury fund or working capital fund, which is funded by individual appropriations from agencies and can be used to construct, manage, and operate a facility; and
- A Military Interdepartmental Purchase Request (MIPR) (for the DOD) or other similar agency request, which can be used to transfer funds for supplies and services that support the partnership (GSA 2012).

An important consideration for agencies in funding facility construction is that the transfer of large-scale capitalization funds is governed by Federal laws and an agency's budgeting and accounting procedures, which often prohibits the use of appropriated funds for construction, unless otherwise authorized by law. In some cases, the transfer of funds across agencies has been authorized through legislation. See the example on the next page.

¹ The Economy Act of 1935, as amended in 31 U.S.C. §1535, authorizes the head of an agency or major organizational unit within an agency to place an order with another agency or organizational unit for goods and services under certain circumstances, which obligates an appropriation of the ordering agency or unit. (See 31 U.S.C. §1535 at <http://www.law.cornell.edu/uscode/text/31/1535>).

Example of Practice 7: Creating a Joint Treasury Fund

In 2002, DOD, the Department of the Navy, and the Department of Veterans Affairs (VA) embarked on a joint venture to manage their health care facilities and services through one chain of command at the Lovell Federal Health Care Center. The agencies identified the need to streamline the transfer and distribution of funds between the agencies to provide effective services and health treatment for patients. This led to a request to create a joint Treasury fund specifically to support the facility partnership. After about 2 years of discussions and negotiations among agencies, Executive offices, and Congress, the agencies received the authority to establish a joint Treasury fund in 2010.

The agencies determined that a joint Treasury fund could greatly improve efficiency and cost-effectiveness of facility operations. Without the joint fund, the service costs of a Navy patient who was treated by a VA doctor would be reconciled separately and billed to the Navy at a later time, which could result in payment delays. Agencies envisioned that having a single account for billing services was a requirement for an integrated facility and would eliminate redundancies and inefficiencies in billing and operations.

Sources: Interviews and Peña, Howieson, and Shipp (2013).

D. Project Agreements

Suggestions from stakeholders involved in previous interagency facility partnerships reveal two main practices relevant to establishing project agreements.

Practice 8: Establish multiple levels of agreement to support various aspects of the partnership

A lack of formal documentation that outlines the roles and responsibilities of agency partners can lead to confusion and ineffective management of expectations across agencies. Further, a lack of documented agreements, particularly those involving agency executive leadership, may be perceived by external stakeholders, including OMB and Congress, as indicating the project has a low priority or has not yet been fully vetted by the participating agencies.

Although not legally enforceable, interagency agreements provide reassurance in the form of guidance for each agency's funding, research, and staff commitments over the lifetime of the partnership. Various factors can influence an agency's compliance with MOUs, including budget uncertainties and staff changes.

Agreements outline each agency's roles and responsibilities and generate trust among the partners. Agencies have established multiple levels of agreement that support various aspects of the partnership and reinforce each agency's commitments:

- High-level MOUs or similar agreements can be established as strategic documents that outline the partnership, mission, vision, roles, funding, and other items related to partnership planning and implementation.
- Implementation MOUs or other detailed agreements can be established at the local level to define how funds will be used for specific operational and

functional dimensions of the facility. These agreements can also include inter-service arrangements that describe an agency's responsibilities for various aspects of operations and maintenance.

- Additional agreements such as research MOUs coordinate research programs and researchers across the agencies and bolster the facility partnership's objectives. Agencies have also established data sharing agreements to facilitate the transfer of scientific or technical information across agencies.
- Policies and document guidelines describe procedures for day-to-day management of the facility partnership (including governance boards, subcommittees, and working groups), and cost-sharing document guidelines outline the process for determining each agency's responsibilities for unanticipated costs.

Practice 9: Develop flexible policies and procedures to address changing needs and opportunities as the partnership evolves

If each agency's expectations are not clearly laid out early in a project's development, then it could cause problems later if the scope of the project changes in any way. A lack of policies, procedures, and agreements that do not clarify how future decisions will be made for future needs may prevent a partnership from performing at its optimum level.

Project policies and document guidelines could be developed up front to help manage expectations, roles, and responsibilities as the partnership develops. Agreements could be flexible to reflect the evolving and dynamic nature of Federal facility partnerships. Flexible agreements also make it easier to bring together agencies with different internal cultures and rules. Keeping the number and type of partners adjustable allows agencies to leverage additional resources later as benefits to the partnership. See the example on the next page.

Example of Practice 9: Development of Cost-Sharing Guidelines for Future Costs

U.S. investments in biodefense increased dramatically following 9/11 and the anthrax attacks in 2001. Federal agencies were directed to coordinate their programs to maximize the unique capabilities of each of the agencies involved in biodefense research programs. The agencies eventually formed the National Interagency Confederation for Biological Research (NICBR), and they coordinated facilities and research at the National Interagency Biodefense Campus (NIBC) located in Fort Detrick, Maryland.

The original agencies of NICBR involved the National Institute of Allergy and Infectious Diseases (NIAID), the National Cancer Institute (NCI), and the U.S. Army Medical Research and Materiel Command (MRMC). In 2003, the Departments of Agriculture and Homeland Security joined NICBR, followed by the Centers for Disease Control and Prevention (CDC) in 2005, the Naval Medical Research Center (NMRC) in 2010, and the Food and Drug Administration (FDA) in 2012.

As the partnership grew, so did the campus at Fort Detrick as new facilities were built at the NIBC. During the planning stages of an infrastructure upgrade to NIBC/NICBR, the partners identified a need to upgrade the electricity and steam infrastructure, but there were no documented guidelines on how to share the cost for the construction and services to be provided by a new Central Utility Plant (CUP). Initially, disagreements about which agency should be responsible for the new infrastructure yielded mistrust among the partners, and agencies became concerned that the costs of the CUP would hinder their research programs. Eventually, the MRMC conducted an external audit to verify the cost of the CUP and instituted a transparent process and exchange of information that allowed the agencies to assess the CUP's costs and come to an agreement on cost shares.

Recognizing that the partnership would have benefited from having a cost-sharing agreement in advance of the need for the CUP, the partners agreed upon a cost-sharing document to outline the decision-making process and manage expectation in the event future infrastructure needs arise.

Sources: Interviews and Peña, Howieson, and Shipp (2013).

E. Governance and Communication

Stakeholders involved in previous interagency facility partnerships suggested two practices involving effective communication through governance among partners and other stakeholders.

Practice 10: Develop formal and informal mechanisms to communicate ideas, concerns, and feedback across the local level to agency executive leadership

Due to the complexity of facility partnerships, decision-making may not always be transparent, which can lead to mistrust. Inefficient and ineffective communication can also lead to unwillingness to work through the many challenges a facility partnership may experience.

As alluded to throughout this best practices document, agencies could improve transparency in several ways. Approaches may include sharing details of internal agency processes so that each agency's information needs can be understood and regularly communicating the status of progress within each agency's process. Transparency promotes confidence and reinforces the roles and responsibilities that the agency partners have established. An open and transparent process may help build confidence within and

across the agencies. Effective communication may also assist agencies, raise concerns, and identify resolutions across various levels of staff within an agency, which keeps partners aware of issues that could derail progress.

Support from all levels of leadership may significantly benefit the development of a facility partnership. Partnerships with engaged leadership that communicate a consistent message of support across the agencies may be more likely to endure the political and budgetary concerns and local implementation challenges that may arise.

The scope, scale, and complexity of interagency facility partnerships drive agencies to seek a range of internal and external stakeholder advice. Agencies have established project teams, committees, and similar groups that involve interagency participation to help communicate information and identify resolutions. Individuals involved come from various backgrounds that may include real property management, facility management, legal counsel, financial and budget management, human capital, legislative affairs, and research program management. They may include contractors and other external stakeholders in addition to staff from the partnership agencies and laboratories. In cases where no expertise exists internally, agencies interested in pursuing a partnership could seek lessons learned and frameworks from agencies that have pursued these mechanisms in the past. See the example below.

Example of Practice 10: Agency and Local Level Leadership Engagement

The Lovell Federal Health Care Center comprises multiple facilities that were originally individually managed by the VA and DOD and are now integrated and jointly managed by staff from the VA (Director) and the Navy Department (Deputy Director). Several steering groups, advisory boards, and councils support the operations and management of Lovell. These governance bodies include a combination of senior staff from DOD, Navy, and VA. Issues are elevated through the chain of command from the local executive leadership levels to the Facility Operations Steering Group and the joint councils, such as the Health Executive Council (HEC) and the Joint Executive Council (JEC), which includes membership from the DOD and VA at the under secretary and assistant secretary levels.

During planning for Lovell, the JEC and HEC depended on leadership at the local level to outline requirements and needs to implement the partnership. This provided a more efficient process to outline the roles and responsibilities of each partner based on local experience with operating and managing the facilities. The governance structure allowed bottom-up issues and concerns to reach agency executive leadership at the highest levels if necessary to resolve issues through the HEC and JEC.

Sources: Interviews; Peña, Howieson, and Shipp (2013); and TRICARE Management Activity (undated).

Practice 11: Establish governance structures to work through unanticipated challenges

Agencies often encounter unanticipated challenges during the implementation of a facility partnership that can cause delays, increase costs, and decrease trust among partners. Although not all uncertainties can be anticipated and addressed during planning, agencies that develop a formal process to identify areas that could hinder the project are

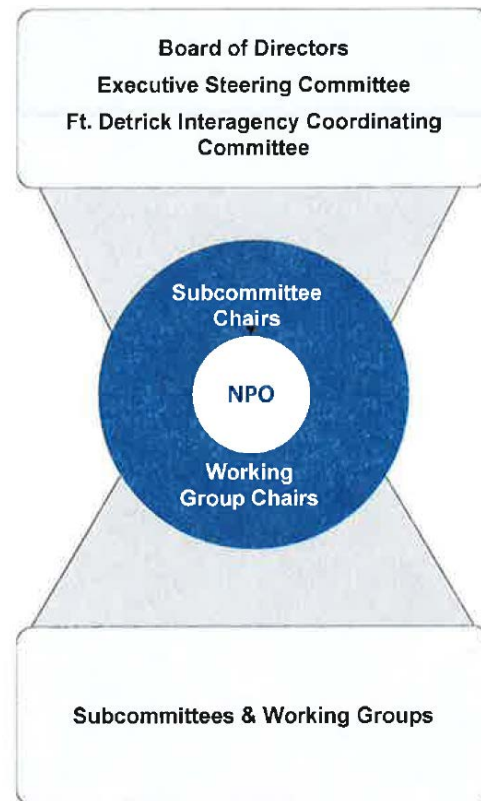
able to better sustain the partnership during periods of instability (e.g., funding uncertainty and staff transitions). One way of doing this is by outlining a governance structure in which various management levels involved in the partnership interact across the working groups, governance boards, committees, councils, and other bodies. This framework facilitates the exchange of information and engages partners in identifying potential challenges and ways to resolve them. See the example below.

Example of Practice 11: Establishing a Partnership Governance Structure

The agencies involved in the NICBR/NIBC partnership established a governance model for managing and operating the partnership (see figure at right). The model consists of the following entities:

- Board of Directors, Executive Steering Committee, and Fort Detrick Interagency Coordinating Committee, which provide strategic direction, decision-making, and oversight
- National Partnership Office (NPO), which was set up to provide a venue and full-time staff to assist in the partnership's day-to-day management
- Active subcommittees, including scientific interaction, sustainment, finance, security, safety, information management, and public affairs and community relations
- Thematic working groups in addition to the ad hoc working groups with legal and medical directors as members

Agency partners fully engage in each of the governance bodies. Some partners have assigned dedicated staff to the partnership to facilitate coordination and communication.



Sources: Interviews; Peña, Howieson, and Shipp (2013); and Archibald (2012).

F. Culture and Trust

There is one main practice from stakeholders on establishing trusting relationships that transcend culture.

Practice 12: Create relationships to effectively understand complementary program activities and needs as well as improve confidence in partner commitments

As previously mentioned, agencies may be motivated to partner with other agencies to take advantage of the unique expertise and intellectual contribution that a partner can bring to the development or management of a facility project. In certain cases, agencies may not have a historical precedent of working together, either on a facility project or

coordinating within a particular program. This can lead agencies to misunderstand of objectives, expectations, and complementarities across partners.

Potential partners can improve their understanding by actively engaging in activities at the intersections of their missions. Such engagement can help them recognize how one agency's objectives complement or align with those of another agency. The dialogue that arises across department, agency, and laboratory staff enables the partners to understand their current mission needs; anticipate changes to requirements, including how they may impact the project scope and implementation; and establish clear expectations of each agency's role based on their objectives. Relationships that foster open and frequent communication build an environment of trust and transparency that is fundamental to a partnership's success. See the example below.

Example of Practice 12: Formal and Informal Mechanisms to Build Relationship

Agencies find both formal and informal methods of collaborating and fostering relationships. Agreements, such as MOUs, may dictate the frequency of formal communication throughout the development of a facility project, such as quarterly and monthly meetings or reports. Agencies may also have built relationships by managing joint research programs or projects, which may provide a foundation for the relationships needed when pursuing a larger-scale, interagency facility partnership.

Agencies also seek informal ways to foster relationships, such as participation in National Academy of Sciences committee meetings that are relevant across multiple agencies' programs as well as annual meetings and conferences in their respective fields. These venues provide other ways for agency counterparts to meet and discuss not only a facility project, but also other areas that are useful for improving understanding of a partner's mission, programs, and priorities.

Personalities are an aspect of culture, responsiveness, communication, and management that also contributes to the degree of trust among agencies. Difficult personalities may contribute to participants' unwillingness to work beyond an agency's culture, programs, and processes and lead to ineffective management of a facility partnership. In some cases, agency leadership selects staff members that have previous experience and a track record of working across agencies on a facility or other type of interagency project. Although human behavior and personalities are not easily predicted or controlled, it is important for staff that are participating in the facility partnership to actively engage and contribute to a culture of respect and effective communication.

Sources: Interviews and Peña, Howieson, and Shipp (2013).

Agencies have sought relationships in which staff are not hesitant to reach out to their counterparts at a moment's notice, thereby easing the exchange of information. In these cases, close working relationships provide reassurance that the partners will respond to internal agency requests regarding the facility project in a timely manner. Timely response contributes to a culture of respect for another agency's processes by recognizing the urgency of requests from other agencies for updates, progress, data, or other information. In some partnerships, close relationships across agencies in one function or organizational area has had positive network effects to foster new working relationships across other functional or organizational areas of the partnership.

4. Conclusion

A Federal facility partnership can be a rewarding undertaking that enables the completion of a project that may have been difficult or impossible for a single agency to pursue. The practices described in this document align to the following questions that departments, agencies, and laboratories could consider before embarking on a partnership:

- *Can/should a single agency fund the project?* It is important to consider and make clear the rationale for the partnership. Examples of rationales may be one agency's unique expertise in project management or historical track record in constructing a certain type of facility, synergy across participating agencies' research programs, and shared intellectual contribution and interest of each partner (Practices 3 and 6).
- *Does the project have champions from all leadership levels and across the EOP to support planning and implementation?* Strong drivers of the success in facility partnerships include broad engagement and support from participating laboratories, agencies, and the EOP as well as strong governance structures that support these across the partnership (Practices 2, 10, and 11).
- *Do the participating agencies have a fruitful history of working together?* Not all facility partnerships begin with a history of participating agencies working together, for example, in coordinating research programs or facilities. In addition, relationships established across agencies with individual program and project managers may dissolve as staff transition out of their roles and new staff enter into those positions. As such, agencies should carefully consider whether starting a partnership of the size and scale of a facility project is a sensible first joint venture and whether partners are sufficiently confident in their understanding of each agency's processes, priorities, cultures, and objectives for the project. Working on projects at a small scale, such as joint-research programs, among other activities can provide insight into an agency and provide a foundation for building the fruitful relationships critical to a future facility partnership (Practices 12).
- *Are participating agencies willing to share, develop, and forego project management responsibilities depending on their expertise?* Simplifying and streamlining the planning and implementation processes across the agency partners are effective partnership strategies (Practices 1, 4, and 7). Agencies

could consider delineating clear responsibilities that avoid duplication throughout project management to decrease the complexity of a facility partnership (Practices 8 and 9). But agencies may be limited in simplifying due to such factors as political or internal pressures and stringent agency policies.

- *Can participating agencies justify the complications inherent to multiple agencies funding a project?* Important considerations of the risks and uncertainties of a facility partnership include the need to depend on other agencies' approval, review, and appropriations processes as well as on their commitment, which need to be maintained over the life of the partnership. Proper reviews by internal and external stakeholders, risk analyses, and cost estimation techniques can help prepare agencies and effectively assess contingencies to mitigate the identified risks (Practices 4, 5, and 10).

Partnerships that carefully consider these questions and accordingly adopt the practices presented in this document, as appropriate, may enjoy the many benefits of an effective Federal facility partnership.

Appendix

Federal Facility Partnerships Investigated

The project team developed the practices in this document by reviewing the lessons learned from previous partnerships and the specific strategies used that facilitated planning and implementation. The project team supplemented the analysis of five Federal facility partnerships identified by Peña, Howieson, and Shipp (2013) with four additional partnerships. Table A-1 presents their types, the Federal partners, and their locations.

Table A-1. Nine Federal Facility Partnerships Investigated for the Best Practices Document

Partnership	Type	Federal Partners	Location
Captain James A. Lovell Federal Health Care Center*	Cooperation and integration of planning, management, and operations	DOD – Navy, VA	Chicago, Illinois
Deep Underground Science and Engineering Laboratory (DUSEL)	Co-funding of a single facility	DOE-SC, NSF	Lead, South Dakota
Fermi Gamma-ray Space Telescope (formerly GLAST)	Co-funding of large instrumentation	DOE-SC, NASA, International Space Agency	Space
Hollings Marine Laboratory (HML)*	Co-funding of supportive infrastructure or services; cooperation and integration of planning, management, and operations	NIST, NOAA	Charleston, South Carolina
Large Synoptic Survey Telescope (LSST)	Co-funding of large instrumentation	DOE-SC, NSF	El Peñón, Chile
Life Sciences Beamlines at the National Synchrotron Light Source (NSLS) I and II*	Co-funding of large instrumentation/user facility	DOE-SC, NIH	Long Island, New York
National Bio and Agro-Defense Facility (NBAF)	Cooperation and integration of planning, management, and operations	DHS, USDA	Manhattan, Kansas
National Interagency Confederation for Biological Research (NICBR)/National Interagency Biodefense Campus (NIBC)*	Co-location; co-funding of supportive infrastructure or services	CDC, DHS, DOD (NMRC), FDA, NIH (NIAID, NCI), U.S. Army MPMC, USDA	Frederick, Maryland (Fort Detrick)
Physical Sciences Facility (PSF)*	Co-funding of a single facility	DHS, DOE-SC, NNSA	Richland, Washington

Note: Refer to the list of abbreviations and their meanings at the back of this document.

* Facilities identified in Peña, Howieson, and Shipp (2013).

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Abbreviations

CD	Critical Decision
CDC	Centers for Disease Control and Prevention
CUP	Central Utility Plant
DOD	Department of Defense
DOE	Department of Energy
DHS	Department of Homeland Security
DUSEL	Deep Underground Science and Engineering Laboratory
EOP	Executive Office of the President
FDA	Food and Drug Administration
GAO	Government Accountability Office
GSA	General Services Administration
HEC	Health Executive Council
HML	Hollings Marine Laboratory
IDA	Institute for Defense Analyses
JEC	Joint Executive Council
LSST	Large Synoptic Survey Telescope
MOU	Memorandum of Understanding
MRMC	Medical Research and Materiel Command
MIPR	Military Interdepartmental Purchase Request
NASA	National Aeronautics and Space Administration
NBAF	National Bio and Agro-Defense facility
NCI	National Cancer Institute
NIAID	National Institute of Allergy and Infectious Diseases
NIBC	National Interagency Biodefense Campus
NICBR	National Interagency Confederation for Biological Research
NIH	National Institutes of Health
NIST	National Institute of Standards and Technology
NNSA	National Nuclear Security Administration
NMRC	Naval Medical Research Center
NOAA	National Oceanic and Atmospheric Administration
NPO	National Partnership Office
NSF	National Science Foundation
NSLs	National Synchrotron Light Source
NSTC	National Science and Technology Council
OMB	Office of Management and Budget
OSTP	Office of Science and Technology Policy
PSF	Physical Sciences Facility
R&D	research and development

SC
STPI
USDA
VA
WBS

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work breakdown structure

REPORT DOCUMENTATION PAGE

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1. REPORT DATE (DD-MM-YYYY) XX-06-2014		2. REPORT TYPE Final		3. DATES COVERED (From - To) Dec 2013 - May 2014	
4. TITLE AND SUBTITLE Best Practices for Federal Research and Development Facility Partnerships				5a. CONTRACT NUMBER NSFOIA0408601	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Peña, Vanessa Whelan, Ryan M. Howieson, Susannah V.				5d. PROJECT NUMBER	
				5e. TASK NUMBER TP-20-1000.00.CK	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Science and Technology Policy Institute 1899 Pennsylvania Avenue, NW, Suite 520 Washington, DC 20006-3602				8. PERFORMING ORGANIZATION REPORT NUMBER IDA	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Office of Science and Technology Policy Eisenhower Executive Office Building 1650 Pennsylvania Ave, NW Washington, DC 20500				10. SPONSOR/MONITOR'S ACRONYM(S) OSTP	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited (19 June 2014).					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT The Office of Science and Technology Policy (OSTP), in conjunction with the Office of Management and Budget (OMB), requested that the IDA Science and Technology Policy Institute (STPI) establish a best practices document concerning Federal partnerships for scientific facilities, infrastructure, and large instrumentation. Federal facility partnerships can be used to leverage the resources of two or more Federal departments or agencies to develop a project of mutual interest. Although opinions on Federal facility partnerships are mixed, these partnerships may help agencies realize a project of a scope that is difficult or impossible for a single agency to pursue. However, Federal facility partnerships can be complicated due to coordinating two or more agency processes, policies, cultures, communication channels, funding streams, and budget cycles, among other factors. This document describes several best practices and examples that Federal department, agencies, and laboratories could consider in the planning and implementation of facility partnerships. The best practices described here are derived from discussions with stakeholders and documentation related to nine Federal facility partnerships pursued across the Government.					
15. SUBJECT TERMS Federal; interagency; partnerships; best practices; lessons learned; coordination; planning; funding; agreements; governance; communication; culture; trust					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report	18. NUMBER OF PAGES 33	19a. NAME OF RESPONSIBLE PERSON Skaggs, Reed
a. REPORT Unclassified	b. ABSTRACT Unclassified	c. THIS PAGE Unclassified			19b. TELEPHONE NUMBER (Include area code) 202-456-6120