

# **NOAA INTEGRATED OCEAN OBSERVING SYSTEM**

## **REVIEW OF MECHANISMS FOR FUNDING AND SUSTAINING REGIONAL OBSERVING SYSTEMS**

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# Chapter 1

## Introduction

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The U.S. government, with a broad range of partners, is in the process of implementing an Integrated Ocean Observing System (IOOS) to increase knowledge of the ocean and coastal environment, including the Great Lakes. The rapid growth in the number of people living in immediate proximity to the ocean is placing conflicting demands on coastal ecosystems and placing an increasingly large segment of our society at risk to natural hazards. These challenges create an immediate need for an IOOS that will make more effective use of data resources to help predict these natural hazards, support ecosystem-based management, and link ocean data and information to a broad range of applications.

Development of IOOS is dependent upon the partnership of U.S. government agencies (federal and state), private enterprise, academia, and nongovernmental organizations who maintain a vast network of observing, data management, and analytical capabilities to help address national and regional priorities. The National Oceanic and Atmospheric Administration (NOAA), as the lead federal agency for implementing IOOS, has a program that is marshalling efforts to design, operate, and improve the national and coastal network of ocean observations, in part through developing a national network of Regional Coastal Ocean Observing Systems (RCOOS). Until recently, NOAA's investment in RCOOS has been through a series of congressionally directed projects. As federal agencies began to develop plans for a coherent system, Congressional action was key to the development of initial regional IOOS components, with directed funding "jump starting" the IOOS development processes. But, lacking a formal program, it was difficult to establish accountability and metrics to evaluate progress toward meeting established program goals. Now, however, the newly created NOAA IOOS program is transitioning this effort from separate small-scale projects to a cohesive and long-term operational network of observing systems, with emphasis on ensuring accountability and demonstrating accomplishments. In FY07, the NOAA IOOS program began this transition through the use of a competitive funding opportunity announcement resulting in the award of cooperative agreements.

The NOAA IOOS program seeks information on additional or alternative ways to fund and sustain regional observing systems and asked LMI to review potential funding mechanisms. This study reflects a part of the IOOS program's effort to establish a more efficient funding process, develop accountability and performance measures for the IOOS-funded regional efforts, and promote the sharing of knowledge and lessons learned among the regional IOOS partners and between these partners and NOAA. This review is part of a larger task, in which LMI is working with the NOAA IOOS program to develop a business model that successfully enables the development and sustainment of a national network of

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regional observing systems that will meet both national and local needs for ocean information.

This report provides LMI’s findings on alternative models and preliminary observations on the suitability of various funding mechanisms (also termed “funding instruments”) for application in the NOAA IOOS environment. The business model effort—comprised of an “as-is” identification and “to-be” recommendation—will be addressed in separate, future reports.

## BACKGROUND

Within the United States, the IOOS is a coordinated network of people and technology, under the auspices of various federal and nonfederal partners, that works to generate and disseminate continuous data on changes in our coastal waters, Great Lakes, and oceans.<sup>1</sup> The development of IOOS has a long history, dating back to the initial recommendations for a Global Ocean Observing System at a 1992 United Nations Conference on Environment and Development. Congress first expressed an interest in IOOS in 1998 when it requested that the National Ocean Research Leadership Council (NORLC) propose “a plan to achieve a truly integrated ocean observing system.” Subsequent studies and reports—including the 2002 Arlie House Workshop and the 2004 congressionally established Ocean Commission Report—provided insight and recommendations for the establishment of IOOS and identified some elements of the system.

In 2005, the establishment of IOOS capabilities became national policy as the result of a Presidential declaration in the U.S. Ocean Action Plan<sup>2</sup> and authority derived from several federal statutes. NOAA, through the IOOS program, is the lead federal agency for administration and implementation of IOOS.<sup>3</sup> A NOAA Decision Memorandum dated December 15, 2006, directs the establishment of the IOOS program within NOAA. The IOOS program’s mission is to execute IOOS within NOAA in collaboration with federal and nonfederal partners. Among these partners are the following agencies and organizations:

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<sup>1</sup> According to <http://ioos.noaa.gov/about/basics.html>, the changes occurring in the oceans that IOOS monitors include, among many others, sea-level rise, coastal flooding, algal blooms, and dead zones.

<sup>2</sup> See <http://ocean.ceq.gov/actionplan.pdf>. Also see [http://www.ocean.us/ocean\\_us\\_mission](http://www.ocean.us/ocean_us_mission), which describes the history of the governance structure: On September 20, 2004, the U.S. Commission on Ocean Policy completed a thorough and expansive report, *An Ocean Blueprint for the 21st Century*. On December 17, 2004, the President submitted to Congress his formal response, *U.S. Ocean Action Plan*, which created a new ocean governance structure for the United States.

<sup>3</sup> Charter of the Interagency Working Group on Ocean Observations, Joint Subcommittee on Ocean Science and Technology, Committee on Environment and Natural Resources, National Science and Technology Council, December 19, 2006.

- ◆ *Federal partners.* Under the congressionally created National Oceanographic Partnership Program (NOPP),<sup>4</sup> 15 federal agencies<sup>5</sup> share the responsibility for developing and executing the national IOOS under NOAA's leadership. In 2000, NOPP established Ocean.US as a federal interagency office to be supported by 10 agencies. Ocean.US provides the planning and collaboration to integrate existing and prospective elements and establish a sustained ocean observing system to meet common research and operational agency needs.
- ◆ *Nonfederal partners.* Under NOAA's leadership, nonfederal partners support IOOS with both operational tasks (such as providing data and maintaining established observing systems) and research tasks (such as developing additional or enhanced observing capabilities; or new or improved models, analysis, and decision support tools). Most of this effort is coordinated by Regional Associations (RAs)<sup>6</sup> and RCOOS, which are funded in part under NOAA's recently awarded cooperative agreements. The 11 RAs—and the National Federation of Regional Associations (NFRA)<sup>7</sup>—were established to engage researchers, data providers, and user groups from the public, private, and academic sectors in identifying regional data and information needs. The RAs provide governance for regional (state and local) coastal ocean observing systems. That governance includes understanding the needs of observing system users and ensuring that those needs are met through the RCOOS and regionally specific modeling, analysis, and decision support tools.

For our analysis of funding mechanisms, LMI focused on the efforts funded through the RAs and the academic or research institutions.

In recent years, NOAA has issued aggregate funding in the range of \$20 to \$30 million per year for the regional activities of the RAs and RCOOS. The RAs and the RCOOS have been separately funded by NOAA. One proposition before NOAA is whether these two funding streams should be combined.

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<sup>4</sup> NOPP was established by the U.S. Congress (Public Law 104-201) in FY97.

<sup>5</sup> See <http://www.nopp.org> for a complete list of participating federal agencies. Among the federal agencies involved in observing oceans are NOAA, National Aeronautics and Space Administration (NASA), National Science Foundation, U.S. Army Corps of Engineers, U.S. Coast Guard, U.S. Department of Energy, U.S. Department of Homeland Security, U.S. Environmental Protection Agency, U.S. Geological Survey, U.S. Minerals Management Service, and U.S. Navy.

<sup>6</sup> The 11 RAs are Alaska Region, Caribbean Region, Central and Northern California Region, Great Lakes Region, Gulf of Mexico Region, Mid-Atlantic Region, Northeast Region, Pacific Islands Region, Pacific Northwest Region, Southeast Region, and Southern California Region. See <http://ioos.noaa.gov/partners/regional.html>.

<sup>7</sup> NFRA is a nonprofit trade association founded in February 2005.

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Against this background, some of the considerations for selecting future funding mechanisms emerge. Among the criteria that are important is a mechanism's ability to

- ◆ access a range of nonfederal partners, including academia, and
- ◆ provide for both operational tasks and research tasks.

In addition to concerns about how best to fund the efforts of nonfederal partners, internal NOAA considerations are relevant to the choice of funding mechanisms. Specifically, the funding mechanisms should offer the following:

- ◆ *Efficiencies and accountability.* The NOAA IOOS program is a relatively new organization, established to serve as the overall coordinator of NOAA's IOOS activities and to provide a consistent management function. It operates with a streamlined staff that needs to use similarly streamlined funding mechanisms. This translates into a program that seeks to provide strategic programmatic oversight and rely heavily on long-term partners for day-to-day activities, combined with necessary federal programmatic and business oversight and involvement to ensure accountability and desired programmatic outcomes.
- ◆ *Long-term relationships to foster business and programmatic objectives consistent with broadly based federal requirements.*
  - Program personnel generally want a long-term relationship with non-federal partners. This is especially true when the program is focused on carrying out long-term research or sustaining an operational capability. From the programmatic perspective, there is sometimes a distinction between "funding"—which is viewed as shorter term—versus "support"—which is viewed as fostering a program.
  - Acquisition and financial assistance managers are required by law to require or encourage a competitive approach to the award of federal funds. In the case of contracts, the Competition in Contracting Act (CICA) of 1984 (Public Law 98-369, 41 U.S.C. 251, et seq.) mandates competition, with a limited set of exceptions. For financial assistance agreements, the Federal Grant and Cooperative Agreement Act of 1977 (31 U.S.C. 6301, et seq.) encourages competition. Competition offers a host of potential benefits, including better prices, expansion of the supplier/partner base, and access to innovation and new technologies.

## STUDY APPROACH

To carry out the funding mechanism assessment for the NOAA IOOS program, LMI gathered and analyzed information and data from a variety of sources. We collected information primarily through telephone interviews, first with individuals in NOAA and other federal agencies with programmatic responsibilities (called “program personnel” for ease of reference), then with individuals in NOAA with acquisition and financial assistance responsibilities (referred to here as “business personnel”). LMI provided interview candidates with a general background on the use of funding mechanisms for the NOAA IOOS, but did not supply any read-ahead materials or prescribed questions. After completing each set of interviews, LMI conveyed findings and observations to NOAA IOOS personnel through a telephone briefing.

### Program Personnel Interviews

NOAA provided the names of programs and organizations (and in some cases, the names of individuals in those programs and organizations) in NOAA and other federal agencies with programmatic responsibilities for the alternative models of interest to NOAA. LMI contacted representatives of these programs and organizations to gather input on the approach used to distribute funding to partners and other related topics.

Table 1-1 identifies the 10 programs and organizations that LMI interviewed.

*Table 1-1. NOAA and Other Government Organizations Interviewed*

NOAA	Other government organizations
Applied Research Centers (ARCs)	Centers for Ocean Science Education Excellence (COSEE)—National Science Foundation (NSF)
Coastal Zone Management Program (CZMP)	
Cooperative Institutes (CIs)	Federally funded research and development center (FFRDC), Thomas Jefferson National Laboratory (JLab)—Department of Energy (DOE) <sup>a</sup>
National Estuarine Research Reserve System Program (NERRS)	
Next Generation Radar Program (NEXRAD)	
Regional Integrated Sciences and Assessments (RISA) Programs	Multidisciplinary University Research Initiative (MURI)—Department of Defense (DoD)
Sea Grant Program	

<sup>a</sup> Interview with an official of the organization operating the FFRDC, not a government official.

Although LMI did not use predefined questions during these interviews, in general, the goal was to gather information on the following topics:

- ◆ Description
- ◆ Activity scope

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- ◆ Authority required (whether special authority was required for the program or component for the arrangements it uses)
  - ◆ Type of funding mechanism (grant, cooperative agreement, contract)<sup>8</sup> and its duration
  - ◆ Federal programmatic role (whether it involves planning, program management, evaluation, oversight, and the like)
  - ◆ Advisory body or bodies (particularly the body's "tier"—whether it was at the federal level or a different tier)
  - ◆ Collaboration approach
  - ◆ Transition issues (whether challenges have arisen in transitions from type of business arrangement to another or one business partner to another).

Before each interview, LMI independently researched the program using online, published resources. Our purpose was to conduct efficient interviews with minimal disruption to the interviewees.

We conducted the interviews in September and October 2007 and reported the results telephonically to the NOAA IOOS program on October 15, 2007.

## Business Personnel Interviews

LMI contacted NOAA business personnel to ascertain current business policies, processes, and practices that might affect the funding mechanisms used in support of the IOOS program. We spoke to the line office responsible for contracting, as well as the grants policy office. We interviewed these business personnel in November 2007 and, on November 21, 2007, reported the results telephonically to the NOAA IOOS program.

## CONSTRAINT

For this part of the overall task, LMI focused exclusively on reporting findings and preliminary observations related to funding mechanisms for regional activities. The forthcoming analysis of alternatives will be part of the "to-be" business model and will include conclusions and recommendations on appropriate funding mechanisms.

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<sup>8</sup> Throughout this report, the term "grant" refers to both grant and cooperative agreement, unless specified otherwise (e.g., where grant and cooperative agreement are each identified separately).

## REPORT ORGANIZATION

The remaining chapters of this report convey our findings and preliminary observations:

- ◆ Chapter 2 presents our findings and observations associated with programmatic considerations.
- ◆ Chapter 3 contains our findings and observations related to business arrangements and funding mechanisms.
- ◆ Chapter 4 presents our observations on business process objectives and discusses next steps.

The appendixes provide additional information.

## Chapter 2

# Program Considerations

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In this chapter, we present our findings and preliminary observations on a number of dimensions discussed during LMI’s 10 interviews with program personnel in NOAA and other federal agencies. We address the following topics:

- ◆ Scope of activities funded and funding instrument
- ◆ Authority
- ◆ Duration of funding and relationship
- ◆ Federal role
- ◆ Advisory bodies
- ◆ Collaboration approach
- ◆ Transition issues.

Appendix A contains a summary of each program, as well as a synopsis of the information gathered from the interviewees on the above topics.

Benchmarking these various programs provided useful information—particularly lessons learned—that NOAA IOOS can consider as it moves forward; however, there is no single answer on any one of the issues LMI explored. Coupled with the preliminary observations here, the forthcoming “to-be” business model will better position NOAA IOOS on the way forward.

## ACTIVITY SCOPE AND FUNDING INSTRUMENT

### Findings

LMI determined, based on the interviewees’ responses concerning program scope and our independent research, that the extramural activities of the 10 programs fell into three categories: operations only (administration, maintenance, and program management efforts), research only (basic and applied), and “research-plus” (basic and applied research, plus an operational, education, training, and/or outreach element). These three categories present a spectrum of complexity, ranging from least complex (operations only) to most complex (research-plus). LMI placed each program in a single category, based on the preponderance of its endeavors; in other words, although any program has an operational aspect, we were

focused on the program's *primary* activity. (Most of the people we interviewed were involved with operations only or research only.) We categorized 5 of the 10 programs as research only, 4 as research-plus, and 1 as operations only.

Table 2-1 summarizes the activity scope and funding mechanism for each of the 10 programs and organizations whose personnel we interviewed. Most have a research-only focus and use grants or cooperative agreements as the funding instrument. (Chapter 3 provides a more detailed discussion of these funding mechanisms.)

*Table 2-1. Scope and Funding Mechanism Used by the Programs and Organizations Interviewed*

Activity scope	Program or organization	Funding mechanism
Operations only	◆ NEXRAD	Contract
Research only (basic and/or applied)	<ul style="list-style-type: none"> <li>◆ Cooperative Institutes; users include—               <ul style="list-style-type: none"> <li>○ ARC</li> <li>○ RISA</li> </ul> </li> <li>◆ MURI</li> <li>◆ JLab—operated as an FFRDC by a LLC (university and commercial firm)</li> </ul>	Grants and/or cooperative agreements (except JLab, which uses a contract)
Research-plus (operations, education, training, and/or outreach)	<ul style="list-style-type: none"> <li>◆ COSEE—service organizations for outreach to the ocean research community</li> <li>◆ CZMP—federal–state partnership</li> <li>◆ NERRS—Federal–state partnership</li> <li>◆ Sea Grant—Federal–state university partnership</li> </ul>	Grants and/or cooperative agreements

## Preliminary Observations

The NOAA IOOS program fits within the research-plus category (the most complex). We based this determination on the goals and objectives identified in the NOAA IOOS 2008–2014 strategic plan.<sup>1</sup>

Another observation is that no single funding mechanism is right for all situations. The mechanism must be selected case by case, considering goals, risk allocation, performance incentives, and other factors.

<sup>1</sup> See [http://ioos.noaa.gov/pdfs/IOOS\\_Prog\\_StratPlan.pdf](http://ioos.noaa.gov/pdfs/IOOS_Prog_StratPlan.pdf).

## AUTHORITY

### Findings

LMI asked each program representative whether the program required special authority to enter into atypical business arrangements. We were seeking information about any *special* authorities that enabled approaches that differed from the norm. For example, statutory or other specific authority might be required to engage in special relationships such as those of a longer duration than typically permitted. LMI determined that the business arrangements used by each of the 10 programs and organizations generally have been designed without benefit of special statutory authority.

### Preliminary Observations

The NOAA IOOS program can readily adapt aspects of other programs for its own use, where it makes sense unless it requires special authority not readily available. In other words, although no single benchmarked program, in its entirety, will be directly applicable to NOAA IOOS (because each program has unique aspects, such as individual goals and objectives), the NOAA IOOS program can consider use of selected best practices.

## DURATION OF FUNDING AND RELATIONSHIP

### Findings

The actual duration of the federal-nonfederal relationships in the programs we benchmarked ranged from 3 years to 20 years. The duration depended largely on the purpose of program:

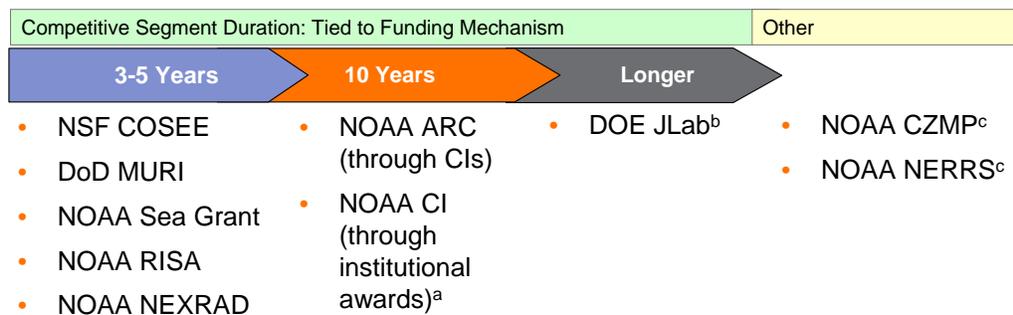
- ◆ *Execution of standard projects.* Those discrete activities with a defined start and anticipated finish had the shortest duration (3 to 5 years), although these can be extended through competition or a sole-source modification, with or without additional funding.
- ◆ *Execution of broad-based research programs.* Certain research efforts that represent a “program of projects” had relationship durations beyond those of individual projects, in order to foster longer-term program research objectives (up to 10 years for a special arrangement, such as NOAA’s Cooperative Institutes).
- ◆ *Fulfillment of a special research and development (R&D) need that is integral to the mission and operation of the sponsoring agency.* The arrangement that supported a long-term, comprehensive R&D need had the longest relationship duration (up to 20 years for an FFRDC sponsoring

agreement, with periodic review and renewal at least every 5 years; the FFRDC arrangement is implemented through a contract with an administering organization, with technical efforts assigned on a task basis).

- ◆ *Fulfillment of programs required by statute.* Some program approaches are defined in statutes, such as engaging in long-term relationships with states, regardless of the fact that funding is provided annually.

Figure 2-1 is an overview of the business relationship durations, by benchmarked program or organization; the subsections below provide additional details. As the figure shows, “competitive segments”—which is the period of time for which the government makes a conditional funding commitment before making a project re-compete—generally last from 3 to 5 years.

Figure 2-1. Duration of Business Relationships



<sup>a</sup> Institutional awards involve an initial 5-year award with the potential for an additional noncompetitive 5-year award.

<sup>b</sup> FFRDC.

<sup>c</sup> Longer-term government-state partnership funded annually.

The individuals with whom LMI spoke had varied opinions on whether longer relationships are preferable. Most of those individuals operating under 3- to 5-year business relationships wanted a longer duration at the outset. However, one person emphasized the importance of not “locking in” to a particular partner. That person’s organization likes to use a staggered mix of 3- and 5-year business arrangements with its various research partners, for reasons of fairness and flexibility. The 3- to 5-year duration of project-based endeavors enables the program to invest less money and less time if it is not sure of a particular effort’s success. The program opted not to pursue long-term awards because it wants to maintain constituency interest in the program; the program believes that long-term awards can be viewed as creating an insiders-only community.

## STANDARD PROJECTS

In large part, the funding mechanism (grant, cooperative agreement, contract) drives the potential duration of a particular business relationship (apart from how it might be funded). Even long-term research project funding will be broken into competitive segments that last from 3 to 5 years. In part, this practice is the result

of federal policy. For acquisition agreements, the Federal Acquisition Regulation (FAR) requires full and open competition to obtain supplies and services in the open market, with specific and clearly limited exceptions. For financial assistance agreements, the Federal Grant and Cooperative Agreement Act of 1977 (31 U.S.C. 6301, et seq.) encourages competition. One means of complying with these requirements and policies is to limit the length of a competitive period. However, many times, the incumbent will be successful in a subsequent competition.

Competition offers a host of potential advantages to the federal office/program, including the following:

- ◆ *More varied ideas and approaches.* In the research area in particular, it is important to ensure that new investigators and new ideas have an opportunity to be funded. Competition holds out the potential for additional entrants in a particular market segment or in a particular research area. When more competitors are available, from an acquisition perspective, product or service features are improved. From a financial assistance perspective, the research base is broadened.
- ◆ *Better prices when acquiring goods and services.* Under an acquisition, there are only two ways to ensure that fair and reasonable prices are being obtained: the competitive pressures of the marketplace, or the use of cost or pricing data. (In the research area for investigator-initiated research or even operational support, funding is determined by the program's budget and spending plan rather than head-to-head competition.)
- ◆ *Access to innovation and new technologies.* Competitors often seek to differentiate themselves by offering new technologies or other innovations. Competition provides the means for such offerings to be made. In the case of services especially, the use of performance-based acquisition techniques allows potential competitors to offer innovative and cost-effective solutions to the government's requirements. When the government's requirements are stated in terms of the outcomes or results desired, without detailed direction or specifications of how the work is to be accomplished, potential competitors are free to offer new technologies and innovative ways to achieve those outcomes. For financial assistance agreements, applicants are offering their proposed approaches to meeting statutory objectives as amplified by the program.

Reports published by the Government Accountability Office (GAO) have consistently extolled the benefits of using competitive procedures to fulfill the government's acquisition needs. GAO reports have also pointed out the benefits of using competition to renew or extend services that are being provided by the nonfederal sector. Even when incumbents have been performing satisfactorily, periodic re-competitions often result in improved pricing or other terms than would have been achieved had those services merely been continued by prolonging an existing

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business arrangement. Although the same pressure does not exist under grants, because the essence of grant programs is a public purpose of support or stimulation, it is antithetical to that concept to make significant use of noncompetitive procedures. However, recognized, limited circumstances for exceptions do exist under both acquisition and grants.

## BROAD-BASED RESEARCH PROGRAMS

In a research environment (especially for applied research), certain programs may benefit from a longer-term business arrangement with their research partners, in order to foster program research objectives. In such cases, an agency may develop a special arrangement that goes beyond a “single project” award. For example, NOAA Cooperative Institutes are funded through what NOAA characterizes as institutional awards. Institutional awards involve an initial 5-year award with the potential for an additional noncompetitive 5-year award. Thus, a program can engage a series of research performers under an umbrella arrangement that has potential for a duration of up to 10 years. The projects that NOAA funds through such an umbrella arrangement must be within the overall scope and funding ceiling.

According to NOAA Administrative Order (NAO) 216-107,<sup>2</sup> “NOAA Policy on Cooperative Institutes (CIs)” (effective September 2, 2005), an institutional award is

a grant or cooperative agreement under which funds should be initially awarded based on competition with the intent to maintain a long-term partnership between NOAA and the recipient so that new awards may be made on a noncompetitive basis if the recipient performs satisfactorily and submits the appropriate application document, and if the results of the periodic reviews validate the effectiveness and continued desirability of the use of institutional awards for the program.

NOAA CIs are academic and nonprofit research institutions that conduct research supporting NOAA’s mission goals and strategic plan. CIs, which are created around research themes, are a NOAA-wide resource, open to all. A CI handbook is available at <http://www.nrc.noaa.gov/ci/policy/docs/handbook.pdf>. Because of the nature of CIs, an extensive process exists to establish one; it takes about a year and involves the entire agency.

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<sup>2</sup> NOAA Administrative Orders are part of the NOAA Directive system and can be accessed at <http://www.corporateservices.noaa.gov/~ames/NAOs/naos.html>.

Currently, NOAA has 22 CIs.<sup>3</sup> They operate according to a standard process; however, they are “owned” by the NOAA component that provides the predominance of funding. Once assigned, a NOAA line office is responsible for the oversight of the competition process, performance, funding throughout the award period, and managing the renewal process, if appropriate.

## INTEGRAL MISSION-RELATED R&D

To execute R&D that is integral to the mission and operation of the sponsoring agency, one benchmarked organization, DOE, uses an FFRDC (JLab). FFRDC business arrangements involve long-term relationships funded via contract for research and development. (FFRDCs are discussed in more detail in Chapter 3.) According to an interviewee from DOE’s JLab, JLab’s mission is such that it cannot be met by DOE’s in-house personnel or by FAR-based contracts. The JLab mission requires a long-term relationship that will provide continuity and allow the laboratory to attract the best scientific and management personnel. DOE, which runs JLab as government-owned, contractor-operated (GOCO) facility, opted to use an FFRDC approach to provide the long-term relationship that is necessary to the department’s missions.

## RELATIONSHIPS SPECIFIED BY STATUTE

Some of the federal programs (specifically, NOAA’s CZMP and NERRS) are engaged in long-term relationships with states. Although the funding occurs annually, the government-to-government relationship itself is more enduring. For these programs, a detailed program approach is specified in statute.

## Preliminary Observations

There are a range of federal-nonfederal relationships available to IOOS. In developing these relationships, it is important to take into account how they relate to each other—in terms of duration and other dimensions—in order to build a cohesive program.

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<sup>3</sup> NOAA’s Office of Oceanic and Atmospheric Research has the following CIs: Cooperative Institute for Arctic Research (University of Alaska), Cooperative Institute for Climate and Ocean Research (Woods Hole Oceanographic Institution), Cooperative Institute for Climate Applications Research (Columbia University), Cooperative Institute for Climate Science (Princeton University), Cooperative Institute for Limnology and Ecosystem Research (University of Michigan), Cooperative Institute for Marine and Atmospheric Studies (University of Miami), Cooperative Institute for Mesoscale Meteorological Studies (University of Oklahoma), Cooperative Institute for Research in the Atmosphere (Colorado State University), Cooperative Institute for Research in the Environmental Sciences (University of Colorado), Joint Institute for Marine and Atmospheric Research (University of Hawaii), Joint Institute for Marine Observations (Scripps Institution of Oceanography), Joint Institute for the Study of the Atmosphere and the Ocean (University of Washington), and Northern Gulf Institute (Mississippi State University).

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## FEDERAL ROLE

Federal program personnel are responsible for the technical/programmatic aspects of the funding process. This includes planning activities such as establishing budgets and determining program funding priorities, engaging with business and other agency personnel in processes leading to award, and a variety of post-award activities. The level and type of post-award activity can vary significantly based on the funding instrument, complexity of the program, number of different program participants (including recipients), and interrelationships among program participants, among other things.

## Findings

Each program or organization has a federal technical/programmatic role that varies based on the activity scope, funding instrument, and number of and relationships among program participants:

- ◆ *Activity scope.* As mentioned earlier, activity scope can be categorized as operations only (administrative and program management efforts), research only (basic and/or applied), or research-plus (basic and/or applied research, plus an operational, education, training, and/or outreach element), with the latter being the most complex.
- ◆ *Funding instrument.* Within the realm of acquisition funding mechanism possibilities are a wide range of contract types. Selecting the contract type allocates cost risk between the government and the contractor. Firm-fixed-price contracts generally require less of a federal role, whereas cost-plus-award-fee contracts require a fairly substantial federal role. Under grants, the federal role is limited; however, cooperative agreements involve substantive programmatic involvement during performance.
- ◆ *Number of program participants and relationships.* Multiple relationships (e.g., awards for research as well as oversight) increase complexity of program administration and management.

All programs are involved in strategic planning, program management, evaluation, and oversight.

## Preliminary Observations

A federal technical/programmatic role exists, regardless of the funding mechanism(s) selected. Chapter 3 discusses this topic in more detail.

# ADVISORY BODIES

## Findings

Advisory bodies associated with federal programs are used to assist with setting priorities, providing technical evaluations, or providing strategic advice. Almost all of the benchmarked programs have advisory bodies, with varying placement, advisory relationships, and funding arrangements:

- ◆ Some directly advise the federal government.
- ◆ Some advise at the local/regional level.
- ◆ Some have multiple advisory bodies to serve different levels.
- ◆ Some are required or funded as part of the federal award, while others are byproducts of the federal award.

Table 2-2 contains information on advisory bodies associated with the benchmarked programs. Almost all programs interviewed have advisory bodies, but most are not required to be chartered under the Federal Advisory Committee Act (FACA) (Public Law 92-463), which emphasizes open meetings, chartering, public involvement, and reporting.

*Table 2-2. Advisory Bodies Associated with Benchmarked Programs and Organizations*

Program or organization (agency)	Tier	Advisory bodies
ARC (NOAA)	Federal	<i>ARCs Council.</i> The members of this scientific advisory committee include directors of ARCs; NOAA representatives from the Climate Prediction Center, Environmental Modeling Center, and Geophysical Fluid Dynamics Laboratory; representatives from the International Research Institute for Climate and Society and NASA Global Modeling and Assimilation Office; and at-large members from the scientific community.
CZMP (NOAA)	State	<i>State councils.</i> The states have advisory councils, but the national program does not.
CI (NOAA)	University	<i>Councils of Fellows.</i> Each CI is advised by a Council of Fellows.
NERRS (NOAA)	Federal; local	<i>National Strategic Committee.</i> NOAA has two voting members on this advisory body. Each research reserve also has a strategic committee.
NEXRAD (NOAA)	Federal	<i>Technical Advisory Committee.</i> Each agency has four members (two operations, two research) and at-large members from laboratories and academia. They review the program and lay out the technical needs (basically a peer review).
RISA (NOAA)	Federal	<i>Government advisory committee.</i> This committee covers three programs, including RISA. The advisors are mostly external (other federal agencies, National Governors Association). The members rotate and the committee is ad hoc.

Table 2-2. Advisory Bodies Associated with Benchmarked Programs and Organizations

Program or organization (agency)	Tier	Advisory bodies
Sea Grant (NOAA)	Federal	<i>National Sea Grant Review Panel.</i> This panel has three members, each with a background that matches Sea Grant's three focus areas: education, outreach, and research. Its primary role over the past 10 years has been to conducting post-performance evaluations.
COSEE (NSF)	National; local	<i>Central Coordinating Office (CCO) national advisory committee.</i> Centers all have advisory committees comprising community members (such as principals, teachers, and museum heads).
JLab (DOE)	University	<i>Board.</i> The board for JLab, which is government owned and contractor operated, has 10 members.

As Table 2-2 shows, five programs—ARC, NERRS, NEXRAD, RISA, and Sea Grant—have advisory bodies at the federal level. Of those advisory bodies that directly advise the federal government, only Sea Grant indicated that it has a committee chartered under FACA.

The General Services Administration (GSA) issues governmentwide guidelines and regulations for FACA management. The application of these guidelines to specific circumstances can often be complex and requires consultation with agency legal counsel. When legal counsel determines that FACA applies, the federal government must comply with certain requirements, including providing advance notice of meetings in the *Federal Register*, holding meetings open to the public, and providing meeting minutes for public inspection.

## Preliminary Observations

Because of varying programmatic needs, different approaches to advisory bodies exist—some programs have a single body, while others have multiple bodies. For NOAA IOOS to determine which approach it needs, it must first define the purpose of any associated advisory bodies. One of the considerations in developing the to-be business model involves whether a federal advisory role should exist for the IOOS-related RAs, including NFRA, and, if so, what implications this might have relative to FACA.

## COLLABORATION APPROACH

### Findings

During our interviews, LMI heard that programs with distributed activities that are expected to interact—for example, programs like IOOS with regions that collect data from diverse locales and are expected to make that information available to investigators—face a challenge to build a collaboration approach that allows

the information to be shared and that maximizes, rather than duplicates, the use of resources.

The benchmarked programs used various methods to encourage collaboration among partners in the supporting research network, including the following:

- ◆ *Sharing data through information technology (IT).* As a condition of program participation, those who collect the data must share it with the whole community, which helps advance science. This is a transformational notion in the scientific community, which traditionally holds onto data until it can publish, rather than giving up data ownership as part of a broader effort. IT facilitates this data sharing, and the potential for gaining access to such data encourages researchers to make this tradeoff. With broadband connectivity, large data resources are available in real time. Scientists can simultaneously collect, analyze, and predict.
- ◆ *Using a regional approach.* A regional structure for a national program provides a tie to local communities. This approach can have a variety of possible levels and arrangements—super-regions, regions, and localities—and can foster local buy-in. This needs to be balanced with ensuring that data collected regionally are available to the whole community.
- ◆ *Establishing joint objectives.*
  - Regional priorities are established and funded through regions.
  - Strategic plans, performance measures, monitoring protocols, and training are shared.
- ◆ *Using a third party to link participants.*
  - An association shares information, fosters working together regionally, and recommends priority areas.
  - A nongovernmental central coordinating office is funded.

## Preliminary Observations

To develop a national network of RCOOS, collaboration among the regional participants will be necessary. In particular, sharing data throughout the entire national network—in an easily accessible manner—is likely to assist with forming an integrated, national program.

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# TRANSITION ISSUES

## Findings

LMI inquired about challenges programs faced with transitions in providers—changes in either a research operator or a program manager—given the competitive environment surrounding most of the funding mechanisms used. (LMI’s review of funding mechanisms was not focused on the topic of transitioning technology.)

With regard to transitioning operators, LMI learned that incumbent providers compete with a high success rate. Nonetheless, the CI handbook addresses the transition process for a “sunsetting” arrangement.

## Preliminary Observations

With proper planning, the NOAA IOOS program should be able to select a funding mechanism (or mechanisms) that will allow it to engage in appropriate relationship durations with the range of partners needed to sustain the program. Planning should include developing scenarios and approaches for transitioning providers, if necessary or desired.

# Chapter 3

## Business Arrangements and Funding Mechanisms

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In this chapter, we present information concerning four business arrangements or funding instruments that are used by the benchmarked programs and have the potential to be used as funding mechanisms by the NOAA IOOS program office:

- ◆ Acquisition contracts
- ◆ Grants
- ◆ Cooperative agreements
- ◆ Federally funded research and development centers.

We also present information concerning a funding mechanism that is not used by any of the benchmarked programs or organizations. We looked at it in order to determine its potential applicability to the NOAA IOOS program. That mechanism is referred to as other transactions (OTs) and is available when an agency has “Other Transaction Authority.”

We begin the chapter with an overview of the possibilities we considered and of the important distinctions between acquisition and financial assistance instruments. We then discuss each funding mechanism, providing information on its purpose and our preliminary observations.

### OVERVIEW

LMI reviewed possible business arrangements and funding instruments to determine their applicability for use by the NOAA IOOS program. These included acquisition instruments, financial assistance instruments, and FFRDCs.

Acquisition instruments are used for buying or acquiring goods and services for the government’s direct use or benefit. Acquisition instruments include procurement contracts based on the FAR, as well as OTs.

Financial assistance instruments, including grants and cooperative agreements and, in limited instances, OTs, are used to transfer a thing of value from the government to a recipient to carry out a public purpose of support or stimulation, as authorized by statute. Guidance for these instruments (except OTs) is found in a variety of Office of Management and Budget (OMB) circulars and other government-wide requirements and, for NOAA, in Department of Commerce (DOC)

implementing regulations and the DOC Grants and Cooperative Agreements Interim Manual.<sup>1</sup>

FFRDCs are not funding instruments. Although they are implemented through a contract, FFRDC arrangements have an additional set of requirements. For purposes of this discussion, we term FFRDCs “business arrangements.”

Table 3-1 summarizes the five mechanisms LMI reviewed.

*Table 3-1. Summary of Business Arrangements and Instruments Reviewed*

Mechanism	Instrument type	Characteristics	Partner	Duration	Funding
Contract	Acquisition	Acquire property or services for the funding agency's direct benefit or use	Private for-profit corporation, not-for-profit or nonprofit entity, public or private university, consortium	Up to 5 years for support services with opportunity for competitive renewal	<i>Fixed price contract:</i> fully funded upon contract award. Fixed payment(s) upon timely delivery at set prices.  <i>Cost reimbursement contract:</i> fully or incrementally funded. Payment(s) upon delivery of best efforts for allowable costs incurred during performance.
Grant	Financial assistance	Fund recipient for public purpose of support or stimulation authorized by statute	Governmental organization, not-for-profit or nonprofit organization, public or private university, consortium	Usually 3 or 5 years per segment, with opportunity for competitive renewals; longer durations for ongoing programs with governmental organizations	<i>Project grant:</i> incrementally funded annually on basis of satisfactory performance.  <i>State grant:</i> funded annually on basis of annual work program review.  Usually advance payment; reimbursement method is the exception.
Cooperative agreement	Financial assistance	Same as grant, but substantial programmatic involvement is expected between the funding agency and recipient	Governmental organization, not-for-profit or nonprofit organization, public or private university, consortium	Usually 3 or 5 years per segment, with opportunity for competitive renewals	Same as grant

<sup>1</sup> Available at [http://oamweb.osec.doc.gov/docs/GRANTS/GCA\\_manual.pdf](http://oamweb.osec.doc.gov/docs/GRANTS/GCA_manual.pdf).

Table 3-1. Summary of Business Arrangements and Instruments Reviewed

Mechanism	Instrument type	Characteristics	Partner	Duration	Funding
FFRDC	Acquisition	Maintain long-term relationship May involve contractor operation of government-owned facilities Undertake ongoing work program and assignment of task work	University or consortium of universities, other not-for-profit or nonprofit organization, industrial firm	Long term for sponsoring agreement (maximum increments of 5 years with periodic review and renewal). Contract with FFRDC administrator subject to FAR restrictions (e.g., FAR 17.605 requires review of management and operating contracts every 5 years). For tasks under the agreement, generally 1 to 5 years.	Same as contract, consistent with contract type (generally cost reimbursement)
Other transaction	Acquisition or financial assistance	Fund prototypes and foster participation of nontraditional (for-profit) performers, for R&D Only those agencies with congressionally granted OT authority can issue OTs	Nontraditional R&D performer	Usually less than 1 year for phase 1 (design concept) on multiphase programs	<i>Acquisition OTs:</i> same as contract <i>Assistance OTs:</i> same as grant, but can use methods other than cost reimbursement up to the funded amount (fixed-support milestone payments are the norm).

Appendix B contains a more detailed matrix, identifying each funding mechanism’s purpose, authority, federal programmatic involvement, types of partners, possible duration, and implications for intellectual property ownership, physical property ownership, and funding.

## ACQUISITION CONTRACTS

### Purpose

A federal agency uses contracts as the funding instrument to acquire property or services for its direct benefit or use. When using a contract, the agency generally specifies its needs in a solicitation and receives offers. This includes performance-based acquisitions. However, basic or applied research resulting from use of a

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Broad Agency Announcement (BAA)<sup>2</sup> allows the investigator to propose an approach within a government-specified research or technology theme (investigator-initiated research).

Per FAR 2.101, acquisition contracts are mutually binding legal relationships obligating the seller to furnish supplies or services and the buyer to pay for them. They include all types of acquisitions that obligate the government to an expenditure of appropriated funds under an instrument with a nonfederal entity and that, except as otherwise authorized, are in writing. Contracts do not include grants and cooperative agreements covered by 31 U.S.C. 6301, et seq.

The government selects the contract type it will issue. Acquisition contracts are of two basic types:

- ◆ *Fixed price.* Under a fixed-price contract, the contractor is paid an agreed-on price for performing the work. These types of contracts are suitable for situations in which the work can be reasonably well defined. The contractor undertakes risk of performance because it must deliver for the specified price.
- ◆ *Cost reimbursement.* Under a cost-reimbursement contract, the contractor performs its best efforts up to a ceiling amount and is reimbursed for actual, allowable costs incurred and, when applicable, a profit or fee. These types of contracts are suitable for situations in which the nature of the work cannot be reasonably well defined. The government undertakes the risk of performance under this arrangement. To provide incentives for appropriate contractor performance levels, the government may use award or incentive fees. Such arrangements are reflected in cost-plus-award-fee or cost-plus-incentive-fee contracts and require the government to conduct periodic, detailed assessments of contractor performance.

## Preliminary Observations

Table 3-2 offers some information on acquisition contracts.

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<sup>2</sup> A BAA is a competitive solicitation procedure used to obtain proposals for basic and applied research, as well as for development not related to the development of a specific system or hardware procurement. The BAA is described in FAR 6.102, "Use of Competitive Procedures," and FAR 35.016, "Broad Agency Announcements."

Table 3-2. Acquisition Contract Programmatic Involvement, Partner Engagement, Duration, and Property Ownership

Federal programmatic involvement	Prime-level partner	Possible duration	Intellectual property ownership	Physical property ownership
<p>Programmatic monitor (project officer, contracting officer's representative, or contracting officer's technical representative, depending on agency terminology) oversees technical progress; degree of involvement varies from review of reports to substantive involvement depending on the nature of the supply or service.</p>	<p>Contracts may be awarded to private for-profit corporations, not-for-profit or nonprofit entities, public or private universities, or consortia.</p>	<p>Up to 5 years for support services, with opportunity for competitive renewal; research contracts commensurate with nature of project and need for review of the science/technology (e.g., can be 3 to 7 years).  Introduces concepts of severability or nonseverability of services.</p>	<p>Unless agency or program has explicit overriding statutory authority, patents and inventions are subject to 37 CFR 401. The recipient has the right to own any invention conceived or first reduced to practice under the award. If it does not exercise that right or file a patent application within the time limits specified in the regulation, the government may request an assignment of all rights and provide a limited royalty-free, non-exclusive license to the recipient.  Government must specify in contract its ownership rights for copyrightable material.</p>	<p>Government-furnished or contractor-acquired nonexpendable personal property as needed for contract performance.  Under FAR 45.107(a)(3), an agency can vest title in tangible property in a nonprofit institution of higher education or in a nonprofit organization whose primary purpose is conducting scientific research under an award for basic or applied research, without further obligation to the government.</p>

Note: CFR = Code of Federal Regulations.

In general, fixed-price contracts require fewer government resources to manage, whereas cost-reimbursement contracts (particularly those with incentive provisions, such as award or incentive fees) can require the investment of significant time and effort by government personnel. Historically, the use of fixed-price contracts for R&D has been questioned by both contractors and oversight organizations, largely because it can be difficult to define R&D efforts in sufficient detail to enable the contractor to accurately estimate its price. In the face of uncertainty, the contractor likely will build in a “reserve” that could cause the government to pay more than it otherwise would have under another contract type.

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DoD has used fixed-price contracts for R&D, in addition to the more traditional cost-reimbursement contract approach, when the acquisitions had the following attributes (in part to obviate the challenges of using these instruments for research efforts):

- ◆ Firm-fixed-price milestones are crafted around small, incremental technical activities. Payments based on the performance of observable technical events are negotiated, which bounds contractors' technical risk; specification compliance is not required for payments to be made.
- ◆ Price reasonableness is established using price analysis,<sup>3</sup> and certified cost or pricing data is not required.<sup>4</sup> In some cases, transfers among corporate divisions are used to verify market prices.

Also, contracts—whether fixed price or cost reimbursement—are generally well-suited as business instruments for use with for-profit organizations, because they can provide the contractor with a profit or fee for its work (the exceptions are cost-sharing and cost-type contracts).

## GRANTS

### Purpose

A grant is a legal instrument used to enter into a relationship the principal purpose of which is to transfer something of value (generally money or property) to a recipient to carry out a public purpose of support or stimulation authorized by a law of the United States (rather than to acquire property or services for the funding agency's direct benefit or use).

### Preliminary Observations

Table 3-3 offers some information on grants.

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<sup>3</sup> FAR 15.404-1(b)(1) states: "Price analysis is the process of examining and evaluating a proposed price without evaluating its separate cost elements and proposed profit."

<sup>4</sup> Through the use of FAR Part 12, "Commercial Item Acquisition," the government does not have to comply with the requirement for certified cost or pricing data that it otherwise must adhere to. This is significant to attract commercial companies that have many of the research capabilities the government wants but are not willing or easily able to provide certified cost and pricing data.

Table 3-3. Grant Programmatic Involvement, Partner Engagement, Duration, and Property Ownership

Federal programmatic involvement	Prime-level partner	Possible duration	Intellectual property ownership	Physical property ownership
Project/program officer monitors performance through reports (type and frequency limited by government-wide policy), site visits, telephone calls, and other means.	Usually a governmental organization, not-for-profit or non-profit organization, public or private university, or consortium.  For-profit organizations may be eligible under some programs, but most agencies do not pay profit/fee under grants.	Usually 3 or 5 years per segment, with opportunity for competitive renewals.	Unless agency or program has explicit overriding statutory authority for more restrictive provisions, nonprofit entities and small businesses are subject to 37 CFR 401 for patents and inventions.  Recipient may copyright material produced under the award, but government has a royalty-free, nonexclusive license to use or authorize others to use.	Title to grantee-acquired tangible personal property generally vests in recipient upon acquisition, but considered conditional title since government can require that title be transferred to it or a third party under specified circumstances; accountability may be waived pursuant to 31 U.S.C. 6306. (While the government could reclaim title, it normally requires direct transfer to a third party to avoid having to transfer title to a future [as yet unknown] recipient.)

Note: CFR = Code of Federal Regulations.

## COOPERATIVE AGREEMENTS

### Purpose

A cooperative agreement is a legal instrument used to enter into the same kind of relationship as a grant, except that substantial involvement is expected between the funding agency and the recipient when carrying out the activity contemplated by the cooperative agreement.

### Preliminary Observations

Table 3-4 offers some information on cooperative agreements.

*Table 3-4. Cooperative Agreement Programmatic Involvement, Partner Engagement, Duration, and Property Ownership*

Federal programmatic involvement	Prime-level partner	Possible duration	Intellectual property ownership	Physical property ownership
Substantial programmatic involvement may include collaboration or participation by designated staff members in activities specified in the award (e.g., serving as co-investigator) or approval to move from one phase to another. It does not include directing or selecting contractors under the award; providing normal stewardship, or exercising more control than is allowed under a grant.	Same as grant, with additional provisions for federal employees. Cooperative agreement should specifically address rights and responsibilities consistent with statutes and regulations, including allocation of rights among the parties, ownership of data and research results, disposition of royalties, other income.	Same as grant, except that under NOAA policy on institutional awards, cooperative agreements may be awarded for 5 years plus a 5-year non-competitive renewal.	Same as grant. Rights may need to be negotiated when federal involvement results in coauthorship.	Same as grant

## FFRDCs

### Purpose

FFRDCs are organizations that are sponsored under a broad charter by a sponsoring government agency (or agencies) for the purpose of performing, analyzing, integrating, supporting, or managing basic or applied R&D. The entities that have FFRDC relationships with government agencies are typically private, not-for-profit or nonprofit corporations; public or private universities; or consortia of such entities and institutions. However, some FFRDCs are administered by private for-profit corporations. In some cases, the receiving entity is separately incorporated to enable it to serve as an FFRDC.

Normally, an FFRDC relationship is established when

- ◆ a long-term relationship is contemplated; and
- ◆ the government needs a special relationship with a partner that involves privileged access to government and supplier data, employees, and facilities beyond that common in a normal contractual relationship.

The business arrangement between the entity operating the FFRDC and the sponsoring government agency (agencies) is accomplished via a long-term contract; work is assigned through some form of task assignment process. The term of the

sponsoring agreement cannot exceed 5 years, but can be reviewed, as a result of periodic review, in increments not to exceed 5 years. The contract with the FFRDC administrator is subject to FAR restrictions (e.g., FAR 17.605 requires review of management and operating contracts every 5 years). The tasks themselves generally are of lesser duration (e.g., 1 to 3 years).

## Preliminary Observations

Establishing an FFRDC does not require special statutory authority; FFRDC creation is an administrative process requiring agency head approval (FAR 35.017(j)). Appendix C contains a complete list of current FFRDCs. DoD and DOE sponsor the majority of them.

Oversight organizations have identified the following key benefits and drawbacks of FFRDCs:<sup>5</sup>

- ◆ Perceived benefits
  - Ability to promote technology transfer between government and private sectors
  - Flexibility to assemble teams of technical experts on a project basis
  - Unbiased advice by not-for-profit or nonprofit entities (where the FFRDC is a not-for-profit or nonprofit) that are not accountable to stockholders
- ◆ Perceived drawbacks
  - Inappropriate mix of public funds and private interests
  - Potential circumvention of civil service hiring practices and salary limitations
  - Difficulty in holding entities accountable.

Table 3-5 offers some additional information on FFRDCs.

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<sup>5</sup> This information was derived from Congressional Research Service, *The Quasi Government: Hybrid Organizations with Both Government and Private Sector Legal Characteristics*, Report for Congress, RL 30533, Kevin R. Kosar, February 13, 2007.

*Table 3-5. FFRDC Programmatic Involvement, Partner Engagement, Duration, and Property Ownership*

Federal programmatic involvement	Prime-level partner	Possible duration	Intellectual property ownership	Physical property ownership
<p>Involvement resides at several levels. Those responsible for the management of the “umbrella” vehicle ensure that work assigned is within scope and monitor cost performance and other operational and technical aspects that go into an assessment of performance (many of these are award-fee contracts).</p> <p>Those assigning work may monitor the research activity directly, but have no rights with respect to contractual performance.</p>	<p>Operated, managed, and/or administered by either a university or consortium of universities, another not-for-profit or nonprofit organization, or an industrial firm.</p>	<p>Long-term for sponsoring agreement, e.g., 5 years with the potential for renewals upon periodic review, up to a total of 20 years. Contract with FFRDC administrator subject to FAR restrictions (e.g., FAR 17.605 requires review of management and operating contracts every 5 years). Work is assigned on a task basis.</p>	<p>Government ownership consistent with award provisions.</p>	<p>Government-furnished real property, when applicable.</p> <p>Government-furnished or contractor-acquired nonexpendable personal property as needed for contract performance.</p> <p>The government retains title to all government-furnished property (see FAR 45.401).</p>

## OTHER TRANSACTIONS

### Purpose

Congress has granted certain agencies “Other Transaction Authority” to enable these agencies to enter into transactions with nonfederal entities using a vehicle (called an OT) other than contracts, grants, or cooperative agreements. Because OTs generally are not subject to federal laws and regulations governing procurement contracts, grants, and cooperative agreements, OTs provide the federal government with flexibility to attract nontraditional (for-profit) R&D organizations that might not otherwise participate because of intellectual property, audit, or similar requirements that differ from commercial practice.

Only those agencies with congressionally granted OT authority can issue OTs. DoD, DOE, NASA, Department of Health and Human Services, Department of Homeland Security, Department of Transportation, and Federal Aviation Administration all have OT authority. There are two types of OTs: acquisition OTs and financial assistance OTs. Acquisition OTs are legally binding contractual instruments, but they are conducted outside the FAR system of contracting. (Indeed, they fall under no regulatory system of mandates.) DoD is the only agency with a fully developed approach to financial assistance OTs.

## Preliminary Observations

DOC/NOAA does not have OT authority; therefore, it does not appear to be a viable funding mechanism for near-term use by the IOOS program. Moreover, because of the availability of other funding instruments and because NOAA has no particular need to attract nontraditional, for-profit companies, it does not appear necessary to seek such authority.

## Chapter 4

# Business Process Objectives and Next Steps

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Funding mechanisms are business tools, available to help the NOAA IOOS program achieve its goals and objectives. In other words, the mechanisms should be used to further program goals and objectives, but they do not drive them. The prior chapters provided some insights into the funding mechanisms being used by other programs that share some of the features of the NOAA IOOS program and into the mechanisms that might be used by the NOAA IOOS program.

Most of the benchmarked programs use grants or cooperative agreements. They do so for a variety of reasons, but the overriding reason should be the principal purpose of the relationship with the nonfederal partners, including what the federal program wants and has to achieve to meet its goals and objectives. Because NOAA has the authority to issue acquisition contracts, grants, and cooperative agreements, this array of tools is available for its use; no single mechanism represents the “right” instrument.

This chapter presents our observations on *business process* objectives for the regional activities—not overall *program* objectives—based on discussions with several NOAA business personnel. With the recent emergence of NOAA IOOS as a program and the discretion to make awards also comes the mandate for appropriate stewardship of federal funds. Now, as a program rather than a series of earmarked projects, IOOS should be setting not only an overarching programmatic direction but also a set of performance expectations. From the business perspective, the funding instruments should be selected and managed to further desired outcomes.

This chapter also discusses next steps for our analysis of funding mechanisms.

## GENERIC BUSINESS PROCESS OBJECTIVES

It is important to recognize the objectives of the business processes associated with funding instruments—both acquisition (contracts) and financial assistance (grants and cooperative agreements). In addition, the organizational culture is an important variable, particularly with regard to the emphasis it places on interaction between the program and business personnel.

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## Acquisition Process

The primary goals of an agency's acquisition process are the following:

- ◆ *Reduce risk.* The acquisition process must seamlessly incorporate adequate levels of review, approval, and oversight to ensure that agency resources are properly expended.
- ◆ *Reduce costs.* The acquisition process must ensure that the agency's day-to-day operational requirements are supported by efficient and effective business transactions to meet user needs.
- ◆ *Improve mission support.* The enterprise's strategic planning, budgeting, and acquisition processes must work together to ensure that executed business transactions support its overall mission and objectives.

A balance among all three goals is essential to an optimal acquisition process. However, at different points in time, an organization might need to focus more on one particular outcome over another. In such instances, an explanatory message needs to be communicated from the very top of the organization throughout the ranks, because friction can result if any of these goals is viewed as competing rather than complementary.

Generally speaking, the acquisition process customer (the program office with the requirement) tends to focus on mission support as the primary goal. In contrast, the acquisition process enablers (acquisition and financial personnel) view reducing risk as key.

## Financial Assistance Process

The following are primary goals of an agency's financial assistance process:

- ◆ *Fair and equitable distribution of funds.* Because financial assistance agreements stem from specific legislative authorization, an agency's financial assistance process focuses on ensuring that eligibility is consistent with that direction.
- ◆ *Results.* Federal financial assistance instruments, whether grants or cooperative agreements, are not considered gifts. There is an expectation of performance and, consistent with the requirements of the award, results. Since the passage of the Government Performance and Results Act and the initiation of the OMB's Program Assessment Rating Tool, financial assistance programs have begun to use performance metrics. Whether they are output- or outcome-oriented metrics depends on the nature of the program and award.

- ◆ *Accountability.* Federal financial assistance awards generally are made with appropriated funds. The funding agencies are accountable to Congress and, through Congress and the various oversight agencies, to the taxpayer for the appropriate expenditure of funds—whether by the program itself or the recipients of those funds.

## Organizational Culture

Having a supportive organizational culture is crucial to establishing an optimal approach to funding and sustaining regional observing systems. Specifically, program success is dependent on a culture that does the following:

- ◆ *Embraces a results-oriented enterprise approach.* Throughout the organization, functional groups work together to attain positive program results.
- ◆ *Plans strategically.* Internal organizations partner to plan strategically to assess internal requirements, apply sound funding strategies, and execute strategic plans. They also work together to plan for and execute these strategies operationally (for example, through advanced acquisition planning).

## NOAA-SPECIFIC BUSINESS PROCESSES

In general, based on LMI's discussions with NOAA business personnel, LMI believes that NOAA business processes are flexible enough to address the NOAA IOOS needs once they are more fully articulated (in part, through LMI's forthcoming to-be business model). The important point is to specify those goals and objectives and share them with NOAA business personnel to enable successful strategy and execution.

The business system should not dictate the funding mechanism. Instead, the desired outcomes should drive the instrument selection. LMI's ongoing business model analysis is striving to establish some parameters for regional activities that will help inform issues such as the appropriate funding mechanisms. In the meantime, through our funding mechanism analysis to date, we have developed some objectives for the NOAA IOOS program. Specifically, to support building a national program, the program office should use funding mechanisms that can do the following:

- ◆ Contribute to achieving tangible program results
- ◆ Continue to sustain the RAs and RCOOS and improve accountability
- ◆ Minimize the administrative impact on NOAA personnel and ensure the flexibility to accommodate changed circumstances, such as those that may occur in the research environment.

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## NOAA-SPECIFIC BUSINESS PREREQUISITES

Although we believe NOAA business processes currently are flexible enough to accommodate program objectives, however they are defined, LMI identified the following prerequisites:

- ◆ Need for advance planning
- ◆ Resource availability.

Each of these is discussed below.

### Advance Planning

Both the acquisition and financial assistance processes require advance planning. The purpose of advance planning is to ensure that the government meets its needs effectively, economically, and on time. Advance planning requires the interaction of program and business officials to discuss strategies, develop action plans, and identify resources to successfully execute the plans. Whether using acquisition or financial assistance processes, advance planning helps the government define its goals and objectives and ensure the following for the resulting solicitation or funding opportunity announcement:

- ◆ Funding strategy is fully considered and articulated.
- ◆ Evaluation criteria are
  - clearly stated,
  - designed to result in consistent outcomes, and
  - outcome based.
- ◆ Applications/proposals can be responsive to programmatic requirements.
- ◆ Reporting requirements are clearly defined.

### STRATEGY DEVELOPMENT

During the planning phase, business personnel, in conjunction with program personnel, can identify strategies for achieving desired program outcomes. Table 4-1 presents some possible strategies that might emerge from advance planning discussions.

Table 4-1. Potential Strategies for Achieving Program Outcomes

Program goal	Potential acquisition solution	Potential financial assistance solution
Achieve tangible program results	Require contractual deliverables Use performance-based acquisition, including performance measurements tied to program results	Incorporate performance metrics, including quantitative metrics, as appropriate, into grant/cooperative agreement awards Require reports to address achievement of those metrics
Ensure adequate national program coverage	Design competition to result in at least one award per defined region (potentially by limiting competition)	Design competition to result in at least one award per defined region (potentially by limiting competition)
Sustain regions (RAs and RCOOS) and improve accountability	Define requirements for regional activities, with incentives and disincentives for specified performance levels	Clearly specify reporting requirements and other accountability provisions and enforce them (through payment or other means) Ensure substantial involvement in cooperative agreement helps achieve program goals and objectives
Minimize personnel impact	Award contracts with maximum durations (e.g., base year plus option years) Minimize amount of federal oversight by awarding fewer contracts and selecting appropriate contract types	Make awards with maximum durations

Additional topics for discussion between program and business personnel related to programmatic and funding strategy might include:

- ◆ Planned funding level versus availability of funds—if the planned funding may not be available (whether in whole or in part), as part of the competitive process, the government can notify the offerors/applicants that any awards are subject to the availability of the funds (rather than delaying planning or other pre-award activities based on availability of funds). Unless the program is zeroed out, this will allow the program to be ready for negotiations when the budget is available, requesting revised work plans or application/proposal budgets as necessary to reflect the amounts available for obligation. For continuing awards, in the event of a continuing resolution, the program can consider incremental funding for funding for operations only (see below) until that year’s funds are available.
- ◆ Funding basis—program and business personnel should discuss potential funding approaches that might allow for adjustments to funding levels to best meet programmatic objectives. One means of ensuring maximum flexibility could be to establish a base amount for operations and a variable amount for research, perhaps performance-based. Although some programs may use a formula basis for determining “base funding,” such formulas generally are based in statute and use demographic statistics as the basis for the formula. A means of determining base funding that would be particular to a given program and set of recipients could be developed

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without such authority as long as the basis is clearly described and those affected have input (e.g., through a *Federal Register* notice).

Addressing these topics in advance enables the government to craft its communications with potential offerors/applicants appropriately. Putting offerors/applicants on notice about such issues in the solicitation/funding opportunity announcement enables them to structure their proposals appropriately.

## TIMELINES

Different factors may impact the length of a process leading to award. These may include:

- ◆ The use of new or innovative approaches,
- ◆ The pursuit of new or innovative technologies,
- ◆ The types of approvals required, or
- ◆ The anticipated dollar value of the project.

Fully engaging business personnel as soon as possible helps the program better craft a strategy designed to meet its objectives. Even so, the program may invest significant time on planning before significant business personnel involvement commences. The timelines discussed below begin at the point in the process when the program has fully engaged business personnel.

For NOAA contracts, timelines are dollar-driven, tied to the following thresholds:

- ◆ *\$100,000–\$500,000*. For FY09, acquisitions anticipated to be at this threshold must be identified by May 1, 2008.
- ◆ *\$500,000–\$5 million*. For FY09, acquisitions anticipated to be at this threshold must be identified by February 28, 2008.
- ◆ *\$5 million–\$10 million*. For FY09, acquisitions anticipated to be at this threshold must be identified by January 30, 2008.
- ◆ *\$10 million or more*. For FY09, acquisitions anticipated to be at this threshold must be identified by October 1, 2007.

Thus, for contracts, the larger the anticipated commitment, the sooner the program must engage the relevant NOAA business personnel. Thus, if, as discussed later (in the “Resource Availability” section of this chapter), the NOAA IOOS program wants to undertake a pilot initiative of any significant dollar amount, it cannot be accomplished in FY09.

Although dollar value itself is not the driving factor in financial assistance planning, it can take 9 to 12 months to complete the funding opportunity announcement, allow for preparation and submission of applications, and evaluate the applications, and make the award. However, depending on what the program wishes to achieve, it may take longer. For example, the process may be lengthier when using a new or innovative approach or deviating from the norm, such as limiting competition, because of the need for special justifications or consultation with the Office of General Counsel.

## PARTNERS

Because it will help inform instrument selection, a key topic for program and business personnel to discuss during advance planning is the desired partners, both in terms of the type of partner (for-profit, not-for-profit or nonprofit, academic) and the desired federal government interaction with the partner:

- ◆ *Type of partner.* In general, “think tanks,” not-for-profit or nonprofit companies, and academia are comfortable with financial assistance arrangements, but they tend to be less familiar with acquisition contracts. Such entities often are reluctant to perform work via contract, because they believe they cannot easily comply with many of the statutory and FAR-based contractual provisions.
- ◆ *Government interaction with partner.* When using an acquisition instrument, the government enters into an “arms length” relationship with its business partner. This means that, to be enforceable, a contract must represent a deal between two parties that act independently. Grants require at least the same level of separation, whereas cooperative agreements, by design, involve substantial governmental involvement. Lower-tier awards and oversight responsibility are two issues that need to be considered:
  - Lower-tier awards. The government’s ability to affect the further distribution of funding is limited under both acquisition and financial assistance instruments. Under the principle of privity of “contract,” (which, in terms of contract law, includes acquisition and financial assistance agreements) the government has a legal relationship only with the prime contractor or recipient; it does not have legal standing to interact with subcontractors or subrecipients.
  - Oversight responsibility. Under an acquisition or financial assistance instrument, the government can address identified issues through use of contract or grant/cooperative agreement resources, as long as the issue is within scope. The government does not have direct oversight responsibility for subcontracts or subrecipients and must rely on the prime contractor or recipient.

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## TECHNICAL EVALUATION

Whether using an acquisition or financial assistance instrument, the government business process involves soliciting proposals or applications and evaluating them. Advance planning by business and program professionals enables the selection of proper evaluation criteria to enable achievement of program goals and objectives.

Under acquisition processes, the government typically evaluates an offeror's proposal across three factors: price or cost, technical (including past performance), and management. Within those broad factors, the government can create subfactors that represent key areas of importance to be considered in source selection.

For financial assistance processes, NOAA uses five evaluation criteria.<sup>1</sup> These criteria exist as a result of a NOAA standardization effort; yet, tailoring is possible. For example, not all five evaluation criteria need to be used, the criteria can be modified (for example, a substitution, deletion, or change in emphasis), and weights can be assigned to emphasize program values. The review against the evaluation criteria is advisory to the selecting official, who can choose successful awardees based on seven selection criteria.<sup>2</sup> Identification of the five evaluation criteria and seven selection criteria in the funding opportunity announcement puts respondents on notice that factors other than technical acceptability come into play when determining who will receive an award.

Either the acquisition or financial assistance process can result in technical evaluation criteria that will enable the NOAA IOOS program to continue funding regionally.

## COMPETITION

As mentioned in Chapter 2, acquisition and grants policies emphasize competition. The FAR requires full and open competition for acquisitions of supplies and services in the open market, with specific and clearly limited exceptions. The Federal Grant and Cooperative Agreement Act of 1977 (31 U.S.C. 6301, et seq.) encourages competition. The competition-based processes in support of both acquisition and financial assistance instruments are designed to implement these policies.

Yet, under either process, NOAA can avail itself of an exception to competition, with proper approvals:

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<sup>1</sup> The five evaluation criteria are (1) importance and/or relevance and applicability of proposed project to the program goals, (2) technical/scientific merit, (3) overall qualifications of applicants, (4) project costs, and (5) outreach and education.

<sup>2</sup> The seven selection criteria are (1) funding availability, (2) funding balance/distribution, (3) uniqueness of the project, (4) program priorities and policies, (5) applicant's prior award performance, (6) participation of targeted groups, and (7) adequacy of information to enable government National Environmental Protection Act (NEPA) determination.

- ◆ Acquisition. The program office would need to write a justification addressing one of the FAR Subpart 6.3 authorities for contracting without full-and-open competition and submit it to the contracting officer (CO). For example, under FAR 6.302.-3, full and open competition need not be provided when it is necessary to award the contract to a particular source or sources to establish or maintain an essential research or development capability to be provided by an educational or other nonprofit institution. The CO will review the justification, concur with it (if in agreement), and obtain necessary approvals. The result will be a justification and approval (J&A) document, as required by 41 U.S.C. 253(f)(1).
- ◆ Financial assistance. While there is no government-wide standard for limiting competition, whether to a single applicant or group of applicants, DOC policy allows for waiver of competition requirements where justified and approved. One such waiver might be a limitation of competition to an identifiable subset of all potential applicants (“limited competition”)<sup>3</sup>. The basis for limiting competition would have to be carefully crafted in order warrant DOC approval and to withstand public scrutiny. This would include a showing of the benefits to the program of limiting competition, as well as the adverse impact on the program of not limiting competition. It also would have to address the duration of the limitation, e.g., one “competitive” cycle, and any future plans for competition.

## Resource Availability

Just as the IOOS program office is operating with finite resources, so too are the NOAA business offices faced with limited resources. Program office engagement in advance planning with the business office enables both entities to plan resources to best support program requirements.

## ADMINISTRATION

Beyond preaward (including advance planning) and award activities, resources must also be available to administer the effort after an award is made. Under contracts, the program office must provide a contracting officer’s representative (COR). Under financial assistance agreements, program office personnel similarly serve in this position (which is sometimes called a program/project officer). This individual helps ensure that performance comports with funding instrument requirements. The COR has programmatic administrative monitoring responsibilities (such as acceptance and approval of invoices) and may have technical responsibilities also. This support is often provided as an auxiliary duty to a primary job, whether it is bench scientist, manager, analyst, or other function. Because they generally have job responsibilities in addition to being CORs and, in some cases,

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<sup>3</sup> Note: DOC grants policy does not specify the process for limiting competition on the basis of an administrative decision; however, a senior member of the Federal Assistance Law Division, DOC, orally validated the potential for limiting competition in this way.

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may serve as a COR only on occasion, some of these individuals are unwilling or unable to perform the function effectively. However, this function must be performed thoroughly and continually. Due to the nature of a requirement, detailed technical knowledge also may be necessary.

## PILOT PROGRAM

The IOOS program has voiced a desire to explore engaging in a pilot program with a limited number of regions to determine the feasibility of migrating from the current cooperative agreement approach to a contractual approach. Considering LMI's review to date, NOAA business personnel appear to have limited ability to support a pilot program with existing resources. In their words, the investment in developing a limited pilot program might not be feasible, given other demands on their time. Similarly, engaging in two parallel funding activities—the current financial assistance instruments, plus an acquisition pilot program—could strain NOAA IOOS program personnel. Certainly one of the factors to consider when assessing the feasibility of a pilot program is the cost-benefit tradeoff of program personnel learning and supporting two processes rather than focusing on improving the current process. And, as a preliminary matter, any initiative—including the possible development of a pilot program—requires a clearly articulated set of goals and objectives before embarking on it. Given the difficulty both program and business personnel may have in supporting a pilot program, initially NOAA may want to focus on enhancing the existing process and defer entertaining a pilot program.

## NEXT STEPS

This report focused on providing information on alternative funding mechanisms to fund and sustain regional observing systems. A forthcoming LMI report will address the “as-is” aspect of the overall regional business model effort, followed by LMI's “to-be” business model recommendations in a separate report.

# Appendix A

## Summary of Programs and Organizations Reviewed

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This appendix contains a matrix, Table A-1, describing the 10 programs and organizations (or components) reviewed and, for each, summarizing the information gathered from the interviewees. NOAA provided the names of these programs and organizations (and in some cases, the names of individuals in those programs and organizations) and LMI contacted representatives of these components to gather input on the array of topics in this matrix.

Table A-1. Summary of Programs and Organizations Reviewed

Program or organization	URL	Person interviewed	Agency	Description	Activity scope <sup>a</sup>	Authority	Competitive segment funding mechanism; duration	Selected aspects of federal programmatic role <sup>b</sup>	Advisory body or bodies	Collaboration approach	Transition issues
NOAA											
1. Applied Research Centers	<a href="http://www.climate.noaa.gov/cpo_pa/cdep/">http://www.climate.noaa.gov/cpo_pa/cdep/</a>	Dr. Ming Ji ming.ji@noaa.gov 301-763-8000 x7400	NOAA	<p>The Climate Program Office has partnerships with NOAA laboratories and cooperative institutes. The laboratories have established formal collaborative agreements with universities/nonprofit research institutions to form Joint Research Institutes that are centers of scientific excellence pertaining to the earth's oceans, inland waters, intermountain west, atmosphere, and arctic environment. The Cooperative Research Institutes bring together the resources of a research-oriented university or institution and NOAA to develop and maintain a center of excellence in research relevant to understanding the Earth's oceans, the Great Lakes, inland waters, Arctic regions, solar terrestrial environment, intermountain west, and the atmosphere. NOAA supports 22 CIs in 17 states.</p> <p>The Climate Program Office sponsors a critical mass of focused research and development at the NOAA Applied Research Centers (ARCs) and aims to benefit climate forecasters at the Climate Prediction Center (CPC) and the International Research Institute for Climate Prediction (IRI), as well as users of such forecasts. The following are some of the ARCs:</p> <ul style="list-style-type: none"> <li>◆ NOAA/Climate Diagnostics Center (CDC)</li> <li>◆ Center for Ocean-Land-Atmosphere Studies (COLA)</li> <li>◆ Experimental Climate Prediction Center (ECPC)</li> <li>◆ Center for Ocean-Atmospheric Prediction Studies, Florida State University</li> <li>◆ Center for Science in the Earth System (CSES), University of Washington/JISAO</li> <li>◆ Geophysical Fluid Dynamics Laboratory (GFDL)</li> <li>◆ NCEP/Environmental Modeling Center (EMC)</li> <li>◆ IRI Modeling and Prediction Research Group</li> <li>◆ NASA Seasonal-to-Interannual Prediction Project (NSIPP).</li> </ul>	Research only.	No special authority required to form arrangements.	<p><i>Mechanism:</i> Grants.</p> <p><i>Duration:</i> Up to 10 years (through use of cooperative institutes).</p>	None identified.	<p><i>Tier:</i> Federal (ARCs Council).</p> <p><i>Comment:</i> Scientific advisory committee consists of directors of ARCs; NOAA representatives from the Climate Prediction Center, Environmental Modeling Center, and Geophysical Fluid Dynamics Laboratory; representatives from the International Research Institute for Climate and Society and NASA Global Modeling and Assimilation Office; and at-large members from scientific community.</p>	All ARCs are part of a community of practice. They are required by the terms of their agreements to work with each other, including attendance at an annual meeting. Also, NOAA can specify multiple ARC involvement in a given project (e.g., Center A does X, Center B does Y, and Center C does Z).	None identified.

Table A-1. Summary of Programs and Organizations Reviewed

Program or organization	URL	Person interviewed	Agency	Description	Activity scope <sup>a</sup>	Authority	Competitive segment funding mechanism; duration	Selected aspects of federal programmatic role <sup>b</sup>	Advisory body or bodies	Collaboration approach	Transition issues
2. Coastal Zone Management Program (CZMP)	<a href="http://coastalmanagement.noaa.gov/programs/coast_div.html">http://coastalmanagement.noaa.gov/programs/coast_div.html</a>	Dr. John King John.King@noaa.gov 301-713-3155	NOAA	<p>The CZMP is a voluntary partnership between the federal government and U.S. coastal states and territories authorized by the Coastal Zone Management Act of 1972. The Coastal Programs Division, within NOAA's Office of Ocean and Coastal Resource Management (OCRM), administers the program at the federal level. CMZP's objectives include</p> <ul style="list-style-type: none"> <li>◆ fostering an effective partnership among federal, state, and local governments that strengthens the capabilities of each partner and</li> <li>◆ addressing national interests, including giving priority consideration to coastal dependent uses and establishing orderly processes for siting facilities related to national defense, energy, fishery development, recreation, ports, and transportation.</li> </ul> <p>NOAA's OCRM supports states through financial assistance, mediation, technical and legal services, and information and by participation in state, regional, and local forums. OCRM's policy and planning expertise is integral to coastal zone management and the development of comprehensive management tools and enforceable policies (e.g., state laws, regulations, and local codes).</p> <p>The CZMP is implemented on a day-to-day basis at the state level in the 34 states and territories with federally approved coastal management programs. The coastal management programs assess emerging issues, develop policies and management approaches, undertake programs and projects in partnership with other state and local agencies, and enforce program policies to balance development and conservation.</p>	Research-plus.	Coastal Zone Management Act. Special authority used to enable special relationships (long-term federal-state). Regulatory coverage: 15 CFR 923, Coastal Zone Management Program Regulations.	<i>Mechanism:</i> Cooperative agreements primarily (some grants). <i>Duration:</i> Long-term government-state partnership funded annually.	None identified.	<i>Tier:</i> State (state councils). The states have advisory councils, but the national program does not.	None identified.	None identified.

Table A-1. Summary of Programs and Organizations Reviewed

Program or organization	URL	Person interviewed	Agency	Description	Activity scope <sup>a</sup>	Authority	Competitive segment funding mechanism; duration	Selected aspects of federal programmatic role <sup>b</sup>	Advisory body or bodies	Collaboration approach	Transition issues
3. Cooperative Institutes	<a href="http://www.nrc.noaa.gov/ci/">http://www.nrc.noaa.gov/ci/</a>	Dr. John Cortinas John.Cortinas@noaa.gov 301-734-1090	NOAA	<p>NOAA CIs are academic and nonprofit research institutions that demonstrate the highest level of performance and conduct research that supports NOAA's mission goals and strategic plan. NOAA currently supports 22 CIs in 17 states. The CIs' research portfolios range from satellite climatology and fisheries biology to atmospheric chemistry and coastal ecology. CIs are located at parent institutions whose geographic expanse extends from Hawaii to Massachusetts and from Alaska to Florida.</p> <p>The CIs are like a center of excellence, allowing a focus on a particular area of research—both basic and applied. They primarily receive NOAA funding, but also have funding from other sources. The work models vary, but the most dominant one is where a CI has close geographical proximity to a NOAA lab and collaboration exists, in varying degrees, between NOAA scientists and the institutional scientists. CIs, which are created around research themes, are a NOAA-wide resource, open to all. Because of the nature of CIs, an extensive process exists to establish one; it takes about a year and involves the entire agency.</p> <p>The CIs operate according to a standard process; however, they are "owned" by the NOAA component that provides the predominance of funding. CIs serve as an umbrella instrument to transfer NOAA money to an institute. One award is made to a CI. Subsequently, project work under a CI is funded via amendment. Once assigned, a NOAA line office is responsible for the oversight of the competition process, performance, funding throughout the award period, and managing the renewal process, if appropriate.</p> <p>See the CI handbook at <a href="http://www.nrc.noaa.gov/ci/policy/docs/handbook.pdf">http://www.nrc.noaa.gov/ci/policy/docs/handbook.pdf</a>.</p>	Research only.	Special authority enables use of university personnel and facilities in a different manner.	<p><i>Mechanism:</i> Cooperative agreements primarily (some grants).</p> <p><i>Duration:</i> Up to 10 years through institutional awards (initial 5-year award with the potential for an additional noncompetitive 5-year award).</p>	<p><i>Oversight and evaluation:</i> Research evaluation begins in year 4 with a peer review done by a panel visit lasting several days. The evaluation system is identified in the CI handbook. The peer review determines whether the program is renewed.</p>	<p><i>Tier:</i> University (Councils of Fellows). Each CI is advised by a council of fellows.</p>	None identified.	CI handbook covers transition process for a "sun-setting" operator.
4. National Estuarine Research Reserve System Program (NERRS)	<a href="http://www.nerrs.noaa.gov/">http://www.nerrs.noaa.gov/</a>	Ms. Laurie McGilvray 301-713-3155 x158 laurie.mcgilvray@noaa.gov	NOAA	<p>The Coastal Zone Management Act created NERRS in 1972 to protect estuarine areas, provide educational opportunities, promote and conduct estuarine research and monitoring, and transfer relevant information to coastal managers. NERRS is a network of 27 protected areas established for long-term research, education and stewardship for healthy and productive coastal ecosystems. The reserve system is a partnership program between NOAA and coastal states, which must apply for a federal designation as a reserve. NOAA provides funding, national guidance, and technical assistance. Each reserve is managed locally on a daily basis by a lead state agency, nonprofit organization, or university, with input from local partners. Research and monitoring is the core mission of the research reserves. Through a distributed network of multiple institutions, NOAA uses the research reserves to provide nationwide data. The network participants must follow common protocols and common processes. The Coastal Zone Management Act provides the statutory support helpful to working directly with the states.</p>	Research-plus.	Coastal Zone Management Act. Special authority used to enable special relationships (long-term federal-state). Regulatory coverage: 15 CFR 921, NERRS regulations.	<p><i>Mechanism:</i> Cooperative agreements primarily (some grants).</p> <p><i>Duration:</i> Long-term government-state partnership funded annually.</p>	None identified.	<p><i>Tier:</i> Federal (National Strategic Committee); local.</p> <p><i>Comment:</i> Federal—National Strategic Committee, with NOAA having two voting members. Local—Each research reserve also has a strategic committee.</p>	<p><i>IT:</i> Data monitoring and collection by reserves. Joint objectives: participants share strategic plan, performance measures, monitoring protocols, training.</p>	None identified.

Table A-1. Summary of Programs and Organizations Reviewed

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5. NEXRAD Program	<a href="http://www.roc.noaa.gov/">http://www.roc.noaa.gov/</a>	Dr. Rich Vogt 405-573-8803 Richard.j.vogt@noaa.gov	NWS	<p>Prior to 1988, NOAA's National Weather Service (NWS) operated different weather radar systems. Those systems were getting old and did not offer national coverage. At the same time, the Air Force (AF) and Navy had weather radars that were getting old, and the Federal Aviation Administration (FAA) needed national coverage. At this juncture, a new technology for Doppler weather radar was maturing, with the research being performed at a NOAA lab. Therefore, DoD, DOT, and DOC formed a tri-agency program to address the challenges. Their arrangement was codified in three tri-agency MOUs, each one covering a different topic:</p> <ul style="list-style-type: none"> <li>◆ Integrated logistics system (ILS)</li> <li>◆ Automated systems operation system</li> <li>◆ Allocation of costs.</li> </ul> <p>The process took several years to put in place, but has been a model for multiagency activities (including the Automated Surface Observing System and the satellite program).</p> <p>The three agencies formed a joint system program office (JSPO), located in DOC/NOAA, to acquire the radars. As soon as the systems were installed, JSPO was dismantled and a Radar Operations Center (ROC) was stood up in 1988, also administered under NOAA/NWS. The Weather Surveillance Radar 88 Doppler (WSR-88D) ROC is located in Norman, OK. The ROC employees come from NWS, Air Force, Navy, FAA, and support contractors. (No LLC arrangement is involved.) The ROC provides centralized meteorological, software, maintenance, and engineering support for all WSR-88D systems. WSR-88D systems will be modified and enhanced during their operational life to meet changing requirements, technology advances, and improved understanding of the application of these systems to real-time weather operations. The ROC also operates WSR-88D test systems for the development of hardware and software upgrades to enhance maintenance, operation, and provide new functionality.</p> <p>NEXRAD is used to warn the people of the United States about dangerous weather and its location. Meteorologists can now warn the public to take shelter with more notice than any previous radar. There are 158 operational NEXRAD radar systems deployed throughout the United States and at selected overseas locations. The NEXRAD network provides significant improvements in severe weather and flash flood warnings, air traffic safety, flow control for air traffic, resource protection at military bases, and management of water, agriculture, forest, and snow removal.</p>	Operations only.	No special authority required to form arrangements.	<i>Mechanism:</i> Contract. <i>Duration:</i> 5 years.	None identified.	<i>Tier:</i> Federal (Technical Advisory Committee). <i>Comment:</i> Each agency has 4 members (2 operations, 2 research) and at-large members from labs/academia. They review the program and lay out the technical needs (basically a peer review).	<i>IT:</i> "Level 2" data sharing occurs regionally.	<i>PM transition:</i> Government joint program office for acquisition transitioned to Operations Center.

Table A-1. Summary of Programs and Organizations Reviewed

Program or organization	URL	Person interviewed	Agency	Description	Activity scope <sup>a</sup>	Authority	Competitive segment funding mechanism; duration	Selected aspects of federal programmatic role <sup>b</sup>	Advisory body or bodies	Collaboration approach	Transition issues
6. Regional Integrated Sciences and Assessments (RISA) Program	<a href="http://www.climate.noaa.gov/cpo_pa/risa/">http://www.climate.noaa.gov/cpo_pa/risa/</a>	Ms. Caitlin Simpson Caitlin.simpson@noaa.gov 301-734-1251	NOAA	The RISA program supports research that addresses complex climate sensitive issues of concern to decision makers and policy planners at a regional level. RISA research team members are primarily based at universities, although some of the team members are based at government research facilities, nonprofit organizations, or private-sector entities. Traditionally, the research has focused on the fisheries, water, wildfire, and agriculture sectors. The program also supports research into climate sensitive public health issues.	Research only.	No special authority required to form arrangements.	<i>Mechanism:</i> Cooperative agreements primarily (some grants). <i>Duration:</i> 5 years.	None identified.	<i>Tier:</i> Federal (Government advisory committee). <i>Comment:</i> The committee covers 3 programs, including RISA. The advisors are mostly external (e.g., other federal agencies, National Governors Association). The members rotate and it is ad hoc.	None identified.	None identified.
7. Sea Grant Program	<a href="http://www.seagrants.noaa.gov/">http://www.seagrants.noaa.gov/</a>	Ms. Jamie Krauk Jamie.Krauk@noaa.gov 202-482-6093	NOAA	Sea Grant is a nationwide network (administered through NOAA), of 30 university-based programs that work with coastal communities. The program engages this network of the nation's top universities in conducting scientific research, education, training, and extension projects designed to foster science-based decisions about the use and conservation of our aquatic resources.	Research-plus.	No special authority required to form arrangements. Regulatory coverage: 15 CFR 917, National Sea Grant Program Funding Regulations, and 15 CFR 918, Sea grants.	<i>Mechanism:</i> Grants. <i>Duration:</i> 4 years.	Program management: National Sea Grant Office consists of 12–15 people in Silver Spring, MD. The federal office has a fiduciary role. The Sea Grant Program Office participates in technical review panels and makes recommendations for funding.	<i>Tier:</i> Federal (National Sea Grant Review Panel). <i>Comment:</i> Panel has three people, each with a background that matches Sea Grant's focus areas: education, outreach, and research. Primary role over the past 10 years has been in conducting post-performance evaluations.	<i>Joint objectives:</i> Regional priorities established through funding of 8 Sea Grant regions. <i>Third-party link:</i> Association shares information, fosters working together regionally, and recommends priority areas.	None identified.

Table A-1. Summary of Programs and Organizations Reviewed

Program or organization	URL	Person interviewed	Agency	Description	Activity scope <sup>a</sup>	Authority	Competitive segment funding mechanism; duration	Selected aspects of federal programmatic role <sup>b</sup>	Advisory body or bodies	Collaboration approach	Transition issues
Other government research organizations											
8. Centers for Ocean Science Education Excellence (COSEE)	<a href="http://www.cosee.net/">http://www.cosee.net/</a> <a href="http://www.nsf.gov/pubs/2007/nsf07527/nsf07527.pdf">http://www.nsf.gov/pubs/2007/nsf07527/nsf07527.pdf</a>	Ms. Elizabeth Romelrom@nsf.gov 703-292-7709	NSF	COSEE is a network of coordinated centers that facilitate collaborations and communications between ocean science researchers and educators. These centers foster the integration of ocean research into high-quality educational materials, allow ocean researchers to gain a better understanding of educational organizations and pedagogy, provide educators with an enhanced capacity to understand and deliver high-quality educational programs in the ocean sciences, and provide material to the public that promotes a deeper understanding of the ocean and its influence on each person's quality of life and our national prosperity. Eligible organizations include academic institutions of higher learning that award degrees in geoscience or environmental science, oceanographic research institutions, professional societies, nonprofit or not-for-profit consortia, informal science centers, museums, aquariums, and state and local education agencies. Each COSEE center must represent a minimum of three partners, including at least one organization from each of the following sectors: ocean science research institutions, informal education institutions, and formal educational institutions.	Research-plus.	No special authority required to form arrangements.	<i>Mechanism:</i> Grants. <i>Duration:</i> 3 to 5 years.	None identified.	<i>Tier:</i> National; local <i>Comment:</i> National—Central Coordinating Office has a national advisory committee. Local—centers all have advisory committees comprising community members (e.g., principals, teachers, museum heads).	<i>Third-party link:</i> Central coordinating office.	<i>Operator transition:</i> Central coordinating office being re-competed.

Table A-1. Summary of Programs and Organizations Reviewed

Program or organization	URL	Person interviewed	Agency	Description	Activity scope <sup>a</sup>	Authority	Competitive segment funding mechanism; duration	Selected aspects of federal programmatic role <sup>b</sup>	Advisory body or bodies	Collaboration approach	Transition issues
9. Multidisciplinary University Research Initiative (MURI)	<a href="http://www.grants.gov/search/search.do?oppld=14519&amp;mode=VIEW">http://www.grants.gov/search/search.do?oppld=14519&amp;mode=VIEW</a>	Dr. Frank Herr frank.herr@navy.mil 703-696-4125 Office of Naval Research Mr. Jon Porter jonathan.porter@osd.mil DDR&E	DoD	MURI is a multiagency DoD program that supports research teams whose efforts intersect more than one traditional science and engineering discipline. Multidisciplinary team effort can accelerate research progress in areas particularly suited to this approach. Multidisciplinary research also can help hasten the transition of research findings to practical application. MURI awards are made in research topics specified by the participating defense agencies each year that the program is in force. Specified topics change each year. Awards are typically for 3 years (funded incrementally or as options), with 2 additional years possible as options to bring the total award to 5 years, and at a funding level ranging from half a million to about a million dollars per year, with the size of the award dependent upon the topic, technical goals, and availability of appropriations.	Research only.	No special authority required to form arrangements.	<i>Mechanism:</i> Grants. <i>Duration:</i> 3 to 5 years.	None identified.	Not applicable; the Office of the Secretary of Defense administers the program, prioritizing the service technologies.	None identified.	None identified.
10. Southeastern Universities Research Association (SURA) Operation of DOE's Thomas Jefferson National Accelerator Facility	<a href="http://www.sura.org/about/contract.html">http://www.sura.org/about/contract.html</a> <a href="http://www.jlab.org">http://www.jlab.org</a>	Mr. Jerry Draayer draayer@sura.org 703-626-5087 President, SURA	DOE	JLab is funded by DOE's Office of Science, with support from the city of Newport News, VA, and Congress. As a user facility for scientists worldwide, JLab's primary mission is to conduct basic research in support of nuclear physics. The nature of the JLab mission is such that it cannot be met by existing DOE in-house personnel or by traditional FAR-based contractor procedures. The JLab mission requires a long-term relationship that will provide continuity and will allow the lab to attract the best scientific and management personnel. DOE uses an FFRDC to provide the long-term relationship that is necessary to DOE missions. The performance-based management and operating contract is held by Jefferson Science Associations (JSA), a limited liability corporation formed for this purpose. JSA combines SURA (a consortium of more than 60 universities across the United States) and CSC (a U.S. government contractor).	Research only. Management and operation by contractor of the lab, including science and technology performance, as well as effective and efficient implementation of critical operational and administrative management systems.	No special authority required to form arrangements. FAR 35.017-1.	<i>Mechanism:</i> Contract. <i>Duration:</i> Up to 20 years (FFRDC).	The Office of Nuclear Physics (within the Office of Science) in DOE-HQ is solicited annually for input on the laboratory's S&T performance.	<i>Tier:</i> University (board). <i>Comment:</i> GOCO contractor has a 10-member board.	<i>IT:</i> data exchange by lab users.	<i>Operator transition:</i> JSC LLC successfully re-competed recently; no transition necessary.

<sup>a</sup> As used here, "activity scope" may involve (1) operations only, (2) research only, or (3) research-plus (e.g., operations, education, training, outreach).

<sup>b</sup> Each program has a federal programmatic role that varies based on the nature of the program, funding instrument, and number/relationships among program participants. All are involved with strategic planning, program administration and management, oversight, and evaluation. Cooperative agreements involve substantive programmatic involvement during performance. Multiple relationships, e.g., awards for research as well as for oversight, increase complexity of program administration and management.

## Appendix B

# Summary of Business Arrangements and Instruments Reviewed

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This appendix contains a matrix detailing the mechanisms reviewed. The matrix, Table B-1, describes the mechanisms and, for each, identifies its purpose, origin or authority, federal programmatic involvement, types of partners, possible duration, and implications for intellectual property ownership, physical property ownership, and funding.

Table B-1. Summary of Business Arrangements or Instruments Reviewed

Mechanism	Description	Purpose	Origin/authority	Federal programmatic involvement	Prime-level partner	Possible duration	Intellectual property ownership	Physical property ownership	Funding
Acquisition Contract	<p>Per FAR 2.101, acquisition contracts are mutually binding legal relationships obligating the seller to furnish supplies or services and the buyer to pay for them. They include all types of commitments that obligate the government to an expenditure of appropriated funds under an instrument with a nonfederal entity and that, except as otherwise authorized, are in writing. Contracts do not include grants and cooperative agreements covered by 31 USC 6301, et seq.</p> <p>Acquisition contracts are of two basic types: fixed price and cost reimbursement. Under a fixed-price contract, the contractor is paid an agreed-on price for performing the work. These types of contracts are suitable for situations in which the work can be reasonably well defined. The contractor undertakes risk of performance because it must deliver for the specified price. Under a cost-reimbursement contract, the contractor performs its best efforts up to a ceiling amount and is reimbursed for actual, allowable costs incurred and, when applicable, a profit or fee. These types of contracts are suitable for situations in which the nature of the work cannot be reasonably well defined. The government undertakes the risk of performance under this arrangement.</p>	<p>Acquisition of property or services for the funding agency's direct benefit or use.</p> <p>Agency-defined needs; although basic or applied research resulting from use of a BAA is treated as investigator-initiated research.</p>	<p>Authority is inherent in statute creating agency.</p>	<p>Programmatic monitor (project officer, contracting officer's representative, or contracting officer's technical representative, depending on agency terminology) oversees technical progress; degree of involvement varies from review of reports to substantive involvement depending on the nature of the supply or service.</p>	<p>Contracts may be awarded to private for-profit corporations, non-profit entities, public or private universities, or consortia.</p>	<p>Up to 5 years for support services, with opportunity for competitive renewal; research contracts commensurate with nature of project and need for review of the science/technology (e.g., can be 3 to 7 years). Introduces concepts of severability or nonseverability of services.</p>	<p>Unless agency or program has explicit overriding statutory authority for more restrictive provisions, patents and inventions are subject to 37 CFR 401. The recipient has the right to own any invention conceived or first reduced to practice under the award. If it does not exercise that right or file a patent application within the time limits specified in the regulation, the government may request an assignment of all rights and provide a limited royalty-free, non-exclusive license to the recipient. Government must specify in contract its ownership rights for copyrightable material.</p>	<p>Government-furnished or contractor-acquired nonexpendable personal property as needed for contract performance.</p> <p>Under FAR 45.107(a)(3), an agency can vest title in tangible personal property in a nonprofit institution of higher education or in a nonprofit organization whose primary purpose is conducting scientific research under an award for basic or applied research without further obligation to the government.</p>	<p><i>Fixed price:</i> fully funded upon contract award. Fixed payment(s) upon timely delivery at set prices.</p> <p><i>Cost reimbursement:</i> fully or incrementally funded. Payment(s) upon delivery of best efforts for allowable costs incurred during performance.</p>

Table B-1. Summary of Business Arrangements or Instruments Reviewed

Mechanism	Description	Purpose	Origin/authority	Federal programmatic involvement	Prime-level partner	Possible duration	Intellectual property ownership	Physical property ownership	Funding
Grant	A grant is a legal instrument used to enter into a relationship, the principal purpose of which is to transfer something of value (generally money or property) to a recipient to carry out a public purpose of support or stimulation authorized by a law of the United States (rather than to acquire property or services for the funding agency's direct benefit or use).	Funding of recipient for public purpose of support or stimulation authorized by statute.	Grant requires authorizing statute (can be part of organic act, e.g., National Science Foundation or Public Health Service Act, or specific programmatic authority). It may have implementing or supplementing program regulations.	Project officer monitors performance through receipt of required reports (type and frequency limited by government-wide policy), site visits, telephone exchanges, or other means.	Grants are usually awarded to governmental organizations, nonprofit organizations, public or private universities, or consortia. For-profit organizations may be eligible under some programs, but most agencies do not pay profit/fee under grants.	Usually 3 or 5 years per segment, with opportunity for competitive renewals.	Unless agency or program has explicit overriding statutory authority for more restrictive provisions, nonprofit entities and small businesses are subject to 37 CFR 401 for patents and inventions. Recipient may copy-right material produced under the award, but government has a royalty-free, nonexclusive license to use or authorize others to use.	Title to grantee-acquired tangible personal property generally vests in recipient upon acquisition, but considered conditional title since government can require that title be transferred to it or a third party under specified circumstances; accountability may be waived pursuant to 31 U.S.C. 6306. (While the government could reclaim title, it normally requires direct transfer to a third party to avoid having to transfer title to a future [as yet unknown] recipient.)	<i>Project grant:</i> incrementally funded annually on basis of satisfactory performance. <i>State grant:</i> funded annually on basis of annual work program review. Usually advanced payment; reimbursement method is the exception.
Cooperative Agreement	A cooperative agreement is a legal instrument used to enter into the same kind of relationship as a grant (see "Description" above), except that substantial involvement is expected between the funding agency and the recipient when carrying out the activity contemplated by the cooperative agreement.	Same as grant, but substantial programmatic involvement is expected between the funding agency and recipient.	Same as grant.	Substantial programmatic involvement may include collaboration or participation by designated staff members in activities specified in the award (e.g., serving as co-investigator) or approval to move from one phase to another. It does not include directing or selecting contractors under the award, providing normal stewardship, or exercising greater control than is allowed under a grant.	Same as grant, with additional provisions for federal employees. Cooperative agreement should specifically address rights and responsibilities consistent with statutes and regulations, including allocation of rights among the parties, ownership of data and research results, and disposition of royalties and other income.	Same as grant, except that under NOAA policy on institutional awards, cooperative agreements may be awarded for 5 years plus a 5-year non-competitive renewal.	Same as grant. Rights may need to be negotiated when federal involvement results in coauthorship.	Same as grant.	Same as grant.

Table B-1. Summary of Business Arrangements or Instruments Reviewed

Mechanism	Description	Purpose	Origin/authority	Federal programmatic involvement	Prime-level partner	Possible duration	Intellectual property ownership	Physical property ownership	Funding
FFRDC	FFRDCs are activities that are sponsored under a broad charter by a government agency (or agencies) for the purpose of performing, analyzing, integrating, supporting, and/or managing basic or applied R&D. The entities that have FFRDC relationships with government agencies are typically private, nonprofit corporations; public or private universities; or consortia of such entities and institutions. However, some FFRDCs are administered by for-profit corporations. In some cases, the receiving entity is separately incorporated to enable it to serve as an FFRDC. Normally, an FFRDC relationship is established when (1) a long-term relationship is contemplated; and (2) the government needs a special relationship with a partner that involves privileged access to government and supplier data, employees, and facilities beyond that common in a normal contractual relationship. The business arrangement between the entity operating the FFRDC and the sponsoring government agency (agencies) is accomplished via a long-term contract.	Long-term relationship funded via contract for R&D. Sometimes involves contractor operation of government-owned facilities.	Agency-head authorization is required for sponsoring agency to establish an FFRDC (FAR 35.017). Use of a management and operating contract to operate a GOCO (FAR Subpart 17.6) requires statutory authority.	Involvement resides at several levels. Those responsible for the management of the "umbrella" vehicle ensure that work assigned is within scope, and they monitor cost performance and other operational and technical aspects that go into an assessment of performance (many of these are award-fee contracts). Those assigning work may monitor the research activity directly, but have no rights with respect to contractual performance.	FFRDCs are operated, managed, and/or administered by either a university or consortium of universities, other not-for-profit or non-profit organization, or an industrial firm.	Long term for sponsoring agreement (maximum increment of 5 years with periodical review and renewal). Contract with FFRDC administrator is subject to FAR restrictions (e.g., FAR 17.605 requires review of management and operating contracts every 5 years). Work is assigned on a task basis, with task duration generally 1 to 5 years.	Government ownership consistent with award provisions.	Government-furnished real property, when applicable. Government-furnished or contractor-acquired nonexpendable personal property as needed for contract performance. The government retains title to all government-furnished property (see FAR 45.401).	Same as contract, consistent with contract type (generally cost reimbursement).

Table B-1. Summary of Business Arrangements or Instruments Reviewed

Mechanism	Description	Purpose	Origin/authority	Federal program-matic involvement	Prime-level partner	Possible duration	Intellectual property ownership	Physical property ownership	Funding
Other Transaction Authority	<p>An OT is the term commonly used to refer to the authority to enter into transactions (other than contracts, grants, or cooperative agreements) with non-federal entities. Because OTs generally are not subject to federal laws and regulations governing procurement contracts, grants, and cooperative agreements, OTs provide the federal government with flexibility to attract nontraditional R&amp;D players who might not otherwise participate because of intellectual property, audit, or similar requirements that differ from commercial practice. The following agencies (listed in descending order of use) have OT authority:</p> <ul style="list-style-type: none"> <li>◆ DoD—granted authority in 1989 (10 U.S.C. 2371)</li> <li>◆ DHS—DHS—granted authority via the 2004 National Defense Authorization Act, Section 1441</li> <li>◆ NASA—granted authority via the 1959 National Aeronautics and Space Act</li> <li>◆ DOT—granted authority in 1998 via the Transportation Equity Act for the Twenty-First Century (TEA-21), Section 502</li> <li>◆ FAA—granted authority in 2003 via “Vision 100—Century of Aviation Re-authorization Act,” Public Law 108-176</li> <li>◆ DOE—granted authority via the 2005 Energy Policy Act, Section 1007 (42 U.S.C. 7256 as amended)</li> <li>◆ HHS—granted authority via the 2005 National Defense Authorization Act, Section 1441.</li> </ul> <p>There are two types of OTs: acquisition OTs and financial assistance OTs. Each is a legally binding instrument other than a procurement contract, grant, or cooperative agreement for performing basic, applied, or advanced research. An acquisition OT is closest in form to a procurement contract. A financial assistance OT is closest in form to a grant.</p>	Funding of R&D.	OT requires special statutory authority (see list in “Description”) combined with authority to award contracts, grants, or cooperative agreements.	<p><i>Acquisition OTs:</i> same as contract.</p> <p><i>Assistance OTs:</i> same as grant.</p>	Nontraditional R&D performer	Usually less than 1 year for phase 1 (design concept) on multiphase programs.	<p><i>Acquisition OTs:</i> same as contract.</p> <p><i>Assistance OTs:</i> same as grant.</p> <p>In either instance, OT flexibility allows negotiation of appropriate terms; minimal government rights may be appropriate.</p>	<p><i>Acquisition OTs:</i> same as contract.</p> <p><i>Assistance OTs:</i> same as grant.</p>	<p><i>Acquisition OTs:</i> same as contract.</p> <p><i>Assistance OTs:</i> same as grant, but can use methods other than cost reimbursement up to the funded amount (fixed-support milestone payments are the norm).</p>

# Appendix C

## Federally Funded Research and Development Centers

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The U.S. government sponsors over 30 FFRDCs, and the National Science Foundation (NSF) maintains a master government list of FFRDCs (FAR 35.017-6). Table C-1 contains the NSF master list.<sup>1</sup>

*Table C-1. Federally Funded Research and Development Centers*

Department	Component	Type of administering partner	FFRDC name, administrator, and location	
Department of Defense	Office of the Secretary of Defense	Other nonprofit institutions	Institute for Defense Analyses Studies and Analyses Federally Funded Research and Development Center, administered by Institute for Defense Analyses, Alexandria, VA National Defense Research Institute, administered by RAND Corporation, Santa Monica, CA C3I Federally Funded Research and Development Center, administered by MITRE, Bedford, MA, and McLean, VA	
	National Security Agency	Other nonprofit institutions	Institute for Defense Analyses Communications and Computing Federally Funded Research and Development Center, administered by Institute for Defense Analyses, Alexandria, VA	
	Department of the Navy	Other nonprofit institutions	Center for Naval Analyses, administered by The CNA Corporation, Alexandria, VA	
	Department of the Air Force	Universities and colleges	Lincoln Laboratory, administered by Massachusetts Institute of Technology, Lexington, MA	
		Other nonprofit institutions	Aerospace Federally Funded Research and Development Center, administered by The Aerospace Corporation, El Segundo, CA Project Air Force, administered by RAND Corporation, Santa Monica, CA	
	Department of the Army		Universities and colleges	Software Engineering Institute, administered by Carnegie Mellon University, Pittsburgh, PA
			Other nonprofit institutions	Arroyo Center, administered by RAND Corporation, Santa Monica, CA

<sup>1</sup> The list that appears in this appendix is from <http://www.nsf.gov/statistics/nsf05306/>.

Table C-1. Federally Funded Research and Development Centers

Department	Component	Type of administering partner	FFRDC name, administrator, and location
Department of Energy		Industrial firms	Idaho National Engineering and Environmental Laboratory, administered by Battelle Energy Alliance, LLC, Idaho Falls, ID Sandia National Laboratories, administered by Sandia Corporation, a subsidiary of Lockheed Martin, Albuquerque, NM Savannah River Technology Center, administered by Westinghouse Savannah River Company, Aiken, SC
		Universities and colleges	Ames Laboratory, administered by Iowa State University of Science and Technology, Ames, IA Argonne National Laboratory, administered by UChicago Argonne, LLC, Argonne, IL Ernest Orlando Lawrence Berkeley National Laboratory, administered by University of California, Berkeley, CA Fermi National Accelerator Laboratory, administered by Universities Research Association, Inc., Batavia, IL Lawrence Livermore National Laboratory, administered by the University of California, Livermore, CA Los Alamos National Laboratory, administered by the University of California, Los Alamos, NM Princeton Plasma Physics Laboratory, administered by Princeton University, Princeton, NJ Stanford Linear Accelerator Center, administered by Stanford University, Stanford, CA Thomas Jefferson National Accelerator Facility, administered by Southeastern Universities Research Association, Inc., Newport News, VA
		Other nonprofit institutions	Brookhaven National Laboratory, administered by Brookhaven Science Associates, Inc., Upton, Long Island, NY National Renewable Energy Laboratory, administered by Midwest Research Institute; Battelle Memorial Institute; Bechtel National, Inc., Golden, CO Oak Ridge National Laboratory, administered by UT-Battelle, LLC, Oak Ridge, TN Pacific Northwest National Laboratory, administered by Battelle Memorial Institute, Richland, WA
Department of Health and Human Services	National Institutes of Health	Industrial firms	National Cancer Institute, administered by Science Applications International Corporation; Charles River Laboratories, Inc.; Data Management Services, Inc.; Wilson Information Services, Inc., Frederick, MD
Department of Homeland Security	Under Secretary for Science and Technology	Other nonprofit institutions	Homeland Security Institute, administered by Analytic Services, Inc., Arlington, VA

Table C-1. Federally Funded Research and Development Centers

Department	Component	Type of administering partner	FFRDC name, administrator, and location
NASA		Universities and colleges	Jet Propulsion Laboratory, administered by California Institute of Technology, Pasadena, CA
National Science Foundation		Universities and colleges	National Astronomy and Ionosphere Center, administered by Cornell University, Arecibo, PR National Center for Atmospheric Research, administered by University Corporation for Atmospheric Research, Boulder, CO National Optical Astronomy Observatories, administered by Association of Universities for Research in Astronomy, Inc., Tucson, AZ National Radio Astronomy Observatory, administered by Associated Universities, Inc., Charlottesville, VA
		Other nonprofit institutions	Science and Technology Policy Institute, administered by Institute for Defense Analyses, Alexandria, VA
Nuclear Regulatory Commission		Other nonprofit institutions	Center for Nuclear Waste Regulatory Analyses, administered by Southwest Research Institute, San Antonio, TX
Department of Transportation	Federal Aviation Administration	Other nonprofit institutions	Center for Advanced Aviation System Development, administered by MITRE, McLean, VA
Department of the Treasury	Internal Revenue Service	Other nonprofit institutions	IRS Federally Funded Research and Development Center, administered by MITRE, Center for Enterprise Modernization, McLean, VA

# Appendix D

## Abbreviations

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ARC	Applied Research Center
BAA	Broad Agency Announcement
CCO	Central Coordinating Office
CFR	Code of Federal Regulations
CI	Cooperative Institute
CICA	Competition in Contracting Act
COR	contracting officer's representative
COSEE	Centers for Ocean Science Education Excellence
CZMP	Coastal Zone Management Program
DOC	Department of Commerce
DoD	Department of Defense
DOE	Department of Energy
FACA	Federal Advisory Committee Act
FAR	Federal Acquisition Regulation
FFRDC	federally funded research and development center
FOIA	Freedom of Information Act
GAO	Government Accountability Office
GOCO	government-owned, contractor-operated
GSA	General Services Administration
IOOS	Integrated Ocean Observing System
IT	information technology
JLab	Thomas Jefferson National Laboratory
LLC	Limited Liability Corporation
MURI	Multidisciplinary University Research Initiative
NAO	NOAA Administrative Order
NASA	National Aeronautics and Space Administration
NERRS	National Estuarine Research Reserve System Program
NEXRAD	Next Generation Radar Program

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NFRA	National Federation of Regional Associations
NOAA	National Oceanic and Atmospheric Administration
NOPP	National Oceanographic Partnership Program
NSF	National Science Foundation
OMB	Office of Management and Budget
OT	other transaction
R&D	research and development
RA	Regional Association
RCOOS	Regional Coastal Ocean Observing Systems
RISA	Regional Integrated Sciences and Assessments
USC	United States Code