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Executive Summary

In 2012, the National Science Foundation (NSF) Office of International and Integrative Activities, International Science and Engineering (OIIA-ISE)[1] section asked the IDA Science and Technology Policy Institute (STPI) to evaluate the role, function, and value of its overseas offices and to consider the implications of an expanded NSF presence internationally. NSF operates three offices: Europe (NSF/E, initiated in 1984), Japan (NSF/J, initiated in 1960), and China (NSF/C, initiated in 2006).

The STPI team used a multi-method approach to data collection to assess office functions and goals. These methods included interviews with NSF staff and other stakeholders, site visits, a request for information (RFI), and analysis of historical documentation, budget information, and travel data. An expert panel was also assembled to advise the STPI team on study design and on interpreting the findings from collected data. Finally, to guide the assessment, the STPI team developed the set of operationalized goals shown in the following table.

Operationalized Goals of NSF Overseas Offices

Facilitation	Representation	Reporting
Supporting existing or developing new programs between NSF and counterpart agencies Facilitating contacts between U.S. and international researchers Facilitating visits by U.S. researchers or students Facilitating visits by NSF staff	Liaising with counterparts Assisting counterparts in developing NSF-like structures Attending meetings on behalf of NSF and representing the United States to international organizations	Reporting to NSF staff on highlights of trips/meetings attended Reporting to NSF staff on the science and technology (S&T) landscape or research in country or region of interest Reporting/translating highlights of publications in country or region

Following data collection and analysis, the NSF sponsor asked the STPI team to convene the expert panel to discuss the materials assembled by the team and to develop findings and recommendations. The panel, consistent with its tasking, met on February 21, 2013, and provided the following findings and recommendations:

- *Overarching Findings* identified (1) that NSF needs to develop and implement a strategic international vision to define the role and function of the NSF overseas

[1] The name of the organization in which the overseas offices are housed has changed, as well as its location in the NSF organizational structure. Throughout the document, the current name and its abbreviation (OIIA-ISE) are used.

offices and (2) that overseas offices located in countries and regions where NSF has active, large-scale collaborations are important to achieving NSF's mission.

- *Strategy Recommendations* focused on collaboration between OIIA-ISE and the NSF Directorates and Divisions to develop a year-to-year, region-by-region operational plan for international engagement that links overseas offices' high-priority activities to NSF's strategic vision in that region.
- *Office Location Recommendations* included (1) identifying Brussels as the optimal location for NSF/E, Beijing as the optimal location for NSF/C, and Tokyo as the optimal location for NSF/J, (2) considering a future office in Southeast Asia, and (3) exploring other low-cost models to expand NSF's international presence.
- *Facilitation Recommendations* highlighted (1) expanding collaboration between overseas offices and NSF Directorate and Divisional leadership in the development of international programs and in planning and executing travel, (2) including facilitation-related priorities and goals in each office's annual operational plan, and (3) providing each office a budget for events that support program development.
- *Representation Recommendations* suggested (1) increasing emphasis on representation activities that facilitate program development and (2) including priority representation goals in each overseas office's annual operational plan.
- *Reporting Recommendations* focused on (1) conveying information that is either only able to be obtained by having an in-country presence or is of specific interest to the NSF Directorates, (2) disseminating Office Head trip reports throughout NSF and across the U.S. Government, as appropriate, and (3) eliminating news clippings of publicly available information.
- *Staffing Recommendations* emphasized (1) having an Office Head who has deep knowledge of NSF and who would be given a longer term appointment than the current 2 years, (2) having the Science Assistant focus on facilitating program development, (3) giving the Administrative Assistant increased responsibility for reporting functions, and (4) considering use of American Association for the Advancement of Science (AAAS) Fellows as Science Assistants or to supplement current office staff.
- *Other Recommendations* included (1) improving coordination of overseas offices with Embassies and other U.S. Federal agencies' overseas offices, (2) revising the budgetary approval process to give Office Heads managerial oversight, and (3) improving systems and administration.

This report's independent assessment described the complexity of the environment in which the overseas offices operate and offered a summary of the data analyzed to (1) inform future management and implementation efforts and (2) give guidance to future analyses of the contributions of overseas offices in the context of global science.

Contents

1. Introduction

A. Background

The National Science Foundation (NSF) Office of International and Integrative Activities, International Science and Engineering (OIIA-ISE) Section seeks to ensure that U.S. institutions and researchers are globally engaged, are able to advance their research through international collaboration, and are maintaining U.S. leadership within the global scientific community. OIIA-ISE, as part of its efforts to achieve these goals, operates three overseas offices: the NSF Japan Office (NSF/J) opened in 1960, the NSF Europe Office (NSF/E) opened in 1984, and the NSF China Office (NSF/C) opened in 2006. As of 2013, NSF defined the goals of the overseas offices as follows:

- *Facilitation.* Promote collaboration between the science and engineering communities of the United States and the respective country/region.
- *Representation*. Serve as a liaison between NSF and agencies, institutions, and researchers.
- *Reporting*. Monitor and report on science and engineering developments and policies.

NSF had reviewed the offices individually but had never evaluated the role and function of all of the offices simultaneously. The OIIA-ISE Advisory Committee for International Science and Engineering (National Science Foundation (NSF) 2005, 17) and the Office of Management and Budget recommended that NSF assess the value of its overseas presence and consider the implications of expanding it.

B. Task

In August 2012, NSF tasked the IDA Science and Technology Policy Institute (STPI) to conduct a review of NSF's overseas offices during fiscal year (FY) 2013. The study questions were as follows:

- *What* types of activities are conducted?
- *Who* are the stakeholders that may benefit from those activities?
- *How* and *why* are the specific activities accomplished?
- *How often* are activities carried out?
- *What* are alternative or complementary U.S. Government sources for these offices?

The study statement of work (SOW) required the following:

- *Historical review*. A history of each office, the dates and rationale for their establishment, and a summary of how their mission has changed over time.
- *Process review*. An assessment of activities performed in each office, the time spent on these activities on a weekly basis, the stakeholders for those activities, and current and past staffing levels, budgets, and expenditures.
- *Comparative review.* The locations and functions of foreign offices of NSF's foreign counterpart agencies around the world and of other U.S. scientific agencies.
- *Stakeholder review.* A review of information gathered from stakeholders to identify the adequacy of the services and functions of the overseas offices and whether alternative methods of providing these services are available in a more efficient and/or effective manner.

These reviews were incorporated into STPI's methodology and are discussed in this report in the context of the overseas offices' primary goals. The results of the comparative review were published in a peer-reviewed journal article (Sergi, Parker, and Zuckerman 2014).

C. Expert Panel

The task specified that a group of experts should be assembled to advise STPI on relevant literature and study design. They were to be selected on the basis of their expertise in at least one of the following areas: science and technology (S&T) evaluation, relevant country experience, or science diplomacy. STPI selected five senior academics and policy experts to serve on the panel:

- Dr. Susan Cozzens, Vice Provost for Graduate Education and Faculty Affairs at the Georgia Institute of Technology;
- Dr. David Mowery, the William A. and Betty H. Hasler Professor of New Enterprise Development at University of California, Berkeley;
- Dr. Norman Neureiter, Director of the American Association for the Advancement of Science (AAAS) Center for Science, Technology, and Security Policy;
- Dr. Denis Simon, Vice Provost for International Strategic Initiatives at Arizona State University; and
- Dr. John Walsh, Professor at Georgia Institute of Technology.

On February 21, 2013, STPI convened the expert panel in Washington, D.C. The panelists were asked to review the alignment of each office's activities with its mission and goals and the similarities and differences across offices. STPI staff facilitated the discussion and provided clarification of study data as needed. The panel provided comment on existing activities and goals, guidance on new activities and goals, and recommendations for improvements across all three offices.

D. Data and Methodology

The STPI team used a multi-method approach for data collection, synthesis, and analysis:

- *Interviews.* The STPI team conducted interviews with current and retired OIIA-ISE staff, former Office Heads, and program staff to provide clarity concerning the functioning of the offices. Data were analyzed without attribution, using a content analytic approach where similar ideas, concepts, and themes were grouped together iteratively. Once individual interviews were coded, the data were organized thematically to characterize office functions.
- *Site visits.* The STPI team visited the three overseas offices to better understand the offices and their activities.[1] Data collection focused on current activities, although some aspects included historical data to identify recent changes in administrative processes.[2] Stakeholders interviewed included U.S.-based and in-country science agency personnel, other government personnel, investigators, students, industry staff, and university staff. Individual interviews with office staff provided information on each person's specific activities. Discussions with Office Heads elucidated his or her role as well as his or her perspective on the roles of the office staff with respect to the office's goals and context. The first site visit took place in Europe from December 3–14, 2012. The STPI team conducted interviews with stakeholders in France, Belgium, Germany, and the Czech Republic. The STPI team traveled to China on January 21–29, 2013, and then to Japan on January 30–February 7, 2013. During the site visits, the STPI team collected overseas office budget information from NSF for the previous 5 to 10 years to understand trends in spending by category (e.g., cost of space/ office rental, travel, housing, and compensation/salary).
- *Document review.* For the historical review, the STPI team reviewed papers stored in the U.S. National Archives and documents collected in collaboration with OIIA-ISE and overseas office staff, including approximately 200 documents produced by the overseas offices and foundational documents detailing the creation of and rationale for the offices. Documents were characterized by type (e.g., internal reports, memoranda), the content was analyzed, time lines detailing the evolution of the offices were developed, and lists of previous overseas Office Heads were created. In cases where documents were not available, the STPI team conducted in-depth interviews to reconstruct as much of the historical record as possible.

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[1] Following the three site visits, the STPI team visited a fourth site, the University of California, Santa Barbara. It was chosen because it participates in an NSF-supported international fellowship program with collaborators in China. The purpose was to better understand the role of NSF/C in facilitating collaborative research between U.S. and Chinese investigators.

[2] Overseas offices staff members were asked to fill out a worksheet to indicate the time spent on specific activities carried out during calendar year 2012 in support of the three primary goals of the overseas offices and other (predominantly administrative) functions.

- *Request for information* (*RFI*). NSF posted an RFI in the *Federal Register* from December 20, 2012, through January 18, 2013,[3] to elicit responses from stakeholders who were knowledgeable about the primary functions of the NSF overseas offices or had interacted with these offices. The RFI yielded 37 responses, most of them from within NSF. A public RFI was used in lieu of an NSF-only survey because it was not known at the initiation of the assessment whether the stakeholder community extended beyond NSF. RFI responses were coded inductively to determine relevant themes and topics.
- *Travel clearance analysis.* OIIA-ISE coordinates the process by which NSF staff receives approval for overseas travel. These approvals (called "country clearances") are stored in an NSF data system. OIIA-ISE provided STPI the country clearance data for calendar year 2012, one record per trip, including the traveler's name, NSF Directorate and Division affiliation, countries visited, dates of the trip, and the purpose of the trip.[4] It was not feasible to identify the cities to which NSF staff traveled or to systematically analyze the purpose of the trips since this is a text field completed by the traveler and, hence, not standardized.[5]

E. History of NSF Overseas Offices

NSF has supported eight overseas offices since 1960, five of which were created to support programmatic collaborations.[6] The following subsections give a brief history of the offices, as gathered from the U.S. National Archives and OIIA-ISE documents.[7] Appendix A provides the names of the Office Heads and their years of service (through the end of FY 2013).

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[3] The RFI was as posted in the *Federal Register*, at https://www.federalregister.gov/articles/2012/12/20/2012-30697/request-for-information-rfi-use-of-national-science-foundation-overseas-offices-in-paris-tokyo/.

[4] The data included 481 trip records, and 477 trip records were included in the analysis (three trip records were blank and one trip occurred in 2013). Of the 477 trips that could be analyzed, 442 (93%) were to a single country, 33 were to two countries, and 2 involved three countries. Analysis is in terms of trip-country pairs. The database is not complete. For example, NSF/J staff identified a trip by the Computer and Information Science and Engineering (CISE) Assistant Director to Tokyo in 2012 that was not listed. It was not feasible to determine the number of "missing" trips.

[5] Inability to code the purpose of trips with confidence meant that it was not feasible to assess the number or percentage of trips that involved scientific conference attendance as compared with those that involved meetings with academic counterparts or government officials.

[6] These support offices (New Zealand, India, Bucharest, Rio de Janeiro, and San Jose) are not intended to fulfill the facilitation, representation, and reporting goals of the NSF overseas offices and, therefore, are not considered in this report. The New Zealand support office is the only one currently operating.

[7] The NSF/J's history is published in detail in Blanpied, Loretz, and Dilworth (2007).

1. NSF/J

The NSF began efforts to establish a regional office in Tokyo in June 1959 (Joyce 1959) after exploratory conversations with and visits to the U.S. Embassy in Tokyo. Other science agencies and members of Congress discussed the potential for creating a U.S. science office in Japan (Joyce 1960), including the Secretary of the Navy requesting permission from the State Department to establish an office in 1959 (Waterman 1959). State Department correspondence indicates that Japanese scientists preferred a non-military U.S. science officer (Joyce 1960; MacArthur 1959), which provided support for NSF to initiate a science office rather than a Department of Defense (DOD) entity. Moreover, NSF management indicated to the Department of State that it would be willing to assist other agencies in developing basic science relationships with Japanese counterparts (Waterman 1960). As a result, the NSF Tokyo Regional Office was officially established within the U.S. Embassy in October 1960 (Blanpied, Loretz, and Dilworth 2007).

The NSF/J was originally staffed by three NSF personnel and three Japanese nationals (Office of Special International Programs 1961). By the mid-1970s, NSF personnel had been reduced to only the Office Head, and, by 1994, the NSF/J had four local employees (Perrolle et al. 1994). The locally employed staff then declined and now includes the current Science Assistant and Administrative Assistant.

2. NSF/E

In 1961, when the United States became a full member of the newly developed Organisation for Economic Cooperation and Development (OECD), the Department of State requested that NSF establish an office in Paris to provide scientific support to the OECD. This office was closed in 1963 (Haworth 1969). In August 1970, in response to urging by the State Department and the White House Office of Science and Technology, NSF dispatched a science liaison attaché to the United Nations Educational, Scientific and Cultural Organization (UNESCO), also located in Paris. When the United States withdrew from UNESCO in 1984, the NSF science liaison stayed in Paris to become, in effect, the NSF representative for Europe and a detailee to the State Department. In this role, the liaison was responsible for reporting to NSF on broad European science developments and to the Embassy Science Counselor on niche science areas, not all of which were of interest to NSF (NSF 2011). Because of these conflicting responsibilities, NSF pressed the State Department to allow its representative to be a direct NSF employee and to be relieved of responsibilities at the embassy. After initially resisting the change, the embassy agreed in 1995. From 1995 to 2012, NSF/E was staffed by an Office Head and a Science and Administrative Assistant, both NSF employees. A locally employed staff member was added as the Science Assistant in 2012.

In the early 1990s, NSF/E's activities focused on former Eastern bloc countries as these countries achieved full political and military independence from the Former Soviet Union (FSU). According to a report by the NSF Office of the Inspector General (OIG), the focus of

NSF/E shifted back to Western Europe in the late 1990s as European-wide organizations were being developed (OIG 1997). Interviewees noted that the focus of NSF/E shifted again to Eastern Europe in the last decade as many of these countries joined the European Union (EU). The OIG report recommended that the NSF should periodically consider moving NSF/E to Brussels, where EU headquarters are located (OIG 1997).

3. NSF/C

In 1994, a NSF task force examining NSF/J recognized growing NSF interest in East and Southeast Asia but recommended against establishing a new office at that time (Perrolle et al. 1994). Subsequent NSF discussions recognized the difficulty in covering China from NSF/J as well as the changing role of China in science (Blanpied, Loretz, and Dilworth 2007). As a result, NSF opened NSF/C in May 2006 with an NSF staff member as Office Head and a Science Assistant and an Administrative Assistant, both locally employed.

F. Organization of the Report

Chapter 2 summarizes the historical goals of the three offices and presents STPI's analysis of those goals and the resulting framework for the study. Chapters 3 through 5 assess the offices through the lens of their primary goals: facilitation, representation, and reporting. Chapter 6 assesses roles and responsibilities of overseas office staff, budget issues, information technology (IT) considerations, integration of the overseas offices into U.S. Embassy activities and overseas offices of other U.S. basic science funding agencies. Chapter 7 presents the expert panel's findings and recommendations. Chapter 8 explores future options for the overseas offices.

2. Overseas Office Goals and Study Framework

A. Analysis of Office Goals

The original goals for NSF/J were identified in a 1959 letter from the NSF Director to the State Department[8] and for NSF/C were identified in NSF's National Security Decision Directive 38 Proposal.[9] The STPI team could not locate documents describing the original goals for NSF/E, so the goals that were included in the 1997 OIG report were used.[10] A comparison of these goals against each other and against NSF's current goals for these offices reveals certain differences. For example, the current definition of facilitation is broader than in the original charter of NSF/J. In particular, logistical support for NSF staff traveling in their country or region is now a responsibility for all the offices and is noted throughout multiple historical reports but was not cited as an original goal for NSF/J or as a reason for its creation. Representation was also not an original goal of NSF/J. A 1995 management review, however, indicated that representation had been integrated into its functions (Perrolle 1995). In contrast, representation is listed as a core function in NSF/E and NSF/C founding documents. Reporting has always been a goal of each office.

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[8] The stated mission of the Tokyo Office was (1) to collect, translate, and disseminate published scientific information; (2) to generate scientific information and exchange same based on face-to-face contact between U.S. and Far East scientists; (3) to support, on occasion, meritorious research problems submitted by Japanese scientists to NSF; and (4) to provide logistic support for NSF-related activities (i.e., Foreign Fellowships, Special Studies, Research Grants). The document also stated the purpose of the office as follows: (1) to provide for better implementation of NSF's responsibilities as spelled out in the National Defense Education Act of 1958 (Section IX) and (2) to provide internal support for basic science divisions within the NSF with specific reference to (a) evaluation of outstanding research in the Far East, (b) evaluation of proposals for grants received from foreign scientists, and (c) evaluation of research resources in terms of their contributions to the basic research effort of the United States (Waterman 1959).

[9] The stated mission of NSF/C was to (1) monitor science, technology, and education developments, particularly in basic research in science and engineering, and report back to the relevant government and scientific communities; (2) represent NSF in contacts with agency counterparts; (3) pursue programmatic requirements; (4) assist visiting NSF officials and scientists in pursuing their objectives; and (5) assist in the needs of the embassy as called upon by the Counselor for Environment, Science, Technology, and Health (NSF n.d.).

[10] The identified mission of NSF/E was (1) Information Gathering—preparing formal reports and brief news items sent to a mailing list of almost 400 people; (2) Representation—attending meetings and assisting NSF management in arranging visits in Europe; and (3) Programmatic Assistance—providing initial connections between American and European scientists (OIG 1997).

Moreover, some original office functions are not included in the current goals of facilitation, representation, and reporting. NSF/J's founding document indicates that the office should fund Japanese scientists. NSF/C's founding document mentions assisting the Embassy Environment, Science, Technology, and Health (ESTH) Section when called upon.

B. STPI Framework for Assessment

As described previously, the NSF overseas offices have a rich history that reflects the complexity of the environment in which they operate. The STPI team developed a generic framework to organize this complexity for evaluation and to provide a context for describing the activities, intermediate outcomes, and downstream impacts of each office. This information was presented at the expert panel meeting in February 2013 and refined based on the feedback received. The next three chapters (Chapters 3–5) assess each of the primary goals of the NSF overseas offices guided by this framework.

1. Overseas Office Activities

STPI began the analysis by identifying generic categories of activities in which overseas offices engage. Six types of activities were identified:

- *Attend meetings* captures interactions of office personnel with individuals or groups.
- *Travel* captures places that office staff visits in the course of their duties.
- *Convene* captures the role that the office plays in bringing together stakeholders, as opposed to attending meetings organized by others.
- *Fund* captures uses of programmatic resources beyond "convening" activities (e.g., grants to foreign investigators, commissioning studies).
- *Communicate* captures formal and informal communications such as written reports, press releases, speeches, blog posts, and so forth.
- *Speak* captures presentations to a variety of stakeholders including country science agencies, investigators, and students as well as presentations for NSF or the U.S. Government more generally.

2. Intermediate Outcomes from Activities

Activities are not conducted purely for their own sake, but to achieve a set of outcomes. Intermediate outcomes of NSF overseas office activities were characterized using a knowledge/attitude/behavior approach (W.K. Kellogg Foundation 2004, 8), as follows:

- *Knowledge* denotes changes in the knowledge state of target stakeholders.
- *Attitude* denotes changes in target stakeholder proclivities for action, either in response to new knowledge or in reaction to existing knowledge.
- *Behavior* denotes target stakeholder actions that may result from changes in knowledge or attitude or be independent of such changes.

Identification of these intermediate outcomes resulting from overseas office activities is challenging. There are relatively simple causal chains from overseas office activities to the knowledge and attitude outcomes. At the same time, such outcomes are difficult to observe, requiring self-reporting methods such as surveys and interviews, and attribution may still be confounded by external influences. Behavior-related outcomes are easier to identify since they tend to be externally observable (e.g., collaborations, formal documents). At the same time, the contribution of the overseas office to these behavior outcomes may be difficult to assess.[11]

3. Downstream Impact of Activities

Potential downstream impacts of the six categories of overseas office activities identified by the STPI team include the following:

- *Research collaborations* include cooperation between local and home-country scientists.
- *Globally connected and engaged academic workforce* includes improvement in the number of researchers who have the skills and interest to collaborate internationally and in the number of internationally collaborative researchers.
- *Scientific breakthroughs* include advances due to knowledge gained by international research collaborations and a globally engaged scientific workforce.
- *Programmatic advances* include new funding programs that involve researchers in the United States and the local country (e.g., Japan) as well as strategic plans or other research roadmaps.
- *United States' situational awareness of S&T in local country* includes the ability of the United States to avoid instances of scientific or technological surprise and to remain at the forefront of research.
- *Capacity development in local country* includes improvements in the structure of the science-funding agencies in the local country.
- *Foreign policy goals achieved* includes the broader foreign policy goals of the United States, such as improved diplomatic relationships or enhanced commercial ties.

These downstream impacts are longer term and larger scale and usually involve the synergistic effect of multiple activities. Thus, the attribution challenges associated with assessing the contribution of the overseas offices' activities to these downstream impacts may be insurmountable.

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[11] If, for example, an overseas office facilitates the development of a particular collaborative research program, a record of that program will be available in in program documentation (e.g., a memorandum of understanding (MOU)), but the relative role of the overseas office may not be amenable to analysis.

4. Relating Activity Categories to NSF Overseas Office Goals

Overseas office goals of facilitation, representation, and reporting are achieved through a combination of activities themselves and the intermediate outcomes and downstream impacts of those activities. STPI's analysis suggests that NSF-provided definitions of "facilitation," "representation," and "reporting" are not sufficiently precise for the study's needs, so STPI revised the NSF overseas office goals definitions for the study, as follows:

- *Facilitation* is when the overseas office works as an intermediary between stakeholders or assists on behalf of actors in the United States or the local country.
- *Representation* is when the office speaks on behalf of the United States, whether in formal or informal situations.
- *Reporting* is when the office conveys information back to the United States.

In general, the facilitation goal is related to the offices' roles in bringing individuals together—whether government personnel, academics, students, or industry representatives, from the United States and the country in which the overseas office is located. Facilitation activities rarely involve directly identifiable intermediate outcomes or downstream impacts; however, depending upon the purpose of an interaction and the stakeholders involved, potential outcomes related to knowledge and attitude would likely occur. STPI's analysis identified four types of facilitation activities relevant to the NSF overseas offices and connected them to the downstream impacts of office activities:

- *Supporting existing or developing collaborative programs between NSF and counterpart agencies in local country.* These activities are intended to produce tangible impacts such as new program solicitations. Overseas offices support program development by arranging relationships between relevant program staff and sharing information regarding practices and policies.
- *Facilitating contacts between U.S. and international researchers.* These activities are intended to foster interactions that could potentially lead to research collaborations by increasing mutual knowledge and propensity to collaborate among researchers.
- *Facilitating visits by U.S. researchers or students.* These activities are intended to develop a globally connected and engaged U.S. academic workforce by reducing the barriers to overseas travel and research.
- *Facilitating visits by NSF staff.* These activities are intended to support NSF staff in carrying out activities (e.g., travel, attend meetings) that support programmatic objectives of these staff members and increase their awareness of international science and technology.

The representation goal involves, primarily, the activities of attending meetings and speaking on behalf of the NSF or the U.S. Government more broadly. Representation generally occurs in meeting-related settings, and the overseas office is, in some cases,

speaking for NSF or even the United States' science establishment. Similar to the facilitation goal, the representation goal rarely involves activities that lead to specific intermediate outcomes and downstream impacts. STPI's analysis identified three types of representation activities relevant to the NSF overseas offices and connected them to the downstream impacts of office activities:

- *Liaising with counterparts.* These activities are intended to share between stakeholders any information that may be valuable in and of itself or may support future activities with tangible impacts.
- *Assisting counterparts in developing NSF-like structures*. These activities are intended to build capacity, which may also support broader foreign policy objectives.
- *Representing the U.S. at meetings and to international organizations.* Attending meetings and speaking on behalf of the United States (or NSF specifically) may support a variety of objectives, depending upon the nature of the meeting and organization.

The reporting goal involves, primarily, the communication activities of the overseas offices, although reports on the highlights of trips and meetings also involve the meeting attendance and travel activities. The type of report and its content determine whether the report contributes to enhancing the general knowledge of target stakeholders, to changing attitudes (e.g., increasing proclivity to collaborate), or to advancing the downstream impact of situational awareness. Types of reporting that STPI identified are as follows:

- Reporting on highlights of trips/meetings attended by overseas office staff,
- Reporting on the S&T landscape in country or region,
- Reporting on a country or region's research in scientific/technical areas of interest, and
- Reporting/translating highlights of publications in country or region.

As a result of the historical and comparative reviews, STPI conceptualized two additional goals of overseas offices:

- *Program support* is when the office itself conducts programmatic functions.
- *Visibility* is when the overseas office engages in efforts intended to increase the local country's knowledge of scientific efforts and results or to facilitate meetings with U.S.-based academic investigators. These activities may be scientific in nature or may have a general "science diplomacy" aspect.

Program support and visibility are not current goals of the NSF overseas offices, although NSF/J's initial charge to fund Japanese scientists is an example of the program support goal. The program support-related activities are dependent on the offices' abilities to

fund conferences, overseas trips, or grants to researchers. The visibility-related activities combine communicating with convening.

C. Use of Framework in Balance of the Study

The next three chapters (Chapters 3–5) assess each of the primary goals of the NSF overseas offices—facilitation, representation, and reporting—guided by the framework categories of activities, intermediate outcomes, and downstream impacts. Because of the complex nature of the NSF overseas office goals, identifying how these goals contribute to downstream impacts is difficult. For example, reporting to agency staff on highlights of trips/meetings attended encompasses multiple generic activity categories (e.g., attend meetings, travel, and communication). It implicitly involves tangible outputs (e.g., formal reports), although the specific intermediate outcomes depend on the stakeholders being addressed (e.g., agency leadership, agency line program staff) and the intended use of the information (e.g., purely informational, potentially supporting the development of future programmatic activities or collaborations).

STPI's analysis in Chapters 3–5 identifies the extent to which each overseas office carries out activities in support of the primary goals and whether each overseas office has been successful in achieving these goals through the activities undertaken. Chapter 6 presents considerations *outside* the three primary goals, including roles and responsibilities of overseas office staff, budget issues, IT considerations, and integration of the overseas offices into embassy activities. The framework was also used to construct the future management models described in Chapter 8.

3. Facilitation Goal

The task SOW defined the NSF overseas offices' facilitation goal as promoting "collaboration between the science and engineering communities of the United States and the respective country/region." Using the framework developed in Chapter 2, STPI researchers operationalized the facilitation goal as having four distinct dimensions in terms of activities:

- Supporting existing or developing collaborative programs between NSF and counterpart agencies,
- Facilitating contacts between U.S. and international researchers,
- Facilitating visits by U.S. researchers or students, and
- Facilitating visits by NSF staff.

This chapter is organized around these four activities and describes how and to what extent each overseas office conducts them. In the final section, the STPI study team aggregated the data and independently analyzed the results to suggest potential approaches to enhancing future efforts as an input to the expert panel's deliberations.

A. Summary of Activities

Overall, NSF/C staff reported spending the most time on facilitation-related activities and the NSF/E staff the least time (see Table 1). The NSF/C Office Head reported spending a substantially larger percentage of time in facilitation-related activities than did the other two Office Heads, whereas the NSF/C and NSF/J Administrative Assistants reported similar percentages that are quite different from that of the NSF/E Administrative Assistant. These differences reflect variation in the activities of the three offices. The Science Assistants, on the other hand, reported spending 30%–35% of their time on facilitation.

Table 1. Self-Reporting of Facilitation Activities, by NSF Overseas Office and Role

Office	Office Head	Science Assistant	Administrative Assistant
NSF/C	60%	35%	40%
NSF/E	26%	30%	5%
NSF/J	16%	30%	45%

B. Supporting Existing or Developing Programs between NSF and Counterpart Agencies

NSF supports research by U.S. scientists only, but it has developed several mechanisms to partner internationally. One approach is to coordinate science programs with other countries. NSF and international counterparts identify topics of mutual interest and align the timing and content of proposal solicitations and the criteria and schedule for review. NSF then funds the meritorious proposals submitted from the United States, and the collaborating partner funds meritorious proposals submitted by its principal investigators (PIs). Coordinated funding programs are considered valuable because they leverage the scientific investment of NSF and provide a mechanism for investigators to develop international collaborations.[12] The OIIA-ISE website included eight collaborative programs as of April 2013 in its lists of NSF program solicitations.[13] An additional 13 collaborative solicitations were identified by the STPI team during interviews and supplementary searches of the NSF Internet site.[14]

Of the 21 solicitations, 14 involved at least one country in Europe, including 3 solicitations where more than 10 European countries were participating. Six solicitations involved

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[12] In addition, certain NSF program solicitations encourage collaboration through funding for U.S. investigators for work with international counterparts. These funding supplements do not specify a particular country or counterpart funding organization. This generic approach was not analyzed for the study.

[13] The programs (with collaborating countries in the order of Asia, then Europe, then others) are as follows: (1) Collaborative Research in Computational Neuroscience (11-505, 12-114), Germany, France; (2) Dimensions of Biodiversity FY 2013 (13-536), China, Brazil; (3) George E. Brown, Jr. Network for Earthquake Engineering Simulation Research (13-544), *Japan*, China; (4) International Collaboration in Chemistry (ICC) (12-562), *Japan*, Taiwan, Austria, France, Luxembourg, Russia, Brazil, Israel; (5) Materials World Network (12-593), China, *Japan*, Taiwan, 16 European countries, Kenya, Tunisia, Brazil, Chile, Mexico; (6) Metabolomics for a Low-Carbon Society (11-527), *Japan*; (7) Plant Genome Research Program (PGRP) (13-522), New Zealand, 13 European countries, Israel; and (8) Surpassing Evolution: Transformative Approaches to Enhance the Efficiency of Photosynthesis (NSF 10-559), United Kingdom. (For ease of reference, mentions of China are underlined, and mentions of *Japan* are italicized.)

[14] The programs (again with China and *Japan* highlighted) are as follows: (1) Dear Colleague Letter (DCL): U.S.-China Collaborative Research in Advanced Sensors and Bio-inspired Technology (NSF 11-024), China; (2) Ecology and Evolution of Infectious Diseases (12-587), United Kingdom; (3) DCL: Digging Into Data Challenge (13-069), Netherlands, Canada; (4) DCL: Clean Water: A Challenge for Researchers (13-082), United Kingdom; (5) Nitrogen: Improving on Nature (12-579), United Kingdom; (6) DCL: Wireless Innovation between Finland and United States (12-110), Finland; (7) DCL: U.S.-China Collaborative Software Research (12-096), China; (8) DCL: NSF-Deutsche Forschungsgemeinschaft (DFG) (German Research Foundation) Collaborative Research (11-053), Germany; (9) DCL: Belmont Forum: G8 Multilateral International Opportunities Fund Initiative (12-072), Australia, *Japan*, India, Austria, France, Germany, Norway, Russia, United Kingdom, Brazil, Canada, South Africa; (10) DCL: G8 Multilateral Funding Initiative "Interdisciplinary Program on Materials Efficiency: A First Step Towards Sustainable Manufacturing" (11-068), *Japan*, France, Germany, Russia, United Kingdom, Canada; (11) DCL: Collaborative Cyberinfrastructure Proposals with European Groups (12-016), all EU countries; (12) International Collaborations in Organismal Biology between the United States and Israeli Investigators (12-577), Israel; and (13) U.S.-Israel Collaboration in Computer Science (12-603), Israel. (For ease of reference, mentions of China are underlined, and mentions of *Japan* are italicized.)

Japanese funding agencies, and five solicitations involved Chinese funding agencies. Other countries in Asia also participated. Two solicitations included Taiwan, one solicitation included New Zealand, one solicitation included Australia, and one solicitation included India. Nine programs included countries in other regions, especially Canada, Israel, and Brazil.[15] In the sections that follow, the facilitation-related activities of the NSF overseas offices are compared against this list to identify the number and fraction of these programs that involved the overseas offices in their initiation and ongoing operations.

An additional path for international collaboration lies in the joint development of large facilities. International collaboration can be important in the initial design and funding of the building and equipment and in the ongoing management and operations of the facility. As of 2013, of the approximately 30 NSF-supported large facilities, 6 facilities included international partnerships.[16] Four of the six facilities had European collaborators, two facilities had collaborators in Japan, and one facility had Chinese partners. Several additional Asia-Pacific countries (especially Australia) were involved in four of the six facilities, and two facilities included partners in the Americas.

1. Office Activities

a. NSF/J

For most of NSF/J's existence, its primary role has been to facilitate international programs and collaborations in Japan.[17] The NSF/J staff and the Japanese government officials who were interviewed in science agencies (e.g., Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japanese Science and Technology Agency (JST), Japan Society for the Promotion of Science (JSPS), and Japan Agency for Marine-Earth Science and Technology (JAMSTEC)) agreed that NSF/J, especially the Office Head and the Science Assistant, played an active role in facilitating the development and implementation of collaborative research programs. For example, NSF/J often serves as the initial point of con-

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[15] Brazilian participation is through the state government of Sao Paolo state (Fundação de Amparo à Pesquisa do Estado de São Paulo) rather than the Brazilian national government.

[16] The facilities (with *Japan* and China highlighted) are as follows (1) Advanced Laser Interferometer Gravitational Wave Observatory, Australia, United Kingdom, Germany; (2) Atacama Large Millimeter/submillimeter Array, *Japan*, Taiwan, European Southern Observatory countries, Canada; (3) IceCube, Sweden, Belgium, Germany; (4) International Ocean Discovery Program, *Japan*, China, South Korea, Australia, New Zealand, India; (5) Gemini Observatory, Australia, Argentina, Brazil, Chile, Canada; and (6) Laser Interferometer Gravitational Wave Observatory, United Kingdom, Germany.

[17] In 1962, the State Department asked NSF to serve as the U.S. implementing agency for the new Cooperative Science Program between the United States and Japan. This program was initiated to help improve relations between Japan and the United States after World War II (Blanpied, Loretz, and Dilworth 2007). It was expanded to include research and student exchange programs and remained active through the early 1990s.

tact for Japanese government officials interested in exploring an idea for a new program. In this facilitation role, NSF/J identifies and initiates contact between Japanese staff and NSF program staff. As programs are being developed, NSF and Japanese government officials also use NSF/J to resolve difficulties about process and content of collaborations. Working with NSF/J helps Japanese officials overcome barriers of language and distance. One Japanese government official estimated that probably 80% of programmatic collaborations begin with discussions with NSF/J, while in the remaining 20% of programmatic collaborations staff in the two countries interact directly. NSF/J staff, U.S. RFI respondents, and Japanese government officials identified seven specific programs for which NSF/J's assistance was invaluable:[18] (1) International Ocean Discovery Program (IODP); (2) Japanese participation in the Atacama Large Millimeter/Submillimeter Array; (3) U.S.-Japan Joint Optoelectronic Program; (4) Metabolomics; (5) George E. Brown Jr. Network for Earthquake Engineering Simulation Research; (6) Materials World Network; and (7) International Collaborations in Chemistry. Of the six collaborative research program solicitations active in 2013 that include collaborations with Japan, four were identified as having received direct NSF/J support in their initiation and development.

For collaborative program development, NSF/J was described as providing essential support in facilitating initial contacts with Japanese agency staff and the fundamental "boots-on-the-ground" support and knowledge that are essential in overcoming differences in review practices and legal, cultural, and national barriers to collaboration. NSF/J also provides insights that are crucial in understanding MEXT and Japanese Ministry of Finance budgets, practice, and behavior insights that have prevented NSF from making decisions based on misinformation or misunderstanding. For ongoing collaborative efforts, NSF/J continues to facilitate informal, day-to-day communications. Stakeholders stated that overcoming barriers to collaboration requires levels of direct support and contact that can only be accomplished by an overseas office whose staff can build the long-term, trusted relationships necessary to complete negotiations successfully.

NSF/J staff and JST and JSPS staff described the role of the Japanese government's own overseas offices in Washington, D.C., as serving as an alternate channel for information exchange between Arlington and Tokyo. All sides agreed that the multi-layered system improved communication. From the NSF perspective, having an overseas office in Tokyo allows the NSF to be proactive in communicating with Japanese counterparts. From the Japanese perspective, NSF/J allows staff to ask questions directly of individuals who have deep NSF knowledge and who can properly route queries or discuss concerns without the possibility of losing information in translation.

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[18] At the time of data collection, NSF/J was also facilitating efforts that eventually resulted in program solicitation 14-575, U.S.-Japan Big Data and Disaster Research.

b. NSF/E

As identified previously, there were 14 cooperative programs active in 2013 that allowed European and U.S. investigators to submit coordinated proposals to NSF and to one or more European science funding agencies. In no case, however, did interviewees identify an integral role for NSF/E in development of these programs, although they described NSF/E as assisting with implementation or program expansion for (1) International Collaborations in Chemistry, (2) Collaborative Research in Computational Neuroscience, and (3) Materials World Network.

Stakeholders stated that collaboration with European counterparts required less direct facilitation support than working in Japan or China. However, they also reported that the proposal formats and review processes for U.S. and European science agencies are different, and assistance in navigating these processes is helpful. They identified U.S.-European collaborative research programs as an area for expanded future interaction and named an effort to foster researcher mobility—the European Research Council (ERC) travel programs mentioned in footnote 19—as a proof-of-concept for U.S.-European collaboration that could be applied to future collaborative research efforts.

c. NSF/C

Stakeholders mentioned that because China's bureaucracy is complex and difficult for U.S. PIs to understand, there is a significant need for a knowledgeable, on-the-ground presence to help navigate it. NSF/C has proven valuable to U.S. agencies and PIs on multiple occasions in this regard. NSF/C staff, and the Office Head in particular, had a significant role in the development of an MOU between the Ministry of Science and Technology's (MOST) Department of International Cooperation and OIIA-ISE that improved collaboration in the NSF Partnerships for International Research and Education (PIRE) program. Several U.S. PIs observed that the PIRE funding model required international collaborators to obtain funding from their home agencies, something that was historically difficult to obtain. Under this MOU, NSF identifies to MOST the meritorious PIRE projects that have collaborators in China. In addition, stakeholders identified that NSF/C facilitated (1) Chinese participation in an International Polar Year project in Antarctica's Gamburtsev Province, (2) China's membership in IODP, (3) the Advanced Sensors and Bio-inspired Technology DCL, and (4) China's participation in Dimensions of Biodiversity. This list includes two of the five collaborative programs identified previously with Chinese participation (see footnotes 13 and 14) and the single large NSF-funded facility with Chinese participation.

2. Common and Dissimilar Themes

All three overseas offices were identified as having contributed to the development or enhancement of the programmatic efforts of NSF Directorates, especially NSF/C and NSF/J. NSF/J has also provided long-term support to programs such as the IODP.

C. Facilitating Contacts between U.S. and International Researchers

While collaborative partnerships often emerge informally through participation in scientific meetings, more formal mechanisms involving the overseas offices may be useful with research communities that do not traditionally collaborate. Over time, the overseas offices have adopted divergent approaches for facilitating new partnerships.

1. Office Activities

a. NSF/J

The NSF/J staff, including the Office Head, has a history of meeting with Japanese and American researchers to ask for assistance in initiating collaborations. One Japanese academic described working with successive NSF/J Office Heads to create collaborations with U.S. investigators. In particular, the office provided advice on ways to build relationships, which eventually resulted in successful joint projects. Interviewees from NSF/J, Japanese government agencies, and other U.S. science agency overseas offices mentioned that NSF/J is hampered in this aspect of its facilitation role because of the lack of funds to support workshops and symposia in Japan. JSPS, for example, often co-sponsors workshops with the overseas offices of other government agencies to bring together Japanese researchers and foreign research communities. On rare occasions, such as the NSF/J's 50th anniversary symposium, U.S. researchers were invited to write NSF workshop grants to obtain travel funds to participate in NSF/J's in-country activities. While identifying collaborative partnerships remains an activity of the Office Head, stakeholders are currently less dependent on this mechanism because the Internet has facilitated direct communication that often leads to collaboration.

b. NSF/E

At present, facilitating contacts between U.S. and international researchers is not a significant aspect of NSF/E's portfolio of activities. However, like the NSF/J staff, the NSF/E staff does provide assistance as requested by investigators, visit universities, and attend meetings that involve academic researchers.

c. NSF/C

The major current PI-level facilitation activity of NSF/C is strengthening existing relationships between Chinese researchers and their current U.S. collaborators. Stakeholders identified these activities as being useful and highly successful. This effort builds on the 2012 MOST-NSF MOU. One approach to strengthening existing projects is for NSF/C to work with Chinese funding agencies on expanding these projects. For example, NSF/C, in response to a request from a Chinese PI, approached MOST to discuss holding a joint workshop on the NSF-funded Lake Taihu reclamation project. In addition to project-specific efforts, NSF/C also engages in wider efforts to encourage funding from Chinese agencies to Chinese

researchers who have existing U.S. collaborations. NSF/C convened a workshop in early 2013 in support of these efforts.

2. Common and Dissimilar Themes

The role played at present by the overseas offices in facilitating contacts between U.S. and foreign researchers varies significantly among offices. In Western Europe, for example, with long-established partnerships and fewer cultural or language barriers, there is less need for direct involvement on the part of the NSF overseas office. One exception may be with countries in Eastern Europe and the FSU, where established collaborative partnerships may not be mature. In Japan and China, given greater cultural, organizational, and language barriers, there is potentially greater value-added by the offices in developing new relationships.

D. Facilitating Visits by U.S. Researchers or Students

Facilitating visits by U.S. researchers and students occurs on a formal (program) and an informal (opportunity) basis. A search in April 2013 identified five NSF international mobility programs.[19] The involvement of the offices with these programs varies. In Asia, for example, where the offices play a large role in facilitating student fellowships through the East Asia and Pacific Summer Institutes (EAPSI), a considerable amount of staff time at all levels is devoted to support of these programs. There is less direct NSF/E staff involvement in facilitating visits by U.S. researchers or students.

1. Office Activities

a. NSF/J

Student exchange through EAPSI is a signature NSF-JSPS collaborative effort. Every summer approximately 65 U.S. graduate students are hosted by Japanese faculty for a two-month summer research experience. NSF/J staff—especially the Administrative Assistant—are heavily involved in the administrative details and logistics surrounding the acceptance, arrival, and stay of the EAPSI fellows. Approximately 40% of the Administrative Assistant's time is devoted to EAPSI on an annual basis, including most of her time leading up to and

[19] The five programs (with collaborating countries in the order of Asia, then Europe, then others) are (1) East Asia and Pacific Summer Institutes for U.S. Graduate Students (NSF 12-498), Australia, China, *Japan*, South Korea, New Zealand, Singapore, Taiwan; (2) Graduate Research Opportunities Worldwide (NSF 13-022). *Japan*, South Korea, Singapore, Denmark, Finland, France, Norway, Sweden; (3) Partnerships for International Research and Education (NSF 11-564), China, Japan, Russia, United Kingdom, Inter-American Institute for Global Change Research (IAI) member countries; (4) Research Opportunities in Europe for CAREER [Faculty Early Career Development Program] Awardees (NSF 13-050), any award with ERC funding (predominantly EU); (5) Research Opportunities in Europe for Post-doctoral Researchers (NSF 13-051), any award with ERC funding (predominantly EU). (For ease of reference, mentions of China are underlined, and mentions of *Japan* are italicized.)

during the summer. NSF/J is peripherally involved in two other current and recently concluded student exchange programs: (1) the National Institute for Materials Science research experience for U.S. undergraduates and (2) a summer exchange program between the University of Tokyo and the University of Illinois at Urbana-Champaign for graduate students in earthquake engineering.

b. NSF/E

There were no student exchange programs that require significant support by NSF/E staff as of 2013. There were, however, two researcher mobility programs in which Europe plays an important role. The first is the Research Opportunities in Europe program, which is conducted through the ERC. This initiative of the NSF Director was negotiated directly by the OIIA-ISE Director and the ERC. The second program, the Graduate Research Opportunities Worldwide, is an expansion of a program between NSF and the Nordic countries and allows NSF Graduate Research Fellows to conduct research abroad. Stakeholders mentioned that NSF/E had an integral role in discussions that led to a May 2013 agreement to add the Netherlands to the program.

c. NSF/C

The initial NSF/C Office Head was instrumental in bringing the EAPSI student exchange program to China by securing funding, primarily from MOST. This development is widely cited as a major success for the Beijing office. The NSF/C Administrative Assistant devotes considerable time to EAPSI.

2. Common and Dissimilar Themes

The three NSF overseas offices differ in the level of effort devoted to facilitating student exchange, with NSF/J and NSF/C having the most established activities and programs. Several interviewees thought that NSF and, more specifically, NSF/E might play a larger role in facilitating science, technology, engineering, and mathematics graduate student exchange between the United States and Europe. Extending the EAPSI program model to Europe would require NSF/E to become more involved in facilitating student mobility.

E. Facilitating Visits by NSF Staff

Facilitating visits by NSF staff frequently involves support by the Office Head and logistical assistance from other office staff to set up meetings or provide visa- or travel-related recommendations. Visits by senior NSF management require more intensive efforts. The number of NSF staff who travels to the regions supported by the three offices varies considerably. Analysis of NSF country clearances in calendar year 2012—the only year for which OIIA-ISE had data that are considered complete and reliable—shows that while a similar number of trips were made to the countries where the offices are located (38 trips to France, 27 to Japan, and 29 to China), a nearly order-of-magnitude difference exists in the number of

trips made to the regions in which NSF/E and NSF/J are located. In 2012, 216 NSF staff trips were made to 25 other European countries.[20] In the East Asia-Pacific region supported by NSF/J, 47 NSF staff trips were made to 10 other countries, primarily to Australia, South Korea, and India.[21] In terms of trips taken by NSF senior management who are most likely to require in-depth support (i.e., the NSF Director and Assistant Directors), no such trips were made to China in 2012, but 16 trips were made to Europe (4 by the NSF Director), and 4 trips were made to the East Asia-Pacific region (3 by the NSF Director).

1. Office Activities

a. NSF/J

NSF/J provides logistical assistance and support to NSF senior staff and other visitors.[22] The amount and nature of this assistance vary depending upon the needs of the visitor. Support to the NSF Director may include making appointments, booking hotel and car reservations, providing advance briefing information, and working on the language of formal prepared statements and press releases. NSF/J may also provide some support to senior Japanese science officials visiting NSF headquarters by helping to facilitate meetings. Historically, the Science Assistant or Administrative Assistant was often called upon to serve as a translator at meetings, but, given the increasing facility of Japanese officials with English, this requirement occurs less frequently. On rare occasions, the Science Assistant or Administrative Assistant provides logistical support for visiting U.S. researchers. A few RFI respondents specifically mentioned the role that NSF/J played in facilitating their trips to Japan. These support functions included scheduling meetings with counterparts in Japanese science agencies and providing transportation, hotel, and related logistical advice and cultural and translation assistance. All respondents considered these services to have been valuable and to have directly contributed to the effectiveness of their interactions in Japan.

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[20] Specifically, 39 trips were made to Germany; 29 were made to the United Kingdom; 20 were made to Switzerland; 14 were made to Italy; 12 were made to Belgium; 11 each were made to Australia, the Netherlands, and Spain; and fewer than 10 each were made to Sweden, Ireland, Turkey, Greece, Finland, Czech Republic, Iceland, Portugal, Scotland, Norway, Romania, Slovakia, Slovenia, Bulgaria, and Ukraine. Calculations were reported as trip-country pairs (shortened to "trips"), so if an individual made a single trip to both Italy and Greece, it was counted separately for each.

[21] In Northeast Asia, nine trips were made to South Korea and four trips were made to Taiwan. In Oceania, 14 trips were made to Australia, two trips were made to New Zealand, and one was made trip to Palau. In South Asia, six trips were made to India, four trips each were made to Singapore and Thailand, two trips were made to Indonesia, and one trip was made to Malaysia.

[22] The NSF/J and NSF/E Office Heads clarified that they only receive country clearances for NSF staff traveling to Japan and France and not for staff traveling elsewhere in the region.

b. NSF/E

NSF/E assists in coordinating NSF leadership and staff visits to Europe. While many individual NSF staff who travels to Europe does not seek assistance, NSF/E often provides senior management some administrative and logistical support. A specific example concerned NSF/E support for the visit by the NSF Director in October 2012 as part of a U.S.-France Joint Consultative Meeting. A few responses to the RFI specifically identified NSF/E facilitation of travel to Europe as valuable, specifically in scheduling meetings with counterparts and providing background information regarding European counterparts and organizations.

c. NSF/C

The NSF/C Office Head frequently travels with NSF teams when they come to China. Sites are selected based on joint NSF-China projects, increasing importance of a region to China's S&T system, and partnership with U.S.-based PIs. The Office Head noted, however, that the resources for adequate travel are insufficient and that support requests have to be prioritized. In advance of high-level visits from NSF leadership, the Office Head develops a list of project sites of interest to the delegation and drafts an agenda for specific meetings. Multiple RFI respondents mentioned the value of NSF/C in helping to schedule meetings, provide assistance with visas and other entry/exit requirements, assist with cultural issues, and provide suggestions regarding transportation and lodging. NSF/C staff also provides guidance on security and translation support.

2. Common and Dissimilar Themes

The three overseas offices currently provide logistical support to NSF staff traveling to the countries, and this support improves the quality of the visits. Stakeholders expressed appreciation for these services. Office staff related that supporting one or two visits per month, even if some of those visits are from NSF senior management, does not pose a large burden on the resources of the overseas offices. Tasking NSF/E and NSF/J with logistical support for regional visitors would increase the workload for the office staff, especially for NSF/E.

F. Potential Approaches to Enhancing Future Efforts

During data collection efforts, stakeholders identified approaches by which the offices could further enhance their facilitation-related efforts in the future, which the STPI team collated and analyzed. Summaries of those suggestions are provided here.

- *Expanded focus on collaborative program development.*[23] Because of NSF/J's success in facilitating development of collaborative programs with Japanese agencies (e.g.,

[23] Overseas offices can only advance collaborative programs of interest to NSF's Directorates. There is less need for offices to facilitate collaborative program development if NSF adopts alternative models (e.g.,

IODP), stakeholders suggested that NSF/J could be encouraged to work regionally because Northeast Asia and the emerging economies in Southeast Asia are of strategic scientific interest. Stakeholders viewed the United States—and NSF in particular—as being able to facilitate activities with countries in these regions. While NSF/C has been successful in facilitating collaborative research opportunities to date, stakeholders had more difficulty identifying specific opportunities for NSF/C because the Chinese science establishment is growing so rapidly. NSF/E, in contrast, was not identified as playing as large a role in facilitating NSF collaborative programs. However, stakeholders identified possible future areas for expansion, including the following: (1) involving NSF/E in negotiating joint funding efforts with EU-level research programs (e.g., ERC programs or Horizon 2020) and (2) targeting a limited set of countries (e.g., Nordic or Central European countries) for future inclusion as participants in existing programs.

- *Expanded focus on researcher-to-researcher collaborations.* Researcher-to-researcher collaborations are primarily the role of PIs rather than the offices themselves, but ideas for appropriate roles of the offices in support of researchers' efforts were suggested. While NSF/C is currently the most heavily invested of the three offices in researcher-to-researcher connections, it was suggested that NSF/C could invest additional effort in the development of collaborative MOUs between NSF and counterpart agencies to expedite high-quality, targeted, and systematic collaborations. Another suggestion was that NSF/C reach out to early-career Chinese PIs—especially researchers returning to China from the United States—to help connect them with potential U.S. collaborators and to facilitate Chinese funding for resulting collaborations. A more general suggestion was that the offices could maintain databases of U.S. investigators who collaborate with local investigators as a general information resource.
- *Expanded focus on student mobility.* NSF/J and NSF/C are heavily involved with the EAPSI students, but these offices do not view themselves as being responsible more broadly for U.S. students in Japan and China—even those supported by NSF awards. NSF/E's current role in facilitating student mobility is even more limited. Stakeholders identified a range of benefits that more extensive overseas office support for such students might provide. The overseas offices might, for example, facilitate the formation of U.S. student communities at overseas universities. This suggestion has the potential to simplify students' logistical burdens when preparing to travel to their host countries and could help to catalyze the formation of U.S. student networks. Others mentioned visa and other logistical hurdles that could interfere with the completion of their

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master agreements that allow for jointly reviewed and funded projects at an agency level) or if NSF chooses not to pursue international efforts.

research and were unaware that NSF overseas offices could have provided assistance. Stakeholders argued that even if no increase occurs in the level of service devoted to facilitating student mobility, increasing the visibility of the overseas offices to students, especially NSF/C and NSF/J, would be valuable.

4. Representation Goal

The task SOW defined the offices' representation function as "liaison between NSF and agencies, institutions, and researchers." STPI's analysis identified that this representation extends beyond a liaison role and includes formal and informal situations whereby the office speaks on behalf of NSF, other Federal agencies, and the U.S. Government. The NSF Office Head is seen internationally as the representative of NSF and the personal representative of the NSF Director and therefore is accorded substantial status and prestige. The representation goal was operationalized as having three distinct dimensions:

- Liaising with counterparts,
- Assisting counterparts in developing NSF-like structures, and
- Representing the United States at meetings and to international organizations.

A. Summary of Activities

The NSF/E and NSF/J Office Heads spend more than one-third of their time on representation activities, while Administrative Assistants spend very little (see Table 2). NSF/C staff reported less time spent on representation than either NSF/E or NSF/J staff.

Table 2. Self-Reporting of Representation Activities, by NSF Overseas Office and Role

Office	Office Head	Science Assistant	Administrative Assistant
NSF/C	15%	15%	10%
NSF/E	39%	17%	5%
NSF/J	35%	30%	0%

B. Liaising with Counterparts

Liaison with staff at science agencies is a common representation function across all three of the NSF overseas offices. The Office Heads and Science Assistants identified liaison activities as part of their responsibilities.

1. Office Activities

a. NSF/J

Currently, the NSF/J Office Head and Science Assistant meet with counterparts in science agencies in Japan one or two times per month to maintain relationships, predominantly with MEXT ministry and subministry staff. In addition, they help to maintain connections with Japanese government officials who transition into new positions at science agencies. These liaison activities have declined in relative frequency since the late 1990s. This decline parallels the creation of Washington, D.C., offices by Japanese science agencies, which now facilitate some of the liaison activities previously carried out solely by NSF/J.

The NSF/J Office Head has begun to embrace a regional role, meeting with science agency staff across the Asia-Pacific region to cultivate relationships for NSF/J and for NSF more broadly. The regional meetings of the Global Research Council (GRC) offer a cost-effective opportunity for the Office Head to meet with counterparts from multiple countries in a single trip; however, these meetings do not allow for the depth of interaction associated with trips to individual countries. The 2012 GRC-Asia meeting in Sendai, Japan, included participation by the Office Head, an NSF OIIA-ISE program manager headquartered in Arlington, and personnel from approximately 10 Asian science-funding agencies.

b. NSF/E

As of 2013, the NSF/E Office Head met regularly with counterparts in France (e.g., with staff from the Agence Nationale de la Recherche (ANR) (National Agency for Research)) and in the Netherlands but not with counterparts in Germany or the United Kingdom. Regular liaison activities with European science agencies have become more difficult to organize under current budget constraints. NSF/E stakeholders also mentioned the importance of maintaining strong relationships with officials at sister science agencies in Europe, and significant value was placed on proximity and physical presence to preserve strong institutional ties. The stakeholders mentioned that NSF/E's Paris location and a limited travel budget hamper regular in-person meetings with European Commission science counterparts in Brussels and member states' science agency representatives, who travel regularly to Brussels, but not to Paris. European Science Agency representatives also commented that they rely on their agency's Washington, D.C., office for liaison purposes rather than on NSF/E. At the same time, they consider NSF/E to be important since it is useful to have a person available in Europe to answer questions about NSF and provide contacts at NSF in Arlington.

c. NSF/C

The NSF/C Office Head meets regularly with counterparts at MOST and the National Natural Science Foundation of China (NSFC). The NSF/C Office Head also meets regularly with the International Relations bureau staff at the Chinese Academy of Sciences (CAS) and coordinates visits to CAS institutes in the provinces through this staff. Interviewees in China

mentioned that NSF/C is valuable in determining specific points of contact at NSF in Arlington because program staff changes regularly. They noted that communicating over long distances is difficult and that NSF/C can reduce this barrier.

2. Common and Dissimilar Themes

Liaison activities are valuable in maintaining connections between NSF and science agencies in regions supported by each of the three offices. They provide continuity and a single point of contact for international science agencies. Interviewees also cited communication in person and in the same time zone as highly beneficial. While Japanese and European (though not Chinese) science agencies have established their own offices in Washington, D.C., NSF overseas offices are still considered valuable in-country assets. NSF/J and NSF/E stakeholders consider regional in-person liaison activities challenging, although participation in regional meetings was identified as a useful mechanism.

C. Assisting Counterparts in Developing NSF-like Organizations

Interviewees identified two assistance roles for overseas offices: (1) they provide advice and expertise to newly founded science funding agencies (especially in emerging economies), and (2) they assist mature organizations to improve their operations.

1. Office Activities

a. NSF/J

Japan's science agencies are constantly working to improve their procedures. The NSF/J Office Head is often asked to give presentations about NSF's peer review system, the FastLane data system, and the roles and responsibilities of NSF program officers. NSF/J was directly responsible for the development of a quick-response proposal process corresponding to the NSF Rapid Response Research (RAPID) mechanism, which in Japan is called J-RAPID. After the Tohoku earthquake, NSF initiated a call for proposals that used the RAPID mechanism, and JST worked closely with the Office Head to develop its corresponding J-RAPID. The mechanism has since been used to work with the government of Thailand in the aftermath of the 2012 floods. Stakeholders also noted that several countries in Southeast Asia, such as Indonesia, Vietnam, and Thailand, are just beginning to develop science funding agencies. NSF sent an Embassy Science Fellow to Malaysia to assist the national government in developing its science-funding apparatus.[24] NSF/J could use short in-country visits to develop an ongoing support role through the Embassy Fellows program.

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[24] The Embassy Science Fellows Program, a program organized by the State Department, allows for U.S. Government scientific personnel to have temporary stays at U.S. embassies to accomplish some short-term project agreed upon by the embassy and the U.S. agency. Typically, Embassy Science Fellowships

b. NSF/E

NSF/E Office Heads and other interviewees reported capacity-building activities in Europe, specifically in Polish science agencies and the Grant and Technology Agencies of the Czech Republic. Staff at ANR in France worked closely with the NSF/E Office Head during ANR's formative years to develop the agency's internal mechanisms, including the development of a quick-response proposal process corresponding to the NSF RAPID mechanism that was used by ANR after the Haiti earthquake.

c. NSF/C

Thus far, the NSF/C has undertaken only limited capacity-building activities. The MOST/OIIA-ISE MOU, which is intended to assist the Chinese government in supporting Chinese researchers who collaborate with U.S. investigators, was the primary example of capacity-building activities identified.

2. Common and Dissimilar Themes

The three NSF overseas offices have dissimilar capacity-building roles. Currently, NSF/E has the most sustained role in building capacity in the science agencies of emerging economies in Eastern Europe. Opportunities to expand this role may become available, depending on NSF priorities and resources. The expansion of the RAPID mechanism to JST and ANR is another concrete example of program development directly attributable to the NSF overseas offices. In China, the MOST/OIIA-ISE MOU is an example of capacity development that may serve as a model for future activities.

D. Attending Meetings on Behalf of NSF

Two distinct activities are included under this general heading: (1) the Office Head is asked to give a presentation on an NSF-specific topic, or (2) the NSF Office Head or Science Assistant is asked to attend a major meeting or conference as part of an NSF delegation or as the sole representative of NSF or the U.S. Government. In such cases, the staff member is representing NSF and is also observing the meeting to collect insights that are shared with headquarters.

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last 2 to 3 months. For more information on the program, see "STEM: Embassy Science Fellows Program 2014," http://www.state.gov/e/oes/stc/stem/fellows/.

1. Office Activities

a. NSF/J

In recent years, there have been few opportunities for the NSF/J Office Head to represent NSF at international meetings. However, NSF/J supports the State Department in planning and conducting Joint Committee Meetings and Joint High Level Committee meetings with Japan.

b. NSF/E

The NSF/E Office Head is regularly asked by NSF headquarters to represent the agency formally by giving presentations on NSF-supported collaborative activities at meetings and workshops. Multiple times each year, the NSF/E Office Head is asked to serve as a member of the U.S. delegation to a large meeting in Europe. For example, the NSF/E Office Head serves as the U.S. representative to the OECD Global Science Forum (GSF). The Office Head also attends conferences that are relevant to other ongoing NSF/E activities. These meetings are informational, promote networking, and increase NSF visibility. For example, the NSF/E Office Head's presence at two 2013 conferences in Prague was cited as a sign of increased NSF visibility in the Czech Republic. A concern noted by stakeholders is that the United States, generally, and NSF, specifically, are often weakly represented at many important European meetings and that the NSF/E Office Head may be the only American in attendance. In such cases, the Office Head not only represents NSF's interests but also provides the U.S. perspective. Budget-related limitations on the Office Head's ability to travel diminish the U.S. voice in European deliberations.

c. NSF/C

There have been few recent opportunities for the NSF/C Office Head to represent NSF and the U.S. Government at international meetings. On one occasion, the Office Head attended a meeting in Shanghai at NSF's request.

2. Common and Dissimilar Themes

Representation at international meetings has been predominantly an NSF/E role. There are no Asian counterparts to the EU, and, currently, worldwide organizations such as the OECD are more likely to host meetings in Europe than in Asia. At the same time, NSF headquarters staff is more likely to travel to Europe, so there may be a greater need for NSF/J or NSF/C to represent the U.S. at meetings that presently occur.

E. Potential Approaches to Enhancing Future Efforts

Stakeholders agreed that the visibility of the NSF overseas offices is a powerful rationale for their continuation. They argued that moving or closing an office would be taken as a sign by the host country that NSF, and the U.S. Government in general, was downgrading diplomatic relations—a circumstance considered likely to damage relationships.

Two opportunities emerged from the discussions regarding representation activities and potential options for the future. It was broadly suggested that NSF and the U.S. science enterprise would benefit from expansion of liaison activities. More regularly scheduled meetings, especially if these meetings lead to tangible follow-on activities, were identified by NSF and the foreign science agency interviewees as valuable. A second opportunity identified responds to the difficulty of conducting ongoing liaison activities across the diverse geographic region supported by NSF/E and NSF/J. In budget-constrained times, NSF should be inventive in creating liaison opportunities and in capitalizing on existing opportunities such as GRC regional meetings. European stakeholders identified the relocation of NSF/E to Brussels or the creation of a satellite office as a mechanism to improve interaction.

Some representation activities, such as meeting attendance without the likelihood of a follow-on activity (e.g., an "NSF 101"-type presentation), were considered of limited value. Stakeholders saw value in capacity-building activities solely as an extension of other representation or facilitation activities and not as a distinct overseas office goal.

5. Reporting Goal

The task SOW defined the NSF overseas offices' reporting goal as "monitoring and reporting on science and engineering developments and policies." Reporting functions were operationalized into four distinct activities:

- Reporting on highlights of trips/meetings attended by overseas office staff,
- Reporting on S&T landscape in country or region of interest,
- Reporting on country or region's research in scientific/technical areas of interest, and
- Reporting/translating highlights of publications in country or region.

A. Summary of Activities

STPI collected historical reporting information for all three NSF overseas offices. Analysis of those reports shows that the pattern of reporting activities of the overseas offices varies across offices and over time. Reporting is primarily the responsibility of the Science Assistant (see Table 3).

Table 3. Self-Reporting of Reporting Activities, by NSF Overseas Office and Role

Office	Office Head	Science Assistant	Administrative Assistant
NSF/C	10%	45%	5%
NSF/E	14%	40%	10%
NSF/J	26%	30%	5%

1. NSF/J

NSF/J's reporting goal was included in its original mission statement in 1960 (Blanpied, Loretz, and Dilworth 2007). NSF/J developed relationships with local Japanese scientific societies, libraries, and government offices to assist in translating Japanese scientific text into English. The office also assisted the National Diet Library on an NSF-funded project to translate the Japanese Periodicals Index into English (Office of Special International Programs 1961). NSF/J has produced four primary report types over the last 30 years:

- *Tokyo Report Memoranda (TRM).* The TRM were initiated in 1982 to convey information on budgetary, administrative, and policy developments and on Japanese science advances. TRM include independent analysis based on site visits, meetings with Japanese officials, and agency reports and other Japanese print sources. The

NSF/J Office Head has maintained the email distribution list, which included U.S. Government personnel and S&T attachés at embassies in Tokyo. TRM are also posted on the NSF/J Internet site.[25]

- *Special Scientific Reports (SSRs).* The SSRs were initiated in 1996 and describe specific research being conducted by visiting U.S. researchers or summer students during their stay in Japan. SSRs were distributed using an email list maintained by the NSF/J Office Head and are available on the NSF/J website.
- *Office Activity Reports.* Between the late 1980s and 2010, the NSF/J Science Assistant produced a monthly report that included paragraph-level summaries of activities. This internal NSF report was provided to the NSF Director, Deputy Director, Assistant Directors, and Division Directors and to OIIA-ISE staff.
- *S&T News Articles.* These are paragraph-length summaries of Japanese S&T and science policy documents, translated by the Science Assistant. Between 1996 and 2011, these articles were distributed by email to U.S. military S&T offices and various Embassy science attachés in Tokyo, Department of State headquarters staff, and NSF staff in Arlington. Since 2011, these articles have been distributed internally to NSF over the *Weekly Wire.*

Over the last 15 years, the number of longer reports on Japanese S&T policy and institutions has declined. Production fell from 40 TRM in 1997 to 2 TRM in 2012. Also, while 15 SSRs were written in 1997, production ended completely in 2010.

2. NSF/E

The STPI team was not able to identify the formal initiation of NSF/E reporting, although documents in a variety of formats were collected dating back to 1990.

- *NSF/Europe Report*. The NSF/Europe Reports, produced from 1991 to 1998, provided in-depth coverage of European science institutions and S&T policy decisions and programs of European governments. These 5- to 15-page reports began with background on the S&T situation of a country and then provided information—usually gleaned through meetings by the Office Head with staff or researchers of the institutions—on specific S&T topics. These reports were similar to the NSF/J TRM in form and intended audience and were distributed through an NSF/E-maintained email list that included selected NSF staff and other U.S. Government personnel. Some reports are available from NSF's publications repository.
- *NSF/Europe Notes.* The NSF/Europe Notes, which were a few paragraphs in length, were produced from 1996–1998 and intended to inform NSF staff about a specific

[25] The 1994 task group noted that the NSF/J's reports had been deeper in technical content during the 1960s and 1970s (Perrolle et al. 1994).

event. The subjects of these documents included news reports and press releases from European science agencies, notices of high-level staff changes at S&T institutions and agencies, and information reprinted from other U.S. science agencies' offices in Europe. The Notes were distributed to OIIA-ISE staff in Arlington.

- *NSF/E Europe Activities Reports (Europe Office Updates).* Beginning in 2000, NSF/E began producing monthly or bimonthly reports for NSF staff called NSF/Europe Activities Reports or Europe Office Updates. In the early 2000s, these documents shared many characteristics of the original NSF/Europe Reports. In 2007, the NSF/Europe Activities Reports became monthly summaries of all Office Head activities, meetings, and trips. When these reports were first introduced, they were distributed to the NSF Director and Deputy Director, Assistant Directors and their deputies, OIIA-ISE, and program staff generally. By 2011, individuals receiving all reports had been reduced to the NSF Director, the Deputy Director, and OIIA-ISE, while individual reports were targeted to particular NSF program staff. NSF/E reporting on the day-to-day activities of the Office in the NSF/Europe Activities Report is unique.
- *Reports from the Road.* The Reports from the Road, a variation on the NSF/E Europe Activities Reports, were introduced by the Office Head in 2011 as NSF internal documents. These reports provide a one- to two-page summary of specific trips, activities, and important meetings undertaken by the Office Head or Science Assistant. Occasionally, the reports include important developments in S&T policy in Europe. All Reports from the Road are distributed to OIIA-ISE and the NSF International Coordinating Committee (ICC), while particular reports are distributed to specific NSF program staff.
- *S&T News Articles.* NSF/E began producing S&T news article summaries for NSF program staff in 2009. These "European Science, Engineering, and Technology Highlights" provide paragraph-length summaries of S&T news related to European countries or to the EU. Currently, the monthly S&T news summaries are distributed throughout the NSF over the *Weekly Wire.*

A trend in NSF/E's reporting activities is difficult to identify due to the shifts in report types. The number of reports increased in the last decade, although they are shorter, more frequent accounts of day-to-day activities.

3. NSF/C

Reporting has been an activity of NSF/C since its inception. NSF/C, like the other two offices, uses a variety of reporting formats.

- *Topical and Special Reports.* These documents focus on specific policies, institutions, or research and are similar in form and content to the TRM and the NSF/Europe Reports. These documents are written in response to the NSF staff's

specific requests for information and are for internal distribution. Production of these reports increased in 2010–2012 relative to 2006–2009.

- *Trip Reports and Selected Meetings Notes.* These two formats—one describing the results of Office Head trips, the other describing the results of meetings—are similar in length and approach to the NSF/E Reports from the Road. These documents are sent by the Office Head to the OIIA-ISE Asia-Pacific cluster head, who is responsible for any further dissemination within NSF.
- *S&T Highlights of China.* In 2007, NSF/C was the first of the offices to introduce highlights of news articles as a reporting form. These reports provide summaries of English-language news articles from Chinese media sources and official government websites and are produced by the Science Assistant and distributed over the NSF *Weekly Wire.*

The predominant focus of the office's reporting appears to have been the S&T Highlights of China summaries.

4. Common and Dissimilar Themes

The reporting activities of NSF overseas offices show current and historical similarities and differences. The primary similarity is that all offices produce short news summaries for the *Weekly Wire*. The primary differences are that NSF/E and NSF/C produce meeting summary documents, NSF/E provides a monthly document that reports on all activities (which NSF/J also did until 2010), and NSF/C only creates documents for longer trips or notable meetings. NSF/J and NSF/C also produce a small number of in-depth topical reports each year for internal NSF distribution.

Historically, NSF/J and NSF/E had emphasized in-depth reporting, but the frequency of detailed reports has declined. NSF/E and NSF/J have introduced shorter, informal reporting formats that describe monthly activities, including the results of trips or important meetings. STPI analysis of these reports shows that they convey factual information or analysis about S&T news, programs, or research institutions. However, they vary in the extent to which they describe an activity and why the Office Head participated in that activity, identify opportunities for others at NSF or in the outside stakeholder community, or relay perspectives and nuances not easily obtained from official summaries or news releases.

B. Potential Approaches to Enhancing Future Efforts

Reporting activities are analyzed based on the reporting categories described in Chapter 2. The STPI process and stakeholder reviews focused on reporting practices and the perceived value of reports to various stakeholder groups.

1. Reporting to NSF Staff on Highlights of Trips/Meetings Attended

The NSF/J's Office Head and Science Assistant report information from science meetings to NSF/OIIA-ISE informally, generally by email to the East Asia-Pacific cluster

head. Stakeholders in U.S. sister science agencies and some Japanese government personnel stated that while they knew of NSF/J's activities with their particular organizations, they were unaware of the full range and breadth of NSF/J's efforts. The NSF/E Reports from the Road are distributed to OIIA-ISE, the NSF ICC, and a select group of NSF staff identified by the NSF/E Office Head. Of the approximately 25 reports produced since October 2011, a few follow-up inquiries were received from program staff who requested that NSF/E staff attend a specific meeting, but no additional information was requested by NSF staff who received unsolicited reports. NSF/C Trip Reports and Selected Meeting Notes are provided directly to the East Asia-Pacific cluster head, who responsible for distributing the information across NSF. As a result, stakeholders did not identify the value provided by NSF/C's reporting specifically.

Informal reports may provide value to NSF headquarters staff in a variety of ways. For example, the Office Head may, in a facilitation role, identify to NSF leadership potential opportunities for collaboration as observed by someone in-country. Informal reports also demonstrate the utility of the Office Head's role and increase his or her visibility at NSF.

2. Reporting to NSF Staff on S&T Budgets and Policy in Country or Region of Interest

Although NSF/J published many reports on the state of the S&T enterprise in Japan, including policies and budgets, stakeholders indicated that this information currently is not of great interest to NSF program officers or senior staff. In contrast, non-NSF stakeholders, including members of U.S. sister science agencies and the Japanese agency officials who had been beneficiaries of NSF/J's past reporting, valued this type of analysis and voiced the hope that NSF/J's reports could again be made public. NSF/E and NSF/C produce few such reports, and stakeholders did not identify a strong need for them at this time.

STPI's analysis suggests that the NSF overseas offices have multiple advantages when producing detailed reports on scientific and policy topics in the countries and regions for which they are responsible. The overseas offices can draw upon a network of in-country contacts in government, academia, and industry and, if resources are sufficient, attend meetings and visit facilities where science and policy are discussed. Overseas office staff members frequently have technical backgrounds and language expertise and can draw upon the expertise of NSF program officers to interpret the data that they collect. At the same time, opportunity costs are associated with such in-depth reporting, especially given NSF's current requirements that any such reports must undergo internal review before external publication.

3. Reporting on Country or Region Research in Scientific/Technical Areas of Interest

Although NSF/J currently produces few detailed reports on priority science topics in Japan, stakeholders (including other U.S. Government overseas office personnel) consider the substantial quantities of information contained in these reports valuable and expressed interest in making them more widely available. NSF/E and NSF/C currently produce few such reports,

and stakeholders did not identify a strong need for them at this time. As with the reporting on S&T budgets and policy, STPI's analysis suggests that the opportunity costs of such efforts may be substantial relative to their value.

4. Reporting/Translating Highlights of Publications in Country or Region

NSF program staff did not identify a current need for highlights. U.S. Government overseas personnel, especially embassy staff, stated that receiving highlights would help them remain current on scientific topics in their respective countries. In STPI's analysis, this reporting does not make best use of the NSF overseas offices. Summarizing international news stories—especially those in English and from official sources—can, in theory, be performed from any location. There is an opportunity cost for the Science Assistant in each overseas office to spend a substantial amount of time on this activity. Moreover, summaries, by their very nature, tend to include generalist information that may not be useful for expert NSF program officers and that may already be known to the science community by the time it is included in a summary. Many generalists across the U.S. Government (in other science agencies' overseas offices and OIIA-ISE equivalents at the State Department) might benefit from highlights-level information, but they currently do not receive it from NSF.

6. Other Process Considerations

While the review of the NSF overseas offices was designed to focus on the three goals of facilitation, representation, and reporting, STPI's analysis of overseas office activities and information gathered from stakeholders identified some additional process issues:

- Overseas office staff roles and responsibilities,
- Travel funds' sufficiency and flexibility,
- IT sufficiency and flexibility,
- Access to the overseas office,
- Overseas offices' integration into the activities of the local U.S. Embassy, and
- Limitations to situational awareness.

The chapter also includes a brief description of the overseas offices of other U.S. basic research agencies.

A. Additional Process Issues

1. Roles and Responsibilities

The Office Head position can be staffed by either permanent NSF staff or rotators who historically have had either long or short careers with NSF and may have extensive or little international experience. In considering the role of Office Head, particular issues that emerged include the following:

- *Need for previous NSF experience.* Stakeholders generally agreed that in-depth knowledge of NSF program development and process was highly desirable—if not an absolute requirement—for an Office Head.
- *Language and cultural skill requirements.* Interviewees agreed that while language proficiency is valuable, cultural competency and other "soft skills" that allow Office Heads to build effective relationships are more important.
- *Office Head term.* The Office Head term is currently 2 years, with the possibility of a single 1- or 2-year renewal. Several interviewees stated that the learning curve for a new Office Head is steep and that a longer term would increase effectiveness.
- *Career path after completing Office Head term.* Stakeholders expressed concern that the Office Head position is not viewed as part of a career trajectory within NSF.

Therefore, increasing the length of the Office Head term—which would be desirable from the standpoint of the effectiveness of the role—may decrease the incentive for NSF staff to apply.

Recruitment of the Office Head is challenging because of the need to attract an individual who has deep NSF experience, local cultural competency, and interest in a multi-year appointment and yet is comfortable with the potential disruption to his or her NSF career trajectory. Resolving this tension is essential to the continuing vitality of the offices.

Science Assistants have local language skills and are involved in facilitation, representation, and reporting activities. Most assistants have scientific training and an interest in science policy and have gone through program officer "boot camp" at NSF headquarters. The role of the Science Assistant, which is to complement and support the Office Head, raises a different concern. The ideal candidate—a recent PhD in a technical field who has skills in multiple languages, knowledge of country/region S&T policies, and close, long-standing connections with many individuals in the country/region's science policy establishment—may be difficult to find. Understanding that each overseas office implements its functions somewhat differently and that the relative emphasis changes with each Office Head, two distinct alternatives for prioritizing required Science Assistant skills appear to be the following:

- *Facilitation emphasis.* This model would require knowledge of and experience with science agencies and science administration in the country/region. Continuity would be valuable because the Science Assistant would develop historical memory for the office and possibly for local science agencies.
- *Representation emphasis.* This model would require a recent PhD or equivalent in a scientific or technical field since it would be advantageous for the Science Assistant to be technically current to be considered credible by stakeholders. This model envisions turnover in the position.

The Administrative Assistant role in all three locations involves a mix of facilitation and administrative functions that may include program support, logistical and travel support for visitors and for the Office Head, and budget and IT/website support.

2. Travel Funds

Based on the STPI analysis of budget information for FY 2006 to FY 2012,[26] approximately 90% of the overseas offices' expenditures are associated with posting the Office Head in-country and maintaining the office, with only approximately 10% allocated for travel. Moreover, stakeholders perceived a decline in NSF travel funds that affected the ability of office staff to attend meetings, including several that were considered high priority. STPI

[26] Analysis excludes salary information, which was not available for the NSF offices.

could not verify these concerns independently because a detailed audit of trip planning records and travel expenditures was beyond the scope of this task. Nevertheless, the budget data available to STPI suggest that the average funds available for travel across the 2006–2012 period are similar for each of the three overseas offices, with NSF/J averaging approximately 10% more than each of the other two offices. Independent of the size of the travel budget, stakeholders also reported that revisions in NSF administrative practices—from a single travel fund for the entire fiscal year to trip-by-trip allocations—have made travel planning difficult.

3. Information Technology

Stakeholders in all three overseas offices identified IT-associated issues. The offices use NSF hardware, software, and servers, which requires overseas staff to physically send computer equipment back and forth to Arlington and frequently leaves the office without backup devices. Other common IT-related complaints concerned the speed of Internet access through NSF headquarters servers, difficulty accessing NSF programs, and time zone differences that complicate requests for IT support. NSF/C, in its temporary location outside of the U.S. Embassy in Beijing, experiences more complex IT challenges. Staff identified several constraints related to telephone and Internet access, although it is unclear whether these issues are due to working remotely from the NSF servers or whether a larger structural problem is associated with doing business in China. As of 2013, the Administrative Assistant often had to travel to the embassy to use its IT systems to handle administrative and operational requests. Videoconference capabilities, on the other hand, were considered by overseas office staff to be improving and valuable for communicating with headquarters.

4. Access to Overseas Offices

Stakeholders considered the location of NSF overseas offices within a U.S. Government facility—whether an embassy, mission, or consulate—restrictive due to security requirements. The U.S. Mission that houses NSF/J requires 24-hour advance notice for visitors, and identification materials and cellular telephones must be left at the front gate. These security measures intimidate Japanese scientists and officials, and the Office Head or office staff generally leaves the embassy to meet with Japanese counterparts. NSF/C stakeholders similarly saw some clear advantages to being physically located outside of the embassy complex.

5. Embassy Integration

Although integration of the NSF overseas offices into the larger U.S. diplomatic efforts in the host country was not part of the initial site visit protocol, it emerged as a concern during stakeholder discussions. While participation in State Department activities is not a formal component of the NSF overseas activities, stakeholders thought that NSF could add S&T value to U.S. diplomatic efforts. NSF/C was identified as highly integrated into local diplomatic activities, but other offices were not. Stakeholders also cautioned that embassy priorities

and NSF's mission do not necessarily overlap and that enhancing embassy integration may have opportunity costs.

6. Situational Awareness

Information on collaborative research and training opportunities and other types of international collaborations is not systematically maintained or centralized in one location by NSF or OIIA-ISE. MOUs provide one mechanism to apprise overseas office staff of NSF's international programs and awards, but neither NSF headquarters nor the offices had a complete set of current MOUs. Finally, as of 2013, NSF did not code international collaborations in its public-facing awards data system or its internal databases, which forced office staff to conduct manual searches to identify relevant awards. This deficiency limits the effectiveness of the overseas offices in keeping abreast of NSF's activities in supported countries and regions and complicates the offices' efforts to facilitate researcher-to-researcher connections and student travel.

B. Overseas Offices of Other U.S. Basic Science Funding Agencies

As part of this study, the STPI team also collected information on the distribution, organization, mission, and operation of international offices of five U.S. basic research funding organizations:[27] (1) National Aeronautics and Space Administration (NASA);[28] (2) Department of Energy (DOE);[29] (3) Office of Naval Research (ONR);[30] (4) Air Force Office of Scientific Research (AFOSR);[31] and (5) Army Research, Development and Engineering Command (RDECOM).[32] These agencies established international offices to leverage global

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[27] Other U.S. science agencies have overseas offices; however, a full analysis of every international office of each scientific agency was beyond the scope of this report.

[28] Three offices: Paris, Tokyo, and Moscow. For more detail, see http://oiir.hq.nasa.gov/index.html.

[29] Thirteen offices: Moscow, Vienna, Beijing, Tokyo, Sofia (Bulgaria), Paris, Astana (Kazakhstan), Baghdad, Baku (Azerbaijan), Bangkok, Islamabad, Kiev, and Tbilisi (Georgia). For more detail, see "Overseas Contact Information," http://nnsa.energy.gov/aboutus/ourprograms/nonproliferation/programoffices/internationaloperations/overseascontactinfo.

[30] Five offices: London, Tokyo, Singapore, Santiago, and Prague. ONR also has outposts in Yokosuka, Okinawa, Bahrain, and Naples. For more detail, see "ONR Locations," http://www.onr.navy.mil/About-ONR/Locations.aspx and "ONR Global Funding Opportunities," http://www.onr.navy.mil/en/Science-Technology/ONR-Global/funding-opportunities.aspx.

[31] Three offices: London, Tokyo, and Santiago. For more detail, see "AFSOR: International Office," http://www.wpafb.af.mil/library/factsheets/factsheet.asp?id=8971.

[32] Three offices: Tokyo (outposts in Singapore, Australia), London (outposts in Germany, France), and Santiago (outposts Argentina, Canada). For more detail, see "International Partnering is a Win-Win Proposition: RFEC Americas," http://armytechnology.armylive.dodlive.mil/index.php/2014/02/15/rfec-americas/; "International Partnering is a Win-Win Proposition: RFEC Atlantic,"

research activities that contribute to their S&T missions. Offices are located in geographic regions where expertise and collaborations exist or where building scientific capacity meets diplomatic goals. DOE has the largest number of offices, with 13 spread across Europe, the Middle East, and Asia.

All five agencies support a Tokyo office and at least one office in Europe. NASA and DOE maintain Moscow offices, while the DOD agencies maintain offices in South America. Like the NSF offices, other U.S. agencies' overseas offices often have two to five staffers (e.g., RDECOM-Santiago and ONR-Prague), although some offices have larger staffs (e.g., ONR-Singapore).

In many ways, these overseas offices act similarly to the NSF overseas offices. They facilitate establishing agreements and research and exchange programs, make individual researcher connections, and provide logistical support for visitors. Many counterpart offices also serve representation roles that are similar to those of the NSF offices. For example, one of the responsibilities of NASA-Paris office is to liaise with NASA's European counterparts. Many of the overseas offices are collocated or affiliated with the embassy of their respective countries. Several also provide support to the embassy.

Some activities performed by these overseas offices, however, differ from the activities of the NSF offices or are not within the current responsibility of the NSF offices. DOD overseas offices sponsor scientific workshops and conferences to bring together researchers who work in specific areas of interest to the funding agency. DOD overseas offices also have funds available to support foreign researchers directly through research grants or contracts. Counterpart international offices also facilitate the maintenance of large-scale internationally collaborative efforts. For example, NASA, as part of its presence in Japan, has maintained scientific liaisons at the Japan Aerospace Exploration Agency (JAXA) facilities to facilitate participation in the International Space Station and other programs under the U.S.-Japan space partnership.

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http://armytechnology.armylive.dodlive.mil/index.php/2014/02/15/international-partnering/; and "International Partnering is a Win-Win Proposition: RFEC Pacific," http://armytechnology.armylive.dodlive.mil/index.php/2014/02/15/rfec-pacific/.

7. Findings and Recommendations

At the expert panel meeting on February 21, 2013, the STPI team presented the data collected as part of this study and facilitated the discussion, while the expert panel reviewed the data collected by the STPI team and provided recommendations. This chapter presents panel's findings on the current functions of the overseas offices and the panel's recommendations as to how best to use these offices.[33] The first section (Section A) discusses overarching findings regarding NSF's need for overseas offices and provides an assessment of how well the offices are fulfilling that need presently. The second section (Section B) includes findings and recommendations related to NSF and OIIA strategy for international engagement and for using the offices strategically. The next three sections (Sections C, D, and E) articulate specific findings and recommendations with respect to facilitation, representation, and reporting. The last section (Section F) outlines findings and recommendations on process issues that affect the strategic use of the offices.

A. Overarching Findings Regarding Overseas Offices

Given the rapid pace at which S&T research and collaborations are accelerating and the international interest in leveraging research investments, overseas offices have strategic value for NSF and for the U.S. Government more broadly. The U.S. research community has much to gain from the effective leveraging of these offices since the processes of scientific research and discovery have become more global in orientation, more collaborative, and less hierarchical in recent years. However, the NSF overseas offices are currently underused by NSF, reflecting the absence of any clear overarching or office-specific strategy for their use. Three overarching findings underlie the more specific findings and recommendations that follow:

- ***Overarching Finding 1.*** There remains a strong need for NSF to have overseas offices located in countries and regions where NSF—and U.S. investigators funded by NSF—have active, large-scale collaborations.
- ***Overarching Finding 2.*** The lack of a strategic vision driving NSF's international engagement—including effective use of its overseas offices—limits NSF's ability to gain from international advancements in S&T.
- ***Overarching Finding 3.*** Drafting and implementing a strategic plan for the use of the NSF overseas offices will improve their role and function.

[33] All statements in Chapter 7 are from the expert panel's perspective and point of view.

B. Comprehensive NSF International Strategy

The NSF overseas offices' current functions do not correspond to an overarching NSF-wide strategic vision. NSF—and OIIA-ISE specifically—lacks a coherent strategic vision for the overseas offices. In the absence of such a strategy, the functions and characteristics of the overseas offices depend on the choices of the sitting Office Head rather than the needs of the NSF Divisions and Directorates that they are designed to serve. Accordingly, their functions and characteristics change with turnover of the Office Head, further complicating their ability to meet the needs of the NSF community at large.

The NSF leadership should develop, promulgate, and implement a clear international posture and strategy for the agency. One possibility would be for OIIA-ISE to work with the Directorates to develop a more robust international strategy and to translate this work into region-by-region strategies that include the necessary steps to achieve the desired goals. The activities and functions of the overseas offices could then be aligned with the actions needed to achieve the strategic goals embedded in the international strategy. The development of such a strategy and a management plan for the efficient and effective use of overseas offices is essential if NSF wishes to remain a strong leader and global partner in international research. This activity, however, would need to be endorsed and supported by the NSF Director, who would actively drive its implementation.

If NSF chooses not to develop an international strategy for the agency as a whole, OIIA-ISE must develop and articulate its own strategy, within which a clear vision for use of the overseas offices should be an integral component. The OIIA-ISE strategy should be one that can be implemented on a regional basis (e.g., separately for each OIIA-ISE regional cluster) and work in concert with the NSF Divisions and Directorates to ensure that the entire agency's priorities are represented.

Given the potential need and opportunity for using the overseas offices, the following recommendations were made to enhance their impact and functionality.

- ***Strategy Recommendation 1.*** OIIA-ISE should work with the NSF Directorates to develop a year-to-year, region-by-region strategic plan for international engagement, drawing on and modifying, as appropriate (e.g., through staffing decisions), the capabilities of the overseas offices.
- ***Strategy Recommendation 2.*** OIIA-ISE should link each overseas office's activities to steps required for accomplishing OIIA-ISE's strategic vision in that region.

C. Facilitation

Currently, facilitation-related activities occur on three levels: logistics for visiting NSF leadership and staff, connections between U.S. and foreign researchers and students, and new opportunities for collaboration with agencies in-country. Currently, the offices are not properly advised of NSF staff traveling to the country or region, which is a detriment to the office and

the traveler. Without this information, the office is not able to provide travel assistance and does not benefit from updates on NSF programs, and NSF staff is not able to use the offices as a resource to recommend site visits and coordinate meetings. Second, the NSF overseas offices are not sufficiently staffed or equipped to foster research connections among host-country and U.S. researchers in anything more than an ad hoc fashion. This situation is reasonable, however, since connecting PIs to potential collaborators is something that happens organically and not typically as a top-down activity. Facilitating agreements through counterpart agencies is a more strategic use of NSF overseas offices' resources. In this regard, the offices would benefit from strategic guidance from OIIA-ISE or from NSF more broadly with respect to priority areas in which agreements or programs would be valuable. Such priorities could also be directly tied to the strategic planning documents of the offices once they are established. There may also be situations where the goal of facilitating new agreements or programs could be advanced through workshops organized by an overseas office that involve government officials, academics, or industry representatives or through office sponsorship of meetings involving NSF program staff or U.S. academics and host-country science agencies. Currently, the overseas offices do not have independent funds for such activities. U.S. academic investigators have to submit workshop proposals that are reviewed by NSF headquarters before funds are allocated. That approach is cumbersome and reduces the overseas offices' capability to facilitate program development.

- ***Facilitation Recommendation 1.*** The overseas offices' primary facilitation function should be the development of collaborative research programs in response to NSF headquarters' needs and priorities. Each office should increase the amount of time spent, especially by the Office Head, in working with NSF staff and international counterpart agencies to better meet NSF needs in establishing new agreements, cooperation mechanisms, and programs.
- ***Facilitation Recommendation 2.*** Consider giving each overseas office a small budget for workshops and events used to support program development.
- ***Facilitation Recommendation 3.*** To strengthen the overseas offices' ability to support headquarters needs, NSF should modify the country clearance process so that more complete information is provided promptly to Office Heads when NSF staff travel to their region. This modification would allow overseas offices to offer improved logistics assistance and to understand more fully NSF relationships, activities, and priorities in the region.
- ***Facilitation Recommendation 4.*** As resources and time allow, the offices should engage in activities intended to facilitate the visits of students and to facilitate researcher-to-researcher relationships, but these activities should be a lower priority.
- ***Facilitation Recommendation 5.*** To ensure that each office's goals are aligned with the regional strategy, OIIA-ISE should develop for each overseas office an annual operational plan that specifies facilitation-related priorities and sets annual goals against which office performance can be measured.

D. Representation

A number of activities are carried out by the offices as part of the representation function: liaising with foreign government counterparts, assisting with capacity building for other host-country funding agencies, and attending meetings on behalf of NSF. The overseas offices currently perform many of these activities, but there is little evidence that any of the offices has a clear set of priorities. As with facilitation, the priorities of the current Office Head form the basis for representation activities. A particular challenge for NSF/E and NSF/J is that they are expected to represent NSF across large geographical regions—Europe inclusive of Russia for NSF/E and the entire Asia-Pacific region exclusive of China for NSF/J.

The representation function has important value in nurturing the NSF's relationships with international partners. Given constraints on resources, increased emphasis should be placed on strategic representation, and the activities that have the highest priority should be those that have the potential to advance collaborative (typically, government-to-government) research program development. Such activities should take precedence over those situations in which the Office Head is asked merely to fill in for headquarters program staff to give a presentation or in which the representation activity is intended to serve the goals of other U.S. Government agencies (e.g., the Department of State).

- ***Representation Recommendation 1.*** Increase the overseas offices' emphasis on representation within their portfolio of activities and expand representation to the extent to which such activities facilitate program development.
- ***Representation Recommendation 2.*** Each overseas office's annual operating plan should include a priority listing of representation activities and goals.

E. Reporting

After reviewing samples of reporting from all of the overseas offices and considering that the current dissemination is limited to NSF (and, in some cases, strictly to OIIA-ISE), the offices are not making efficient use of their full reporting capabilities. Considerable advantage can be gained from gathering information through attendance at meetings or events, including trips taken by office staff. Such reports may be of use to NSF staff outside of OIIA-ISE working in that country or region presently or who may be trying to develop collaborative programmatic opportunities. All NSF Office Heads should be expected to provide written informational reports for NSF stakeholders. Currently, reporting format and content vary by overseas office and Office Head, and some reporting formats do not provide the level of detail required to support facilitation efforts. Headquarters staff should assist OIIA-ISE in developing a reporting format that ensures that the most applicable information is distilled and disseminated.

The current NSF/E practice of disseminating trip reports directly to interested stakeholders is superior to channeling trip reports through the OIIA-ISE regional coordinator. For the Office Heads to be able to facilitate programmatic activities effectively, they need to inter-

act directly with their counterparts in the line Directorates and Divisions. The reporting mechanism should provide information directly from the overseas offices to program staff and serve as the starting point for dialogue. Providing trip reports to other U.S. Government staff working in the region or country may have value by ensuring that they are able to keep abreast of host-nation science policy issues.

The current emphasis in some office reports on collating publicly available (typically, English language) information into S&T news clippings is unimpressive. This reporting activity is of little to no value to NSF, especially given the AAAS and the Nature Publishing Group's creation of international bureaus for collecting scientific news. News clippings are a serious misallocation of the time of the Science Assistants who compile them. If the S&T news clipping summaries are maintained, the function should be refocused solely on information not available in English.

In-depth reporting, which has diminished over the last decade, remains valuable. One idea suggested was that the Science Assistants, working with their Office Heads, could be asked to report on topics of interest based on their unique access to local sources and people who are not readily available to most of the NSF, the U.S. Government, and the broader U.S. S&T community. Such activities are certainly appropriate for the overseas offices, but questions were raised regarding whether the resources required for topical reporting exceed the value of such reports. Any such in-depth reporting should be made available to the broader stakeholder community rather than limited to the NSF headquarters staff who requested any particular topic to be studied.

Given current constraints placed on reporting (in terms of resources and distribution of reports), a choice must be made between increasing resources earmarked for reporting or curtailing the reporting functions. In their present form, the office reports do not serve a useful function for the range of potential stakeholders involved in international S&T cooperative activities inside or outside of NSF. The reporting function is, at present, the least valuable of the three overseas office functions. To justify maintaining reporting as a primary function, considerable changes would be needed in the way these activities are prioritized.

- ***Reporting Recommendation 1.*** Focus reporting on information that can only be obtained by having an in-country presence or on information of specific interest to the NSF Directorates.
- ***Reporting Recommendation 2.*** Maintain the Office Head trip reporting function and focus it on detailed information regarding policies, activities, and personnel rather than merely providing short summaries of activities undertaken.
- ***Reporting Recommendation 3.*** Disseminate trip reports more widely throughout NSF and beyond (e.g., to all Assistant Directors and relevant

program staff and to others from across the U.S. Government who are working in the areas), as appropriate.

- ***Reporting Recommendation 4.*** Eliminate reporting of publicly available, English-language S&T news clippings.
- ***Reporting Recommendation 5.*** If resources can be made available, consider reestablishing detailed reporting on specific topics that would be of interest and value to the broader research community.

F. Other Issues Relevant to Overseas Office Operations

Other factors and issues that affect the effectiveness of the offices include the current makeup of office staff and issues related to turnover, office location, integration with the embassy and other overseas offices, and travel approval and IT processes.

1. Office Staff

Each office currently includes an Office Head and two Foreign Service Nationals: a Science Assistant and an Administrative Assistant.[34] Staffing-related challenges in filling the Office Head position include the ability to recruit qualified applicants due to the lack of incentives for NSF career staff to leave headquarters and the uncertainty surrounding the availability of acceptable positions upon returning to NSF from an overseas post. To be effective in the position, the current 2-year extendable term is too short. Given the start-up time required to become expert in the workings of counterpart agencies and the need to transition to the next Office Head, the 2-year model leaves only a few months when the Office Head is working at full capacity. The ability of the Office Head to accomplish NSF programmatic facilitation- and representation-related responsibilities depends on his or her NSF expertise and experience.

A prerequisite for success as the Office Head is deep experience with NSF as a career employee or as an external researcher who has ties to the agency through funding, service on review panels, or prior temporary assignment as a rotator. An ideal candidate also should be sufficiently senior to interface effectively with high-level personnel from NSF and the host country, accomplished in his or her field, and culturally competent in a foreign setting. Such a person should be able to engage effectively with government officials, Nobel Prize winners, and foreign researchers alike. Because the rest of the staff in each office is required to speak the local language, there is no obvious need for the Office Head to speak the local language—although language skills do enhance the Office Head's effectiveness.

Notable too is the absence of any organized process through which departing Office Heads can provide guidance to the incoming leadership and a summary of activities under-

[34] With the exception of NSF/E, where there is one locally employed staff member (the Science Assistant) and one NSF direct hire (the Science and Administrative Assistant)

taken during their tenure. More effort needs to be devoted by the departing Office Heads and OIIA-ISE to facilitate these significant transitions that occur every 2 to 3 years.

Both the Science and Administrative Assistants may be underused at present. In view of prior recommendations to change reporting-related responsibilities, the Science Assistant position could be reconfigured from its current focus on low-level reporting to providing more support for higher level facilitation-related activities, such as nurturing new collaborative funding opportunities with counterpart agencies. Alternatively, and especially in overseas office settings where local language skills and continuity of relationships may be less important, NSF might consider using AAAS fellows as a less costly replacement or as a supplement to existing staff. This model would provide AAAS fellows one year at NSF headquarters learning the culture and structure of the organization and a second year at an overseas office, with the title either of "Science Assistant" or potentially "Deputy Office Head." This role should be defined and filled strategically, based on identified needs of the office rather than past experience. Similarly, the Administrative Assistant role should be oriented to meet identified needs, such as collating information for reports in the local language or providing language skills.

The Science Assistant and Administrative Assistant positions that are being described are not generic. These positions likely will vary across overseas offices and may require highly specialized expertise. OIIA-ISE and the Office Heads need to be more proactive in defining these roles, outlining criteria for the positions, and selecting the individuals.

- ***Staffing Recommendation 1.*** Select Office Heads who are NSF career staff or who have deep knowledge of the organization and who are sufficiently senior to represent NSF to high-level researchers and officials in counterpart agencies.
- ***Staffing Recommendation 2.*** Increase the Office Head tenure to a minimum of at least 3 years, with the option to extend by an additional 2 years.
- ***Staffing Recommendation 3.*** Change the Science Assistant role from focusing on reporting to focusing on facilitation with counterpart agencies and use the Administrative Assistant to bolster any remaining reporting.
- ***Staffing Recommendation 4.*** Consider using AAAS Fellows for the role of Science Assistant or for supplementing the current office staff capacity.
- ***Staffing Recommendation 5.*** Ensure that OIIA-ISE is more engaged in defining the requirements for personnel filling these positions and in selecting the individuals who will fill them.

2. Office Location

Given the concentration of science agencies that are relatively easily accessible in Western Europe, representation is one of the most important functions of NSF/E. Relocation to Brussels would enable NSF/E to enhance its representational role. NSF/J has important dip-

lomatic and symbolic meaning, and relocating or closing it may damage U.S.-Japan relations. It is therefore critical to maintain an overseas office in Tokyo, but such an office should also cover North Asia, including South Korea and Taiwan. NSF/C should be maintained, given China's expanding S&T role. Depending on the workload associated with regional responsibilities, NSF may need to increase the status or number of the Science Assistant(s). Southeast Asia is a region where opportunities are emerging rapidly for scientific collaboration. An office located in Southeast Asia could also cover South Asia. Singapore would be the most appropriate location for such an office. In addition, OIIA-ISE should consider investigating other models to expand its global presence, including the Embassy Science Fellows program to enable short-term appointments, the possibility of serving a longer term as an Embassy Fellow, embedding NSF staff in other U.S. agencies (including embassies), and sharing space on a temporary or part-time basis.

- ***Location Recommendation 1.*** Move the Europe office to Brussels.
- ***Location Recommendation 2.*** Keep the China office in Beijing.
- ***Location Recommendation 3.*** Keep the Japan office in Tokyo and broaden its responsibilities to North Asia (South Korea and Taiwan)
- ***Location Recommendation 4.*** Subject to budget availability, plan for an additional office in Singapore or elsewhere in Southeast Asia.
- ***Location Recommendation 5.*** Explore low-cost models of expanding NSF's presence outside the three regions served by overseas offices.

3. Coordination with Mission and Other Offices of U.S. Science Agencies

Relationships with overseas offices of other Federal agencies and the U.S. embassies also need to be addressed. NSF and other Federal science agencies located in the same country rarely know about the activities and programs of one another. In some cases, this lack of coordination leads to overlap in activity and an underuse of other offices' resources. In addition, security-related restrictions at embassies can impinge on the overseas offices' ability to perform their functions. Representation and facilitation to counterpart agencies may best be accomplished from outside embassy complexes. Although many of these problems cannot be easily solved by NSF alone, if there is any flexibility in maintaining office space outside of the embassy, NSF should seek to do so.

- ***Coordination with Mission Recommendation 1.*** Improve coordination of activities with the ESTH section of the embassy and with other U.S. agencies' overseas offices, although such coordination should not become a primary goal.
- ***Coordination with Mission Recommendation 2.*** Work with the local embassies to address access challenges facing the overseas offices.

4. Travel Approval and IT Processes

The current system requires OIIA-ISE approval for travel by Office Heads, which severely limits the overseas offices' ability to accomplish their representation and facilitation functions. The OIIA-ISE approval requirement often means that travel is approved late, thus increasing costs. In consultation with OIIA-ISE, Office Heads should have predetermined budgets that fall under their own managerial control. This approach would provide an additional mechanism for the offices to tie in directly to the strategic goals laid out for the offices by NSF leadership.

While the videoconference capability with NSF headquarters is highly valuable, other aspects, especially the management of the purchase, initialization, and repair of computer hardware, complicate the activities of the overseas office staff. It should not be necessary for the overseas offices to wait months for computer equipment to be shipped back and forth to Arlington if repairs or new hardware are needed.

- ***Process Recommendation 1.*** Amend the budgetary approval process so that Office Heads have managerial oversight and are able to tie specific activities to management plans of the overseas office and strategic plans of the NSF.
- ***Process Recommendation 2.*** Develop procedures that, while conforming to NSF information security requirements, accelerate the process for computer hardware purchase, installation, and repair.

8. Options for the Future

This report's independent assessment described the complexity of the environment in which the overseas offices operate. It further offered a summary of the data collected and analyzed to inform future management and implementation efforts and to give guidance to future analyses of the contributions of overseas offices in the context of global science. The expert panel's findings and recommendations are intended to provide NSF near-term advice regarding the management of the existing overseas offices. The findings also suggest options for the long-term future.

To complete the current assessment of NSF's overseas offices, this section provides a series of models, approaches, and metrics that may be useful as NSF considers this report and the expert panel's findings and recommendations. Four business models for overseas offices are presented. These models reflect different ways to achieve the NSF international mission through some form of office structure. Coupled with the conceptual framework for overseas office activities, intermediate outcomes, and downstream impacts presented in Chapter 2, these models should assist NSF in comprehensively evaluating its international mission and goals and planning a potential future path forward. The STPI team recognizes, however, that these four models are not the only options and that countries and regions, with their unique combinations of scientific, economic, and cultural factors, may require different or blended models in order for NSF to achieve its international goals.

A. Proposed Business Models

1. Centralized Web-Based Business Model: Located at NSF Headquarters

While face-to-face interactions serve an important role in the development of collaborations, web-based communication has shifted cultural norms about acceptable approaches to build professional relationships. The centralized, web-based business model draws upon this paradigm shift in global communication and relies on the Internet and social media, such as Skype, virtual meeting support tools with visual and audio links, and document sharing in real time. This model implies that most current overseas office functions would be conducted from NSF headquarters, supplemented by strategically oriented travel for meetings and conferences by NSF headquarters staff as required.

2. Regionally Distributed Business Model: Locate Offices in Developed Countries/Regions

Placement of overseas offices in strategically identified locations with similar S&T priorities maximizes personal interactions in leveraging programs and collaborations. As this report has demonstrated, many advantages of the existing NSF overseas office model could be strengthened through strategic analysis and planning. This business model assumes the continuation of NSF's current approach.

3. Emerging Economies Business Model: Locate Offices in Countries/Regions Developing S&T Capacity

NSF has served as a model science organization for several nations that are developing their S&T infrastructure. This business model recognizes the difficulties inherent in placing an overseas office in an emerging economy and the benefits to NSF and U.S. diplomacy. NSF benefits from access to new intellectual talent and resources and the U.S. benefits diplomatically from the extension of national S&T priorities and values. This model continues the practice of NSF support for overseas offices but shifts these offices from being located in countries and regions where scientific research is strong and collaborations exist to areas where the potential for future collaboration over the long term is strong and NSF effort could be expected to develop that potential.

4. One Government Business Model: Locate in Developed or Developing Countries/Regions

The multiplicity of overseas offices maintained by S&T agencies of the U.S. Government suggests that consolidation of efforts and resources may achieve cost savings and more strategic program development without loss of agency-specific missions and goals. This "One Government" model may motivate the S&T agencies and the State Department to develop a single U.S. international S&T strategy. It may also provide international access to agencies that, due to their size, budget, or other constraints; are unable to develop their own international offices and programs.

Three options for achieving these aims are as follows:

- Shared office: each agency has its own administrative and science staff,
- Shared office: shared administrative staff with science staff from each agency, and
- Shared office: shared administrative staff with technical experts for U.S. Government priority science areas.

B. Communication Patterns Associated with Different Business Models

The alternative business models would have various patterns of communication associated with them. The current approach, which would be continued in Business Models 2 and 3, is a triply redundant set of channels whereby NSF headquarters communicates directly with its

equivalent international agencies and with those agencies' overseas offices in Washington, while the NSF overseas offices communicate with NSF headquarters and each equivalent agency's headquarters. Having multiple channels of communication maximizes the likelihood that information will be transmitted effectively but is associated with the substantial cost of maintaining overseas office personnel. Business Model 1 would dramatically simplify communication patterns. If all agencies close down their overseas offices because culture and technology permit it, a single, headquarters-to-headquarters communications channel remains. Business Model 4 is intended to address a different concern—namely, the fact that the U.S. Government comprises multiple agencies that support scientific research, each of which maintains its own overseas offices. Moving to a unified model has the potential again to simplify communication patterns and decrease costs, although such an approach would require coordination and communication across agencies.

C. Metrics for Future Assessment of Overseas Offices

Metrics are critical for the evaluation of the offices over time. Metrics should be chosen to measure each office's progress toward meeting goals (which could be office specific or common across all offices). Candidate metrics include the following:

- Program metrics
  - Active MOUs with peer nations to support collaborative research or mobility programs
  - Joint development of scientific priorities between NSF and peer agencies
  - New joint program solicitations with peer countries
  - Continuing support for existing joint program solicitations supported
  - NSF awards made through joint program solicitations
  - Above-average scientific return (number/quality of publications/importance of findings) to awards made through joint program solicitations.
- Advisory and assistance to country/region metrics
  - Science agency infrastructure development
  - Scientific program development
  - Workshops and conferences.
- Diplomatic metrics
  - NSF and U.S. Government science priorities
  - Dual-use materials
  - Stable science economy
  - Harmonized regulations.

As part of its response to this report's recommendations, NSF should choose appropriate metrics for future assessment and management of the overseas offices.

Appendix A.
List of NSF Overseas Office Heads (Through 2013)

Office Head	Years Served
Japan	
Robert Webber	1960–1962
Robert Oetjen	1962–1964
J. E. O'Connell	1964–1966
Walter Hodge	1966–1970
Henry Birnbaum	1970–1974
Manfred Cziesla	1974–1976
Ebert Ashby	1976–1982
Charles T. Owens	1982–1986
Alexander DeAngelis	1986–1989
Charles Wallace	1989–1991
Larry Weber	1991–1996
Edward Murdy	1996–1999
William Blanpied	1999–2002
Christopher Loretz	2002–2005
Junku Yuh	2005–2006
Larry Weber	2006–2007
Machi Dilworth	2007–2010
Anne Emig	2010–2011
Edward Murdy	2012–present
Europe	
Manfred Cziesla	1984–1988
Pat Johnson	1988–1990
Charles T. Owens	1990–1992
Christine Glenday	1992–1995
Norbert Bikales	1995–1998
David Schindel	1998–2004
Mark Suskin	2004–2007
David Stonner	2007–2011
Carmen Huber	2011–present
China	
William Chang	2006–2008
Alexander DeAngelis	2008–2010
Emily Ashworth	2010–present

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Abbreviations

AAAS	American Association for the Advancement of Science
AFSOR	Air Force Office of Scientific Research
ANR	Agence Nationale de la Recherche (National Agency for Research)
CAREER	Faculty Early Career Development Program
CAS	Chinese Academy of Sciences
CISE	Computer and Information Science and Engineering
DCL	Dear Colleague Letter
DFG	Deutsche Forschungsgemeinschaft (German Research Foundation)
DOD	Department of Defense
DOE	Department of Energy
EAPSI	East Asia and Pacific Summer Institute
ERC	European Research Council
ESTH	Environment, Scientific, Technology, and Health
EU	European Union
FSU	Former Soviet Union
FY	fiscal year
GRC	Global Research Council
GSF	Global Science Forum
IAI	Inter-American Institute for Global Change Research
ICC	International Coordinating Committee
IDA	Institute for Defense Analyses
IODP	International Ocean Discovery Program
IT	information technology
JAMSTEC	Japan Agency for Marine-Earth Science and Technology
JAXA	Japan Aerospace Exploration Agency
JSPS	Japan Society for the Promotion of Science
JST	Japanese Science and Technology Agency
MEXT	Ministry of Education, Culture, Sports, Science, and Technology
MOST	Ministry of Science and Technology
MOU	memorandum of understanding
NASA	National Aeronautics and Space Administration
NSF	National Science Foundation
NSF/C	NSF China Office
NSF/E	NSF Europe Office
NSF/J	NSF Japan Office
NSFC	National Natural Science Foundation of China
OECD	Organisation for Economic Cooperation and Development
OIG	Office of the Inspector General

OIIA-ISE	Office of International and Integrative Activities, International Science and Engineering
ONR	Office of Naval Research
PGRP	Plant Genome Research Program
PI	principal investigator
PIRE	Partnerships for International Research and Education
RAPID	Rapid Response Research
RDECOM	Research, Development and Engineering Command
RFI	request for information
S&T	science and technology
SOW	statement of work
SSR	Special Scientific Report
STPI	Science and Technology Policy Institute
TRM	Tokyo Report Memorandum
UNESCO	United Nations Educational, Scientific and Cultural Organization

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14. ABSTRACT

In 2012, the National Science Foundation (NSF) Office of International and Integrative Activities, International Science and Engineering (OIIA-ISE) section asked the IDA Science and Technology Policy Institute (STPI) to evaluate the role, function, and value of its three overseas offices, covering Europe, Japan, and China. The report's independent assessment described the complexity of the environment in which the overseas offices operate and offered a summary of the data analyzed to inform future NSF management and implementation efforts and to give guidance to future analyses of the contributions of overseas offices in the context of global science.

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