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SCIENCE AND TECHNOLOGY

Federal Efforts to Collect and Analyze Information on Foreign Science and Technology

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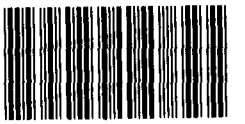

Mr. Chairman and Members of the Subcommittee:

We are pleased to discuss the results of the work that we performed at your request regarding the U.S. government's efforts to collect and assess information on foreign science and technology. Specifically, we (1) identified the extent and nature of federal activities for gathering and analyzing this information, (2) reviewed the coordination of efforts to collect and monitor the information, and (3) considered the usefulness of the available information to U.S. businesses.

In performing our work, we obtained information from seven federal agencies (see app. I). These agencies are the primary federal organizations that collect and/or analyze information on foreign science and technology. Specifically, we interviewed agency officials in Washington, scientists at three federal laboratories, and U.S. officials who monitor foreign technology information in Japan. We also interviewed representatives of five trade associations.

My statement also reflects the results of work that our National Security and International Affairs Division has been doing at the request of Senator Bingaman. The objective of this work is to determine how effectively U.S. military, civilian government, and private sector resources in Japan monitor and disseminate information about Japanese technology to U.S. policymakers and industry, as compared to Japanese resources performing similar roles in the United States. Senator Bingaman encouraged us to share information from this work with you today. In addition, in March 1990, we issued a report that discussed the federal government's monitoring and dissemination of the results of foreign research.[1] Some of the information that we are presenting today builds upon that effort.

In summary, we found that a whole host of federal offices and laboratories collect information on foreign science and technology. Located throughout the government, these organizations are concerned primarily with defense, intelligence, commerce, and science. Generally, the organizations obtain their information from open (public) sources. In some instances--particularly in the intelligence community--they analyze it and restrict access to their analyses. The purposes for which the organizations collect and assess the information are determined largely by their missions.

No central federal agency is responsible for coordinating either the collection or the monitoring of information on foreign

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[1]Foreign Technology: U.S. Monitoring and Dissemination of the Results of Foreign Research (GAO/NSIAD-90-117).

science and technology. Agencies with common interests do, however, have efforts under way to coordinate the collection and monitoring of relevant information.

Both government officials and business representatives said that they thought at least some of the information currently collected through federal organizations could be of use to U.S. businesses. However, the usefulness of this information to U.S. businesses has not been determined.

BACKGROUND

As other countries have gained strength in new technologies, the importance to U.S. industry of obtaining information about foreign scientific and technological developments has grown. U.S. firms increasingly use information about foreign competitors' products, services, and business practices in order to retain their competitiveness in world markets. This information can enable them to measure their own capabilities against those of their competitors--a process known as "benchmarking"--as well as set targets for improving their operations and endeavor to surpass their competitors.

FEDERAL ACTIVITIES FOR GATHERING INFORMATION ABOUT FOREIGN SCIENCE AND TECHNOLOGY INFORMATION ARE WIDESPREAD AND VARIED

The federal offices and laboratories that collect and analyze information on foreign science and technology are located throughout the government. In general, these organizations use this information to support their missions and rely on such open sources as scientific journals and the news media. They also collect information from their employees located in foreign countries and through international agreements to exchange information. We also found one example of a federal organization which has provided a different role than information collection and analysis. In this example, the Department of Energy's Sandia National Laboratories worked directly with U.S. industry to benchmark a piece of Japanese manufacturing equipment.

Information Is Collected Extensively for Defense-Related Purposes

The Central Intelligence Agency (CIA) and the Department of Defense (Defense) have developed extensive intelligence community networks that collect and analyze foreign scientific and technical capabilities because of its importance to the national defense. Both CIA and Defense generally restrict access to this information because it may disclose a relationship with a source of information that is classified or because it includes other classified or proprietary information.

Much of the information gathered by CIA and Defense is obtained through open sources. For example, CIA's Foreign

Broadcast Information Service (FBIS) publishes daily and more detailed periodic reports derived from open sources and Defense's Central Information Reference Collection (CIRC) database contains analyses of foreign open source scientific and technical publications. Moreover, Defense Intelligence Agency (DIA) officials stressed that the value added by their agency is in the analysis of open source information to fit their agency's particular Defense-related purposes and that it is after this analysis has been performed that the information becomes restricted.

Several other organizations within Defense monitor and disseminate information about foreign technology. In Japan, for example, these organizations use similar methods of monitoring information--such as visiting laboratories and interviewing individual scientists, attending technical meetings and conferences, and monitoring Japanese/Asian literature--to support their own missions. The Defense Technology Office in Japan,[2] among other activities, monitors Japanese commercial technologies to identify potential defense applications and provides this information to appropriate offices within Defense to support the Department's mission. To support its own mission, the Office of Naval Research, Asia (ONRASIA), identifies developments and trends in basic science and technology in the Asian rim countries and determines how they will affect the Navy.

Information Is Also Collected for Research and Development, Science, Technology, and Trade Purposes

Offices within the Departments of Commerce, Energy, State; the National Aeronautics and Space Administration (NASA); and the National Science Foundation (NSF) collect foreign scientific and technical information primarily to improve their research and development programs and to support the government's science, technology, and trade policy-making. For example, Commerce collects and analyzes information to determine the foreign availability of items controlled for national security purposes, and NSF analyzes information on international science and technology to plan its scientific funding activities. As is the case for the intelligence community, this information typically comes from open sources, such as scientific journals and conferences, as well as from interviews, plant visits, and debriefings of U.S. government and company officials.

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[2]Defense was instructed to establish this office in the National Defense Authorization Act for Fiscal Year 1991 (P.L. 101-510, Nov. 5, 1991) to investigate, evaluate, and facilitate opportunities for cooperation between the United States and Japan for the development of technologies of interest to Defense. The Defense Technology Office is part of the Mutual Defense Assistance Office within the Embassy.

In addition to speaking with representatives of the organizations that collect and analyze this information, we interviewed scientists at Sandia National Laboratories who have worked directly with the semiconductor manufacturing consortium SEMATECH in benchmarking foreign technology. In one case, they obtained the best available piece of semiconductor manufacturing equipment, which was Japanese, and determined its operating parameters, such as its mean time between breakdowns. As a result, Sandia provided SEMATECH with the information that semiconductor equipment suppliers needed to develop equipment whose performance characteristics would be competitive with the Japanese equipment. This assistance grew out of SEMATECH's technical assistance agreement with Sandia to establish the Semiconductor Equipment Technology Center which is primarily designed to improve the reliability of U.S. semiconductor manufacturing equipment.

EFFORTS TO COLLECT AND MONITOR INFORMATION ARE NOT CENTRALLY COORDINATED

In our March 1990 report on federal monitoring of foreign technologies, we found that coordination between or among the various government organizations that monitor foreign technology information is limited, and we could find no central source identifying such activity. Our work for this testimony identified only limited efforts to better coordinate activities in this area.

For example, the National Defense Authorization Act for Fiscal Years 1992 and 1993 required the Secretary of Defense to establish the Office for Foreign Defense Technology Monitoring and Assessment to help coordinate certain defense-related foreign technology monitoring activities. DIA officials whom we interviewed said that DIA is the lead agency in establishing this office. DIA has taken some steps to satisfy the legislation's requirements by putting together foreign technology competitiveness databases and doing related risk assessments.

Another effort to coordinate federal science and technology information collection was begun in the mid-1970s by Commerce, Energy, Defense, the National Library of Medicine (NLM), and NASA. These organizations eventually established a group called CENDI (Commerce Energy NASA/NLM Defense Information) to improve federal scientific information management systems through information exchange.

An additional example of coordination efforts is the U.S. civilian and Defense organizations we interviewed this past year in Japan. These organizations have several mechanisms for coordination, such as biweekly meetings that afford opportunities for sharing information. However, according to Defense officials, there are several problems. For example, many of the military participants are uncomfortable and non-communicative during the meetings because they have different missions and differing

reporting requirements. In addition, some of the organizations do not always attend the meetings.

Duplication and Gaps in Collecting and Monitoring Foreign Science and Technology Information May Continue

Our earlier report on federal monitoring of foreign technologies found that duplication, or overlap, among monitoring efforts occurs but may be limited because the monitoring organizations have a limited scope and subject range based on their individual missions and needs. One officials told us that duplication of monitoring efforts can be beneficial, because it helps in verifying the accuracy of the information that is collected.

Our earlier report also found that the potential for information gaps and overlap between agencies exists due to the lack of a central source and limited coordination among agencies. It is difficult to determine where the gaps and overlap occur, since no central information source identifies all of the technologies being monitored. Furthermore, many specific technologies are made up of individual components that may be monitored separately or not at all.

THE USEFULNESS OF FEDERAL INFORMATION ON FOREIGN SCIENCE AND TECHNOLOGY TO U.S. BUSINESSES IS UNCLEAR

Although our interviews indicated that information on foreign science and technology may be helpful to U.S. businesses, its usefulness has not been fully determined. For example, some of the government officials and laboratory scientists we interviewed said that the information on foreign science and technology that they used in their work would be helpful to U.S. businesses. Representatives of the five trade associations we contacted said that their member companies would probably use such information if it were available. However, they noted that their organizations were not familiar with the kind of information available, which would determine its usefulness for benchmarking and other purposes. While some information on foreign science and technology is already available from the federal government, efforts have only recently begun to make more available to U.S. industry.

Changes in the Dissemination of Federal Foreign Science and Technology Information to U.S. Businesses Are Under Way

Some federal information is already available to the public and businesses. For example, State, Commerce, and NSF, whose missions include disseminating information to industry, make information collected abroad available to the public through the Science and Technology Reporting for Information Dissemination Enhancement (STRIDE) database. Subscriptions to the database must be purchased from Commerce's National Technical Information Service

(NTIS), since NTIS does not receive an annual appropriation and must support its operations from its sales. NTIS distributes the scientific and technical information that it receives from federal agencies, federal contractors, and foreign governments. This information primarily consists of publications and computer databases.

NTIS is also involved in recent efforts to provide U.S. businesses with access to some of the information about foreign science and technology that CIA and Defense have derived from such open sources of information as foreign broadcast media and foreign technical journals. In September 1992, NTIS and CIA initiated discussions about ways to provide U.S. businesses with access to FBIS' open source databases. NTIS has proposed to provide (1) general access to the database used for FBIS' daily reports and (2) controlled access by U.S. companies to the database for more sensitive FBIS reports, such as the Joint Publications Research Service. NTIS would control businesses' access to FBIS information by forming a joint venture with a consortium or trade association, requesting it to identify foreign technical information of particular interest to its members and regularly searching the FBIS database to provide relevant information. The joint venture partner would be required to limit distribution of this information to its U.S. members and would pay NTIS a subscription fee for the service.

A committee made up of 23 federal agencies, called the Scientific and Technical Intelligence Committee, has also begun to make more information available to U.S. businesses. In January 1993, this committee's Open Source Intelligence Subcommittee undertook the development of a draft plan that, in part, could provide U.S. businesses with controlled access through NTIS to other open source databases, particularly Defense's CIRC database. While information in this database historically has focused on the former Soviet Union and its Eastern European allies, Defense in the past 2 years has given increased attention to a more general assessment of foreign technological advances. About 200,000 new records were added to the CIRC database in 1992.

For the most part, the Defense organizations in Japan that monitor foreign technology information told us that disseminating information to U.S. industries is not a part of their mission. However, some of these organizations have disseminated information to industry on their own initiative without any formal policy changes. For example, ONRASIA scientists have developed extensive lists of recipients--including officials from government laboratories, industry, and academia--for information in their areas of expertise. These scientists use electronic mail or electronic bulletin boards to provide information to their users.

The Usefulness of Federal Foreign Science and Technology Information Has Not Been Determined

We believe there may be reason for caution in efforts to provide federal foreign science and technology information to U.S. businesses because the usefulness of this information to them has not been determined. A 1988 report prepared for NSF, State, and Commerce examined nonclassified foreign technology information collected through government agencies and evaluated its potential value to federal laboratories and users outside of government.[3] This report found that information contained in State's STRIDE database was generally viewed as being of limited value to industrial research and development managers.

In addition, because access to information gathered by CIA and Defense has been restricted, it is difficult to assess the usefulness of this information to U.S. businesses. However, providing U.S. businesses with access to FBIS and CIRC databases through NTIS offers a means to assess their usefulness to industry. Because NTIS does not receive annual appropriations, its costs for culling relevant information from the databases will be borne by industry users through their subscription fees. Thus, as NTIS pointed out in discussions, one indication of the usefulness of this information may be the ability of the fees to support NTIS' operations.

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In summary, Mr. Chairman, we found that many different offices and laboratories within the federal government gather information on foreign science and technology, usually for their own specific purposes. Although some of this information could be helpful to U.S. businesses, neither the value of the information to business nor the interest of business in obtaining the information from the federal government has been determined. NTIS has efforts under way to make some information from Defense and CIA accessible to industry, and industry's response to this opportunity may provide some indication of the information's usefulness to U.S. businesses.

Mr. Chairman, this concludes my statement. I would be pleased to respond to any questions that you or Members of the Subcommittee may have.

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[3]William D. Guns, Catherine P. Ailes, and Damian M. Saccocio, Project Stride: S&T Reporting For Information Dissemination Enhancement, SRI International, STPP-TN-3164-5 (Aug. 1988).

AGENCIES THAT COLLECT INFORMATION ON FOREIGN SCIENCE AND TECHNOLOGY

CENTRAL INTELLIGENCE AGENCY
- Foreign Broadcast Information Service
- Joint Publications Research Service

DEPARTMENT OF COMMERCE
- Bureau of Export Administration
  - Office of Foreign Availability
  - Office of Industrial Resource Administration
- International Trade Administration
  - Office of Import Administration
  - Office of International Economic Policy
  - Office of Trade Development
- Technology Administration
  - National Technical Information Service
  - Japan Technology Program
  - National Institute of Standards and Technology

DEPARTMENT OF DEFENSE
- Air Force Detachment 1, Foreign Aerospace Science and Technology Center
- Air Force Office of Scientific Research, Far East
- Army Research Office, Far East
- Army Science and Technology Center, Far East
- Defense Intelligence Agency
  - Defense Attache Office, Tokyo
- Defense Technical Information Center
- Mutual Defense Assistance Office, Japan
  - Defense Technology Office
- Naval Science and Technical Group, Far East
- Office of Naval Research, Asia

DEPARTMENT OF ENERGY
- Office of Foreign Intelligence
- Los Alamos National Laboratory
- Sandia National Laboratories

DEPARTMENT OF STATE
- Bureau of Oceans and International Environmental and Scientific Affairs

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
- Scientific and Technical Information Program

NATIONAL SCIENCE FOUNDATION
- Division of International Programs
- Division of Science Resources Studies
- Tokyo Regional Office

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