

TECHNOLOGY TRANSFER: PRACTICES FROM THE DEPARTMENT OF DEFENSE

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The Problem

Technology transfer is an important mandated function of the Department of Defense (DoD) laboratories. However, effective technology transfer is challenging for DoD laboratories for several reasons. IDA was asked to identify exemplar practices employed throughout DoD, along with policy and legislative initiatives that might improve DoD's overall efforts to transfer innovations to the commercial marketplace.

Technology transfer is the process of sharing, transmitting, or conveying technology, data, and information (intellectual property) between government agencies, industry, and academia. IDA was asked to identify exemplar technology transfer practices throughout DoD laboratory enterprise and technology transfer policy and legislative issues that the Office of the Secretary of Defense (OSD) could address to enhance current practices or to develop new practices. Also, the research was intended to provide information to DoD laboratory and technology transfer office personnel about best practices and encourage their adoption across DoD. The research team reviewed pertinent literature including previous IDA research on DoD laboratories related to technology transfer. The team also interviewed stakeholders, including representatives from DoD Offices of Research and Technology Applications (ORTA) and legal staff involved in the technology transfer or acquisition processes, and personnel from other agencies.

Literature Review

A review of academic literature, government reports, and legal documents on technology transfer highlighted strategies and factors for success, but not specific practices. It was noted that effective technology transfer is challenging for DoD laboratories for the following reasons:

- Defense laboratories primarily focus on technology transition and view transfer for non-military purposes as secondary.
- Defense research and development (R&D) might not be commercially relevant or could be classified.
- Defense inventions might be protected via trade secrets rather than patents.
- Defense researchers often work on weapon systems, for which performance is overriding, making it difficult to work with

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industry partners who also must balance schedule and cost.

The exemplar practices presented in the literature focus on high-level strategies to improve technology transfer at DoD laboratories. These strategies include providing guidance to DoD laboratories to strategically plan and engage in technology transfer; to empower and reward researchers engaged in technology transfer; to create effective and efficient technology transfer offices; to establish processes that streamline executing technology transfer agreements; and to leverage other technology transfer resources at the local, State, and national levels.

The following are critical factors for a successful technology transfer program: an effective ORTA, engaged researchers, well-managed intellectual property, effective use of technology transfer mechanisms, efficient technology transfer processes, and meaningful interaction with industry through marketing or partnerships.

Interview Findings

Semi-structured interviews with DoD-affiliated laboratory ORTA staff and other stakeholders were conducted using the themes identified in the literature. Programs and processes identified during the discussions were considered exemplar practices for technology transfer at DoD laboratories if they resulted in measurable outputs or outcomes (e.g., reduction in the number of days to execute agreements or increase in the number of agreements); adoption by other laboratories; continued

implementation of the exemplar practice; or assignment of dedicated resources. The research team identified more than 20 exemplar practices and organized them into the seven categories described in the following paragraphs.

Ensuring Effective ORTA Organization and Staffing

Exemplar practices in this category focus on organizing staff by technology or business area, building strong relationships with DoD attorneys, and providing seed money to ORTAs to pilot programs or software to facilitate technology transfer. With decentralized staff and localized control, ORTAs are enabled to make quick decisions and attract experienced staff. In addition, decisions are accelerated, and the lines of communication are opened. For example, the Department of Navy Technology Transfer Program Office funds Navy laboratories to conduct pilot projects of new technology transfer approaches. The funding amounts vary from \$5,000 to \$50,000 for each project. Navy laboratories compete for the funding. Examples of the outcomes of these pilot programs include the Innovation Discovery Process and the Military to Market program.

Empowering, Training, and Rewarding Scientists and Engineers

Many laboratories are using classroom and online training, boot camps, and presentations by companies and venture capitalists to inform and inspire researchers to file invention disclosures and patent

applications or work with companies through Cooperative Research and Development Agreements (CRADA).

For example, a new Defense Acquisition University online course provides training on ensuring that agreements anticipate data rights for future acquisitions. Recognizing and rewarding researchers for their efforts include giving awards and plaques, and sharing royalty payments. Training administrative staff to identify novel technologies (intellectual property), and working with researchers to file invention disclosures are other exemplar practices.

Capturing and Managing Intellectual Property

DoD laboratories have developed methods for capturing and managing intellectual property (IP) during two stages: identifying IP during R&D phases and evaluating invention disclosures for licensing or commercialization. At laboratories, staff identifies IP so it can be documented in the form of invention disclosures and provided appropriate protection in the form of patents and copyrights. Then most DoD laboratories undergo some type of evaluation to determine which invention disclosures to protect. Many ORTAs use an invention review board process to determine whether to patent technologies from invention disclosures.

An exemplar IP identification practice is the Innovation Discovery Process at Naval Surface Warfare Center (NSWC) Crane Division that helps researchers identify potential IP. This process involves innovation

mining where inventors discuss their research projects in front of business and engineering faculty, entrepreneurs, and industry and technology transfer experts. NSWC Crane evaluates the success of Innovation Mining Events using counts of invention disclosures, potential commercialization ideas, completed post-event disclosures, inventors trained about IP, and partners exposed to NSWC Crane through participation in the events.

Using Technology Transfer Mechanisms to Full Potential

Many DoD ORTAs and attorneys have been creative in their use of traditional technology transfer mechanisms. This creativity allows DoD laboratories to license government software, engineering drawings, and other works of technology-related authorship in the absence of a patent; conduct research partnerships with foreign governments; or use abbreviated CRADAs for material or data transfer, material evaluation, and device evaluation. These special CRADAs streamline or tailor the CRADA process to allow industry to work with laboratories or use laboratory facilities. For example, staff of the Air Force Research Laboratory Information Directorate (AFRL/RI) developed a Limited Purpose CRADA for protecting software. The mechanism is intended to provide software to first responders and other interested organizations subject to security restrictions. In exchange, AFRL/RI receives feedback about the software. The software use agreement also acts as a trial usage agreement. If an organization likes the

software, a license can be purchased later. The Air Force Office of the General Counsel has approved the use of the Limited Purpose CRADA for software agreements, and AFRL/RI has entered into about a dozen such agreements.

Managing and Monitoring Technology Transfer Processes

The following categories of practices have been developed to manage and monitor technology transfer: changing processes; tracking of CRADAs and licenses; developing handbooks for commonly executed agreements and contracts; developing databases and checklists for technology transfer processes; and using software programs designed to manage intellectual property. The Aerospace Corporation, which manages a Federally Funded Research and Development Center (FFRDC) for DoD, developed the Intellectual Property Program Licensing Toolkit. The toolkit includes an initial questionnaire that inquires how the business will use the license; a licensing worksheet that asks for information on execution fees, royalties, and field of use; a standard license agreement; and a license agreement change request that divides the standard license agreement into editable sections.

Marketing Laboratory Technologies and Capabilities to Industry

Multiple approaches are used within DoD laboratories to market laboratory technologies and capabilities to industry. These activities include highlighting DoD

technologies through technology showcases, training industry about working with DoD laboratories, and preparing and advertising market assessments for technologies that could be licensed and developed or implemented by companies. DoD laboratories conduct outreach to industry through presentations at events and meetings. For example, the Army Corps of Engineers Construction Engineering Research Laboratory staff participates in meetings that manufacturers attend; researchers at the Army Research Laboratory hold regular discussions with licensees, CRADA partners, and other collaborators to ensure a common understanding about agreements; and representatives of the Air Force Human Effectiveness Directorate attend trade shows and other industry meetings to showcase facility capabilities.

Building Partnerships

DoD laboratories use multiple mechanisms to form partnerships with outside organizations to facilitate technology transfer, including Partnership Intermediary Agreements, Educational Partnership Agreements, and Other Transaction Authority agreements. There are five types of partnerships (national partnership intermediaries, local partnership intermediaries, universities, venture capital organizations, and economic and technology development organizations) and a range of functions performed by partnering organizations for laboratory ORTAs (identifying patentable IP; writing invention disclosures; executing deals such as patents, licenses, and

CRADAs; developing marketing plans; funding technology development and maturation; providing seed funding to businesses; marketing laboratory technologies; running technology showcases; and connecting laboratories with universities (e.g., students and researchers) and staff of local and national businesses). Two partnerships highlighted as exemplar practices during interviews with DoD laboratory ORTA staff are the Griffiss Institute, affiliated with AFRL/RI in Rome, New York, and the NSWC Crane's partnership network.

Summary

Many DoD technology transfer organizations have implemented creative approaches within the

boundaries of existing regulations, directives, and instructions. Encouraging the adoption of these exemplar practices is likely to accelerate the transfer of innovations to the marketplace.

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