Executive Summary of Agency Reports in Response to the October 28, 2011 Presidential Memorandum:

Accelerating Technology Transfer and Commercialization of Federal Research in Support of High-Growth Businesses[1]

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I. Introduction

On October 28, 2011, the President issued the Presidential Memorandum (PM) -- *Accelerating Technology Transfer and Commercialization of Federal Research in Support of High-Growth Businesses*. This PM recognized the importance of Federal laboratory technology transfer and instructed agencies "*to increase the successful outcomes of these activities significantly over the next 5 years, while simultaneously achieving excellence in our basic and mission focused research activities.*"

Thirteen agencies[3] responded to the PM with plans to revise and enhance efforts to promote and track technology transfer activities. Submissions encompass a wide variety of technology transfer activities, with subsets applicable to any one agency being determined by the applicable agency's mission.

As diverse as their missions are, several themes are consistent across agencies:

- Agencies recognize that transferring the results of intramural research and development to U.S. industry, local and state governments, non-profit organizations and other federal agencies is an integral part of, and entirely consistent with, their missions.
- Agencies recognize the importance of continual improvements to the efficacy and efficiency of their technology transfer activities and the development of appropriate metrics for measuring efficacy and efficiency.
- Agencies recognize that it is the impact of their technology transfer activities that is important, rather than tallies of output. However, no efficient way to consistently

[1] http://www.whitehouse.gov/the-press-office/2011/10/28/presidential-memorandum-accelerating-technology-transfer-and-commerciali

[2] For further information contact the Technology Partnerships Office, National Institute of Standards and Technology, U.S. Department of Commerce, www.nist.gov/tpo.

[3] Department of Agriculture, Department of Commerce, Department of Defense, Department of Energy, Department of Health and Human Services (separate plans for Centers for Disease Control and Prevention, Food and Drug Administration, and National Institutes of Health), Department of Homeland Security, Department of Interior, Department of Transportation, Department of Veterans Affairs, Environmental Protection Agency, and National Aeronautics and Space Administration.

measure impact in the aggregate or to calibrate the impact of one technology transfer activity over another has been identified.

- Agencies recognize the potential for multiplying the impact of their technology transfer activities by partnering with other federal agencies and partnership intermediaries. Many agencies will implement collaborative activities in the next five years based on their five year plans.
- Agencies recognize the significant potential to be gained by leveraging technology transfer activities with Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs. Many agencies included such programs in their five year plans.
- Agencies recognize the importance of providing streamlined access to their intellectual property, facilities, collaboration opportunities, and SBIR/STTR programs.
- Agencies have, in general, designed their five year plans to be "living plans" in the sense that a variety of new activities will be tried, successful ones fully implemented, others modified, and some retired. "Lessons learned" and "effective practices" will be widely shared via the Interagency Working Group on Technology Transfer (IAWGTT) and the Federal Laboratory Consortium (FLC).

II. Abstracts of the Individual Approaches Being Taken by Responding Agencies

A. Department of Agriculture (USDA)

Overview

Successful adoption of USDA knowledge and research outcomes typically requires complementary assets and services provided by multiple agencies in USDA, including agencies that are not primarily engaged in direct research in the physical and life science arenas. The breadth and scope of USDA science and technology agencies create some unique challenges. USDA research and development is conducted in agencies with 100% internal research, agencies with units dedicated 100% to research, agencies with "methods development" research elements but also regulatory responsibilities, as well agencies entrusted with land management responsibilities such as natural resources preservation. The USDA report describes four agencies with science research missions that develop innovations in the agriculture sector, and seven agencies that contribute resources and services to enhance success and global competitiveness of the businesses that adopt the innovations for commercialization.

Goals and Objectives

The USDA Science & Technology (S&T) agencies recognize the issuance of the Presidential Memorandum as an unprecedented opportunity to unify and improve technology transfer mechanisms and enhance the delivery outcomes of public goods. In response, USDA has prepared a detailed plan with specific goals and objectives that are outlined in 32 initiatives promoting technology transfer and commercialization during the 2013-2017 timeframe. Most of the initiatives described will begin in FY 2013 and will continue through the five year period, ushering in a new era of unprecedented collaboration among agencies of USDA to enhance services and opportunities to the customers and stakeholders of that Department.

B. Department of Commerce

Overview

Using the existing framework from its annual technology transfer reports, the Department coordinated its response across its research organizations. The National Institute of Standards and Technology (NIST), the National Atmospheric and Oceanographic Administration (NOAA), and the National Telecommunications and Information Administration (NTIA) each provided individual sections to the report.

NIST

Overview

In response to the Presidential Memorandum, NIST initiated a detailed process to review existing policies and processes related to technology transfer. NIST has developed a broad definition and approach to technology transfer with an emphasis on using multiple approaches to facilitate collaboration and application of scientific results.

NIST is expanding the metrics collected for technology transfer. Traditionally, the metrics reported are counts of activities, such as the number of Cooperative Research and Development Agreements (CRADAs), with anecdotal examples of public benefit. In order to improve the measurement of technology transfer, NIST will refine the existing set of metrics and develop new metrics, when appropriate, that can serve as the basis for the application of rigorous economic assessment tools.

Goals and Objectives

To establish appropriate goals and develop valid measurements (or eliminate metrics that are not useful), NIST will continue the process of benchmarking its technology transfer activities against other agencies and adopting "best practices." A necessary step in measurement is the collection of relevant data about technology transfer activities. The diversity of NIST's activities and the comprehensive collection of detailed data will require a multi-level, multi-year approach. A further requirement will be the application of existing analytic tools, and very likely the development of new analytic tools, to effectively assess the impact of these activities. NIST has consolidated its planned approach in two overarching goals: 1) improving the transfer of NIST technology and work products, and 2) improving NIST technology transfer through collaborations.

NOAA

Overview

Over the next five years, NOAA will continue to direct its technology transfer and international collaboration activities toward accomplishing its mission goals. NOAA's primary technology transfer mechanism has historically been the open dissemination of scientific and technical information to individuals, industry, government, and universities. This means of transfer is consistent with the agency's mission and scientific tradition. NOAA finds this method of technology transfer to be the most efficient and economical.

Goals and Objectives

In 2010, NOAA conducted a survey of staff from each Line Office to determine the overall awareness of its technology transfer program and the effectiveness of tools provided. In response to the President's Memorandum, results from this survey have been used to structure NOAA's plan to improve and broaden its technology transfer activities. The goals and objectives of this plan are designed to provide NOAA scientists with a greater understanding of technology transfer mechanisms and greater support from a centralized technology transfer office with dedicated and knowledgeable staff. NOAA's plan includes the following eight programmatic actions to increase internal and external awareness, improve support and programmatic functions, and better track progress toward increasing technology transfer:

- Optimize ORTA Management and Staffing Structure.
- Central Management of Patents.
- Programmatic Advice and Guidance.
- Establish Technology Transfer Review Board.
- Enhance Internal Education on Patents and Technology Transfer Issues.
- Increase Outreach to Industry.
- Develop Database of NOAA Technologies and Opportunities.
- Improve Performance Measurement and Tracking.

NTIA

Overview

The Institute for Telecommunication Sciences (ITS) is the chief research and engineering arm of the NTIA.

ITS supports NTIA telecommunications objectives of promoting advanced telecommunications and information infrastructure development in the United States, enhancing domestic competitiveness, improving foreign-trade opportunities for U.S. telecommunications firms, and facilitating more efficient and effective use of the radio spectrum. ITS also serves as a principal Federal resource for solving telecommunications concerns of other Federal agencies, state and local governments, private corporations and associations, and international organizations.

Goals and Objectives

ITS uses three principal means for achieving technology transfer: cooperative research and development; technical publications; and leadership and technical contributions in the development of telecommunications standards. In response to the Presidential Memorandum, ITS will continue its participation in CRADAs with private-sector organizations, promote wider dissemination of its technical publications using electronic media and enhancements to the ITS website, develop new metrics that will identify efforts to download publications, data, and software, and maintain its leadership role and technical contributions to national and international organizations developing telecommunications standards.

C. Department of Defense (DOD)

Overview

The DOD *Strategy and Action Plan* identifies new performance goals to measure, track and increase the number and pace of DOD's technology transfer (T2) and commercialization of activities. The plan addresses this task by establishing a set of performance measures that will permit DOD's T2 participants to baseline their performance and to determine what initiatives and program changes may be warranted to improve future performance. The data collection process and performance goals will be continuously updated over time.

DOD technology transfer is a decentralized process with local application governed by broad DOD and DOD Component policy and assignment of responsibilities. Each Military Service and participating Defense Agency has implementing guidance with a formal Office of Research and Technology Applications (ORTA) at each laboratory/technical activity and supplemental support from financial personnel, Intellectual Property (IP) attorneys, and the many individual scientists and engineers that conduct the actual research and development work.

This decentralized approach allows the local technology transfer processes, procedures, and projects to fall within the specific mission-related activities of the local laboratories.

Goals and Objectives

In order to better meet the full intent and obligation of activities required by the Presidential Memorandum, DOD is currently reviewing and updating its Technology Transfer Program (DODI 5535.8) and, if necessary, will also update its directive on the licensing of government-owned inventions (DODD 5535.3.) DOD objectives are to:

- Establish enterprise-wide T2 best practices to encourage and facilitate accelerated commercialization and transfer of DOD innovations (Internal process improvements).
- Foster the Defense Laboratory Enterprise's Innovation Ecosystem through the use of accelerated T2 as a "Research Development Test & Evaluation Force Multiplier" (Innovation Enhancements).
- Accelerate commercialization of DOD Innovations by private sector to build new industries, generate employment opportunities and foster the wider Innovation Ecosystem (Positive economic impact).
- Develop new metrics to provide increased context for measuring accelerated technology transfer and commercialization (Enhanced T2 enterprise intelligence).

D. Department of Energy (DOE)

Overview

Over the last several years, DOE has been working on developing metrics that drive behavior for optimal technology transfer at DOE Facilities. In general, technology transfer metrics are notoriously poor in measuring outcomes and impact; rather, they typically measure output, which can be useful, but does not necessarily support or drive the desired behavior. In addition, there are a number of other technology transfer outcomes that are not necessarily captured in the

current metric collection, such as an invention that is not patented or licensed yet leads to the development of an entirely new industry or results in ground-breaking efficiencies.

Goals and Objectives
Increase collaborations between DOE and its facilities with the private sector to support commercialization and technology transfer of its research and development investments. Use technology transfer activities and tools to leverage DOE resources for the overall benefit to U.S. competitiveness, enhancement of the Nation's energy security, national security, scientific discovery, and quality of life. DOE objectives are to:

- Establish a strong foundation for successful commercialization of inventions with policies and actions that encourage inventorship, outreach, and availability of technology.
- Widely promote promising technologies and make available to the public the knowledge, intellectual property, and capabilities developed at DOE Facilities through patenting, licensing, and collaboration. These intermediate steps in the process are necessary for successful commercialization.
- Streamline processes.
- Streamline the SBIR Program to be more responsive to small businesses.
- Leverage new legislative initiatives under the Smith-Leahy America Invents Act to enhance and develop technology transfer and commercialization strategies.
- Gather historical data to develop baseline measures that can be compared to the new metrics.

E. Department of Health and Human Services

Centers for Disease Control (CDC)

Overview
The overarching aim of the plan is to encourage formation of technology transfer partnerships between CDC and federal and non-federal entities, including private firms, research organizations, and nonprofit entities. Implementation of the plan is targeted to increase the efficiency of CDC's technology transfer program by allowing professional staff to increase their focus on marketing and partnership activities.

Goals and Objectives
CDC enumerated the following five goals for accelerating technology transfer and commercialization of federal research:

- Increase the number of technology transfer partnership activities with non-federal entities (commercial, research, and nonprofit organizations).
- Improve CDC's technology transfer business processes.
- Expand technology transfer knowledge among CDC community members.

- Improve collaboration with other federal agencies that focus on human and animal diseases.
- Measure impact of CDC's technology transfer program.

The plan is intended to be an evolving document. During the first year, CDC will work toward achieving the initial metrics, develop methods to capture the data for each task, and initiate collection of baseline measures. CDC will conduct ongoing evaluation and will adjust the goals, tasks, metrics, and timeline, as needed.

Food and Drug Administration (FDA)

Overview

FDA is committed to modernizing its science and regulatory paths to promote innovation, as evidenced by its recently published innovation blueprint. FDA's innovation blueprint outlines strategies to help reposition the U.S. medical product industries to adapt to the changing scientific landscape and drive innovation forward to provide Americans with cutting edge treatments and therapies that are safe and effective. At the same time, the outlined strategy will support economic growth and development in a critical sector of the economy.

Goals and Objectives

FDA has the following goals for accelerating technology transfer and commercialization of federal research:

- Increase the number of technology transfer partnership activities with non-federal entities, including industry, academia, and nonprofit organizations.
- Improve FDA's technology transfer business processes.
- Expand technology transfer knowledge among FDA community members and increase the Agency's awareness of the value of its technology transfer program.

The Plan establishes goals to increase the number and pace of effective technology transfer and commercialization activities in partnership with non-federal entities, including private firms, research organizations, and nonprofit entities. The initiatives and activities outlined in the Plan contribute to accomplishing the goals. The Plan includes initial milestones and measures for evaluation purposes. The Plan covers the 5 year period from 2013 through 2017.

While the Plan presents initiatives and activities to accelerate technology transfer and commercialization under partnerships with non-federal entities, it will also present objectives to improve the Agency's internal processes needed to establish and carry out the partnerships. The Plan is intended to be a living document. In the first year, FDA will finalize the initial measures, develop methods to capture the data for each measure, and initiate collection of baseline measures. FDA will continue to evaluate the gathered measures in light of the objectives and will adjust the objectives, tasks, and measures as necessary and appropriate to pursue the stated performance goals.

National Institutes of Health (NIH)

Overview

The overarching aim of the Plan is to increase the number and pace of effective technology transfer and commercialization activities in partnership with non-federal entities, including private firms, research organizations, and nonprofit entities. The Plan covers two distinct programmatic areas: the first part involves research and development activities that occur at the NIH; the second part involves extramural SBIR/STTR grants and contracts. The Plan presents activities to accelerate technology transfer and commercialization, but also focuses on non-partnership activities such as improving procedural efficiencies and automation of common high volume activities, which in turn will free up time for NIH technology transfer professionals to dedicate to partnership activities. This approach is expected to increase both the number and pace of formation of technology transfer partnerships without sacrificing quality and conformance with policy. The Plan also describes intermediate to long term investments in human capital development and information technology (IT) to better leverage limited technology transfer resources going forward as to well as improve methods for understanding the impact of the Program.

The Plan is intended to be a living document. In the first year, NIH will finalize the initial measures, develop methods to capture the data for each measure, and initiate collection of baseline measures. Most of the measures are available from existing metrics collected or from reports generated by the NIH internal database for tracking all patenting and licensing activities and the number of CRADAs. In the first year, the Office of Technology Transfer (OTT) and the NIH Institute & Centers (IC) will put in place new means of tracking activities that are not already captured by the existing procedures. NIH will continue to evaluate the gathered measures in light of the objectives and will adjust the objectives, tasks, and measures if necessary and appropriate to pursue the stated performance goals. In addition, throughout the duration of the Plan, NIH will seek ways to better understand the long-term and far-reaching impact of the Program.

Goals and Objectives

The NIH is cognizant of the necessity to meet these changing needs through new and innovative approaches to technology transfer and the award of SBIR/STTR grants and contracts. Accordingly, the Program has begun to implement initiatives intended to enhance NIH's technology transfer and commercialization activities. These include:

- Facilitating the exchange of proprietary materials and information needed to advance biomedical research.
- Streamlining licensing procedures and reducing the time required to license Technologies.
- Reviewing practices for establishing CRADAs with the goal of reducing the time required to establish CRADAs.
- Facilitating commercialization through local and regional partnerships.
- Promoting NIH inventions and technologies for development and commercialization.

F. Department of Homeland Security (DHS)

Overview

The DHS Technology Transfer Office is housed within the Science and Technology Directorate, Research and Development Partnerships Group. The Technology Transfer Office operates from a centralized location to set DHS technology transfer policy, and to promote the transfer and/or exchange of technology with industry, state and local governments, academia, and other federal agencies. The technologies developed and evaluated within DHS can have tremendous potential for applications throughout the nation and dramatically enhance the competitiveness of individual small businesses as well as expanding areas of exploration and cooperation for all non-federal partners.

Goals and Objectives

The DHS Technology Transfer Office is still in its infancy. Over the next several years, DHS's objective is to continue to lay a proper foundation for technology transfer by entering into collaborative research and development agreements, creating the right partnerships, building a patent portfolio, and providing licensing opportunities to move DHS technologies into the marketplace. As each aspect of technology transfer grows, the DHS Technology Transfer Office will continue to move toward establishing an exemplary program, generating high-technology outputs and commercializing cutting-edge technology.

In response to the Presidential Memorandum, DHS has established a series of goals that will enhance the ability of the DHS Technology Transfer Office to provide cutting-edge technology to the homeland security enterprise and the nation. Among these goals, DHS will strive to increase the output of agreements and invention disclosures by 10 percent in each fiscal year, increase the number of collaborative agreements by 10 percent in each fiscal year, increase the number of invention disclosures throughout DHS, increase the number of royalty-bearing licenses, and reach a greater number of potential non-federal partners through various outreach methods.

G. Department of Interior (DOI)

Overview

The DOI will facilitate technology transfer between its laboratories and other entities to the extent practicable, as authorized by legislation, and consistent with the Department's mission. This includes technology transfer between federal as well as non-federal entities, including private parties and other non-governmental organizations. Accordingly, the Department will update its Departmental Manual to incorporate general policy and procedures for technology transfer applicable to all bureaus. The bureaus will develop their own guidance consistent with Departmental policy and their own missions.

DOI will develop general policies and update, where appropriate, existing procedures for implementing technology transfer, and related activities, such as benefit sharing, between DOI bureaus and non-federal entities. These policies will address and encourage various technology transfer mechanisms, including licensing, CRADAs, facility use agreements,

enhanced use leasing, and engagement with local and regional partnerships, as appropriate. These policies will also address and encourage the heads of bureaus with Federal laboratories to include technology transfer efforts as a responsibility for each laboratory science and engineering professional, as appropriate. The general policy will be adopted and memorialized as part of the Departmental Manual and used by bureaus to establish similar bureau-specific policies.

Goals and Objectives

- Develop Departmental policies for implementing technology transfer activities authorized by the Federal Technology Transfer Act and related legislation.
- Review and improve procedures and practices for licensing and establishing other technology transfer agreements.
- Develop and submit annual reports on technology transfer.
- Analyze, where possible, trends in technology transfer metrics to help improve the effectiveness of technology transfer programs in stimulating innovation.
- Improve public access to information related to inventions owned by the various bureaus and DOI's other technology transfer activities.
- Train scientific, technical and engineering personnel engaged in research and development in technology transfer and encourage bureaus, where appropriate, to include technology transfer as an evaluation criterion for such personnel.

H. Department of Transportation (USDOT)

Overview

The current approach of the USDOT to technology transfer is diverse and unique to each mode of transportation. Each agency conducts its own type of deployment activities according to its mode and type of research. Through each agency's research, development, and technology programs, that agency facilitate technology transfer of innovative technologies and solutions to improve transportation safety and efficiency.

The USDOT T2 plan approach expects to achieve the acceleration of the technology transfer and commercialization results by regular assessment and evaluation of the plan's objectives and activities through the use of metrics. During the plan's first year, USDOT will work to baseline USDOT activities results using collected data and analysis.

Goals and Objectives

USDOT has three goals for accelerating T2 and commercialization of federal research:

- Increase the number of T2 partnerships with entities from academia, industry, commercial, nonprofit, government, and non-government.
- Increase the number of commercialization activities.
- Improve the efficiency of USDOT T2 business processes.

I. Department of Veterans Affairs (VA)

Overview

Unlike other federal agencies, VA has no laboratories whose predominant function is research. VA includes research as part of the mission of each Veterans Administration Medical Center (VAMC), although the primary mission of a VAMC is patient care for veterans. Because each VAMC has research activities, under the law, each is a Federal laboratory. This means, as a practical matter, research is a relatively small, but important part of the mission of each VAMC. Based on appropriations, less than 2 percent of VAMC budgets are exclusively for research. At the same time, the dual mission of a VAMC means that the research at a VAMC is intimately connected to veteran patient care activities. In fact, the majority of VA researchers are active clinicians. This leads to a focus on research areas most likely to benefit veterans.

VA's research mission is therefore entirely intramural. VA does not have authority to award grants to parties outside VA. Its only mechanism for funding the private sector is through contracts under the Federal Acquisition Regulations (FAR), through which VA acquires goods and services not available within VA in order to meet VA program goals. Consequently, VA does not have a SBIR or STTR program.

Goals and Objectives

Most VA inventions are jointly owned by VA and its academic affiliates, making technology transfer a collaborative effort. In order to fulfill the goals of the PM, VA has developed a series of new initiatives.

These initiatives include:

- Increasing the number and quality of Invention Disclosures (ID) VA receives.
- Streamlining the process of determining whether the Federal Government is the owner of any invention.
- Improving VA's current mechanisms for working with its affiliates.
- Establishing a more systematic internal patent policy for VA.
- Improving VA's commercial licensing processes.

J. Environmental Protection Agency (EPA)

Overview

In 2011, EPA developed a document entitled, "Technology Innovation for Environmental and Economic Progress: An EPA Roadmap." In this document, EPA presents a vision for technology innovation which promotes innovation that eliminates or significantly reduces the use of toxic substances and exposure to pollutants in the environment and that also promotes growth of the American economy. Building upon EPA's history of scientific and technological expertise and innovation, EPA seeks out prospective technological advances that have the greatest potential to help achieve multiple environmental goals. Working in partnership with EPA's diverse set of stakeholders, EPA will speed the design, development and deployment of the next generation of environmental technologies, creating a cleaner environment and a stronger economy for our nation and the world.

New and innovative approaches to environmental technology are increasingly part of the solution for existing and emerging environmental challenges. The preponderance of evidence demonstrates that environmental protection and economic progress go hand-in-hand. EPA is working with both internal and external stakeholders to develop the capacity and implement specific strategies to meet new challenges and opportunities.

EPA's Open innovation challenges tap into the vast expertise that exists beyond the boundaries of a single organization. Congress recently passed legislation that authorizes the use of prizes and challenges across the federal government to spur innovation, solve tough problems, and advance core missions through a process like open innovation. Over the next year, EPA will use its prize and challenge authority to attract innovative solutions, from both the public and its own employees, to high-priority environmental protection needs. These challenges will be posted online to the public with the expectation that solutions can be developed by external parties.

Goals and Objectives

EPA's technology transfer objectives:

- Partnerships with external organizations on research projects to enhance the breadth and effectiveness of EPA technology development.
- Effectively moving EPA-developed technologies and expertise into the marketplace.
- Leveraging innovative partnerships with other agencies on technology transfer for the purposes of collectively marketing government-owned technologies, establishing cooperative research projects with small businesses, and pooling EPA outreach efforts to local business communities.
- Engaging scientists in intellectual property protection and technology transfer at all stages of research.

K. National Aeronautics and Space Agency (NASA)

Overview

At its core, the NASA technology transfer program is focused on creating benefits for society through transferring NASA's inventions and innovative knowledge to outside organizations. This focus is consistent with NASA's fundamental statutory direction to preserve "the role of the United States as a leader in aeronautical and space science and technology" and encouraging "the fullest commercial use of space" by providing for the "widest practicable and appropriate dissemination of information concerning its activities and the results thereof."

NASA is at the forefront of the Nation's initiatives to develop breakthrough space capabilities and applications to support the development of a strong, innovative, and competitive commercial space sector and to support a robust U.S. space industrial base. An effective way to transfer technology and support the development of U.S. commercial activity through partnership activities is a core component of NASA's program to develop innovative new space technologies.

Goals and Objectives

NASA is exploring ways to enhance or improve its ability to increase the rate, volume, and quality of technology transfer to industry, academia, and other government agencies thereby increasing the economic impact and public benefit of the Federal technology investments. To this end, NASA has identified seven key objectives:

- Revise Agency policies to ensure alignment with NASA's commitment to technology transfer best practices.
- Identify strategies to build partnerships for technology development, transfer, and mutual benefit.
- Strategically acquire and manage intellectual property.
- Increase the number of new technologies reported by NASA civil servants and contractors.
- Develop and implement innovative methods for technology licensing.
- Increase Agency use of CRADA authority to accelerate licensing of resulting technologies.