EXECUTIVE OFFICE OF THE PRESIDENT

WASHINGTON, D.C.

August 17, 2017

M-17-30

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

FROM: MICK MULVANEY
DIRECTOR, OFFICE OF MANAGEMENT AND BUDGET

MICHAEL KRATSIOS
DEPUTY ASSISTANT TO THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY

SUBJECT: FY 2019 Administration Research and Development Budget Priorities

American leadership in science and technology is critical to achieving this Administration's highest priorities: national security, economic growth, and job creation. American ingenuity combined with free-market capitalism have driven, and will continue to drive, tremendous technological breakthroughs. American inventions have fundamentally changed the course of human history: the incandescent light bulb, the airplane, satellite navigation, and the internet have improved the lives of millions of Americans and billions around the world. In spurring future advances, Federal funding of research and development (R&D) programs and research infrastructure can play a crucial supporting role.

This memorandum highlights the Administration's R&D priority areas for formulating FY 2019 Budget submissions to the Office of Management and Budget (OMB). These priorities should receive special focus in agency budget requests. This memorandum also provides additional guidance on balancing new priorities with existing demands, encouraging agencies to focus on R&D investments that best serve the American people and are budget neutral.

R&D Priority Areas

American Military Superiority

The American warfighter requires state-of-the-art tools and technologies to defeat a growing number of emerging threats. Agencies should invest in R&D that can support the military of the future, including in technologies related to the development of missile defense capabilities, a modern strategic deterrent, hypersonic weapons and defenses, autonomous and space-based systems, trusted microelectronics, and future computing capabilities. Historically, Federal R&D investments in military technology have led to the development of breakthrough technologies that have improved lives beyond the battlefield. While military R&D should serve the national defense first and foremost, the Administration recognizes the contributions of military R&D to the development of tremendously useful civil applications. Accordingly, we encourage programs with dual-use potential to be leveraged for Federal non-military advancements.

American Security

The security of Americans at home and abroad is paramount. Emerging threats against the American homeland compel the Federal Government to develop the technologies necessary to prevent terrorist attacks, mitigate the effects of both natural and adversarial threats and hazards, and secure American borders. Agencies should invest in R&D to increase the security and resilience of the Nation's critical infrastructure from both physical threats and cyber-attacks, which have increased rapidly in number and complexity in recent years. To develop stronger air, land, and maritime border defenses, agencies should invest in technologies that can support border surveillance and law enforcement capabilities that can detect and interdict illegal activity, including the smuggling of contraband and radioactive material. Special attention should be paid to R&D that can support the safe and secure integration into society of new technologies that have the potential to contribute significantly to American economic and technological leadership.

American Prosperity

Federal investment in R&D plays an important supporting role in America's economic growth. Properly executed, it can lead to tremendous job creation in new businesses and industries. Emerging technologies such as autonomous systems, biometrics, energy storage, gene editing, machine learning, and quantum computing, may well have the highest potential to drive the economy and create entirely new industries. Agencies should continue, and expand where necessary, efforts to focus on basic research in these areas and reduce funding overlaps with industry in later-stage research, development, and deployment of technologies. By providing the fundamental building blocks of new technological advances, the Government can empower the private sector to accelerate research discoveries from the laboratory to the marketplace. Working in tandem, the Government and the private sector can promote the nation's economic growth through innovation, and create new products and services for the American people.

American Energy Dominance

A consistent, long-term supply of lower-cost American energy will provide security through energy independence and help create a stable supply of high-paying jobs, while lower prices for electricity and fuel will spur American prosperity. Development of domestic energy sources should be the basis for a clean energy portfolio composed of fossil, nuclear, and renewable energy sources. Agencies should invest in early-stage, innovative technologies that show promise in harnessing American energy resources safely and efficiently. As initiated in the FY 2018 budget, Federally-funded energy R&D should continue to reflect an increased reliance on the private sector to fund later-stage research, development, and commercialization of energy technologies.

American Health

R&D investments in health-related fields both lengthen and improve the quality of American lives. As part of the Administration's commitment to improving health outcomes while lowering healthcare costs, agencies should give priority to biomedical programs that encourage innovation to prevent, treat, and defeat diseases, and maintain America's standing as a world leader in medicine. Agencies should prioritize R&D focused on solutions for an aging population, as well as on combating drug addiction and other public health crises. Alongside foundational biological research, agencies should support investments that develop tools and technologies with the potential to open new areas of discovery. In particular, agencies should prioritize R&D efforts that will lead to more efficient and effective healthcare.

R&D Priority Practices

Increasing Government Accountability and Efficiency

In order to maximize the impact of taxpayer dollars, the Administration is committed to improving the efficiency of Federal programs, eliminating government waste where it exists, and creating benefit for the American public. **When considering new research programs, agencies should ensure that the proposed programs are based on sound science, do not duplicate existing R&D efforts, and have the potential to contribute to the public good. Agencies should also identify existing R&D programs that could progress more efficiently through private sector R&D, and consider their modification or elimination where Federal involvement is no longer needed or appropriate. To the extent possible, quantitative metrics to evaluate R&D outcomes should be developed and utilized for all Federal R&D programs.**

Supporting Innovative Early-Stage Research

Basic and early-stage applied research are critical components of the American research enterprise and the basis of new technological development and commercialization. However, in the development of high-payoff technology, early-stage research often involves greater uncertainty and may not provide the economic incentive needed to attract private sector investment. Therefore, agencies should give priority to funding basic and early-stage applied research that, supplemented by private sector financing of later-stage R&D, can result in the development of transformative commercial products and services. Strong partnerships with the private sector will be critical to maximizing the efficacy of Federal funding. Furthermore, agencies should take advantage of innovation from the private sector, where possible, to adapt to Federal needs, rather than re-inventing solutions in parallel. Budget proposals should minimize focus on incremental efforts that are already being explored by industry.

Maximizing Interagency Coordination

The Administration's R&D priorities require coordinated interagency initiatives, which yield greater impact than that of individual agency activities. Agencies should support ongoing interagency initiatives and participate in applicable interagency coordination groups. Where appropriate, agencies should maximize the coordination, promotion, and planning of their R&D programs through the National Science and Technology Council (NSTC). The interagency process is encouraged to avoid duplicative efforts and maximize collaboration, including in assessments of the impact of R&D investments.

R&D Workforce and Infrastructure

Developing a Future-Focused Workforce

The Administration is committed to improving the technical training of the American workforce through Science, Technology, Engineering, and Math (STEM) education and apprenticeships. Emerging technologies will present tremendous opportunities for new job creation, but will also require a technically skilled and capable workforce to meet demand. In order to maintain American competitiveness and help ensure that the domestic workforce is available and qualified for the jobs of the future, agencies should incorporate STEM education, including computer science education, and workforce training opportunities into their programs. Agencies should give priority to policies and actions that place an emphasis on expanding the STEM workforce to include all Americans,

both urban and rural, and including women and other underrepresented groups in STEM fields. In order to track improvements in these areas, agencies should develop quantitative methods or metrics and collect data to analyze the effectiveness of the STEM programs.

Modernizing and Managing Research Infrastructure

State-of-the-art research infrastructure provides the United States with unique capabilities, ensuring that the American science and technology workforce has the capabilities it needs to conduct world-leading research. Maintaining and modernizing research infrastructure is critical to getting the best value out of R&D investments. Innovative partnership models involving other agencies, state and local governments, the private sector, academia, and international partners can help maximize utilization of underused facilities and lead to sharing the costs of new R&D facilities. As in previous years, proposals for the construction and operation of new facilities must be justified and balanced with funding for the operation and maintenance of existing facilities. Where feasible, agencies must take steps to reduce waste by disposing of facilities that are no longer needed. Agencies must also carefully manage long-term, multi-year investments, so that resources are not wasted at the end of the fiscal year.