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**Position Statement on the Fiscal Year 2016 Budget Request for the Department of Defense
Research, Development, Test and Evaluation (RDT&E) and
Science and Technology (S&T) Programs
Submitted by the ASME Department of Defense Task Force**

April 30, 2015

Introduction

The Department of Defense (DOD) Task Force of the Board of Government Relations Inter-Sector Committee on Federal R&D of the ASME Public Affairs and Outreach Sector is pleased to comment on the Fiscal Year (FY) 2016 budget request for the Research, Development, Test and Evaluation (RDT&E) and the Science and Technology (S&T) portion of the DOD budget request.

With over 140,000 members, ASME is a worldwide engineering society focused on technical, educational and research issues. It conducts one of the world's largest technical publishing operations, holds over 30 technical conferences and 200 professional development courses each year, and sets many industry and manufacturing standards. This position statement represents the considered judgment of experts from universities, industry, and members from the engineering and scientific community who contribute their time and expertise to evaluate budget requests and policy initiatives the DOD recommends to Congress.

Importance of National Security Research

For several decades, the United States has led the world in science, innovation, and defense technology. Investing in our nation's technical superiority has provided the U.S. with security and a number of advanced technologies that have benefited both the Department of Defense and the general public. The 2014 Quadrennial Defense Review recognizes that "innovation is paramount given the increasingly complex warfighting environment we expect to encounter." While the U.S. maintains a slight lead in research and discovery, many recent studies have shown that this lead is quickly eroding. Other nations are investing heavily in research and development, enabling the next generation of innovative ideas and technology to be developed overseas, to the detriment of the U.S. economy and national security. We must give more attention to the vital role that DOD S&T programs play in meeting this challenge.

Our statement addresses three (3) primary funding areas: Science and Technology (S&T); Operational Test and Evaluation (OT&E); and the University Research Initiative (URI). Our statement also outlines the consequences of inadequate funding for defense research. These include a degraded competitive position in developing advanced military technology versus potential competitors that could harm the United States' global, economic, and military leadership.

DOD Request for RDT&E and Defense Science and Technology

The Administration requested \$69.9 billion for the Research, Development, Test and Evaluation (RDT&E) portion of the FY2016 DOD budget, a 9.3 percent increase from the FY 2015 enacted

amount of \$64 billion. This is still significantly lower than the final FY 2011 appropriated level of \$76.1 billion. These resources are used mostly for developing, demonstrating, and testing weapon systems, such as fighter aircraft, satellites, and warships. The FY2016 budget request for the Defense Science and Technology (S&T) portion of RDT&E is \$12.2 billion, a 0.11 percent increase from the FY 2015 funding level.

If enacted, the FY 2016 budget request for Defense S&T would reduce the investment in critical areas of national security research. We strongly urge Congress to consider additional resources to ensure that funding for the S&T portion of the DOD budget at least maintain pace with inflation. While the 2014 Quadrennial Defense Review states that the DOD can manage the current risks with the proposed budget, the Review expresses concern with addressing these risks should the fiscal environment not improve.

A relatively small fraction of the Research Development Test & Evaluation (RDT&E) budget is allocated to S&T programs. While the FY 2016 S&T request represents only about 17.5 percent of the RDT&E total, these accounts support all of the new knowledge creation, invention and technology developments for the military. Unfortunately, Basic Research (6.1) would receive a significant reduction.

Basic Research (6.1)

Basic Research accounts would decrease 8.3 percent to \$2.09 billion for FY 2016. While basic research accounts comprise only a small percentage of RDT&E funds, the programs that these accounts support are crucial to fundamental scientific advances and for maintaining a highly skilled science and engineering workforce. Maintaining a skilled workforce, in particular, is critical given the large turnover that will occur in the next few years in key science and engineering industries. The National Science Foundation's 2014 Science and Engineering (S&E) Indicators Report shows that the US severely lags the rest of the world, in both real terms and on a percentage basis, with only 5 percent of first university degrees being granted in engineering versus 31 percent in China¹. Combined with the NSF's findings that the average age and retirement rate of the engineering workforce will continue to rise over the next few years², the Task Force reiterates the need for robust S&T programs at DOD as critical to our economic competitiveness and national security.

Basic research accounts support science and engineering research and graduate education at universities in all 50 states. Current high-technology weapon systems, from advanced body armor, vehicle protection system, to the global positioning satellite (GPS) system, have their origin in fundamental discoveries generated in these basic research programs. We must invest in basic research now, so that the fundamental scientific results will be available to create innovative solutions for future defense challenges. In addition, many of the technical leaders in corporations and government laboratories that are developing current weapon systems were educated under basic research programs funded by DOD. Failure to invest sufficient resources in basic, defense-oriented research will reduce innovation and weaken the future scientific and engineering workforce. Several of the proposed reductions to individual S&T program elements are dramatic and could have negative impacts on future military capabilities. The Task Force urges Congress to build upon the President's request of \$2.09 billion for Basic Research (6.1).

Applied Research (6.2)

¹ Table 2-42: <http://www.nsf.gov/statistics/seind14/content/chapter-2/at02-42.pdf>

² Table 3-12: <http://www.nsf.gov/statistics/seind14/content/chapter-3/at03-12.pdf>

Applied Research would be increase 1.4 percent to \$4.7 billion in FY 2016. The programs supported by these accounts apply basic scientific knowledge, often derived from basic research programs, to support important defense needs. Applied research programs may involve laboratory proof-of-concept and are generally conducted at universities, government laboratories, or by small businesses. Many successful demonstrations led to the creation of small entrepreneurial companies. Some devices created in these defense technology programs have dual use, such as GPS, and the commercial market far exceeds the defense market. However, without initial support by Defense Applied Research funds, many of these companies would not exist. Like 6.1 Basic Research, 6.2 Applied Research has also funded the education of many of our best defense industry engineers. Failure to properly invest in applied research would stifle a key source of technological and intellectual development as well as stunt the creation and growth of small entrepreneurial companies. The Task Force urges Congress to support a budget with consistent and notable increases for Applied Research (6.2) in FY 2016 and beyond.

Advanced Technology Development (6.3)

Advanced Technology Development would experience a 2.6 percent increase, from \$5.3 billion in FY 2015 to \$5.46 billion in FY 2016. These resources support programs where readily available technology can be transitioned into weapon systems. The real system level demonstrations funded by these accounts allow companies to incorporate new technologies into weapon system programs. This line item funds research in a range of critical material technologies, including improved body armor to protect troops against improvised explosive devices (IEDs) and in developing light weight armor for vehicle protection. With the problems faced in Iraq and Afghanistan with IEDs and the need for improved armor systems, it does not seem wise to cut materials research. Fortunately, in the past few years the United States Congress has recognized that such cuts are not in the best interest of the country, and has appropriated additional resources to maintain healthy S&T programs in critical technologies. The Task Force again urges Congress to support a budget consistent and significant increases for Advanced Technology Development (6.3) in FY 2016 and beyond.

Defense Wide Research

S&T funding for Defense Wide account activities would increase by 6 percent to \$5.57 billion. With the exception of the Air Force, each individual service branch would experience a reduced budget under the President's request – with the largest cuts proposed for Army accounts at 13.9 percent. Navy S&T funds would decline 1.9 percent.

The Administration has requested a 1.95 percent increase for the Defense Advanced Research Projects Agency (DARPA) at \$2.97 billion for FY 2016. However, only the Applied Research account would receive an increase of 5.4 percent to \$1.2 billion. Basic research at DARPA would decrease 0.8 percent. Advanced Technology Development would also decrease 0.2 percent. The Task Force encourages Congress to increase the President's request of \$5.57 billion for Defense Wide research agencies.

Operational Test and Evaluation (OT&E) Request

Funds for the Operational Test and Evaluation (OT&E) function help ensure that new technology and weapon systems are thoroughly tested, effective, and safe for our troops. The FY 2016 request of \$170.5 million represents a reduction of 18 percent from the FY 2015 appropriated amount of \$208 million. This account has faced significant reductions over the past few years based upon historical standards (the 2005 appropriated amount was \$310 million). The Task Force urges Congress to provide strong funding for OT&E in FY 2016.

University Research Initiative (URI) Request

The University Research Initiative (URI) supports graduate education in Mathematics, Science, and Engineering. The program would see a funding reduction to \$330.5 million in FY 2016 from \$370.6 million in FY 2015, an 10.8 percent reduction. Within the FY 2016 request, the Administration has requested a decrease of 19 percent for the Army, 13 percent for the Navy, and 3.6 percent for the Air Force URI account.

Sufficient funding for the URI is critical to educating the next generation of engineers and scientists for the defense industry. A lag in program funds will have a serious long-term negative effect on our ability to develop a highly skilled scientific and engineering workforce to build weapons systems for years to come. While the DOD is facing difficult budget pressures and significant cuts, these pressing needs should not be allowed to squeeze out the small but very important investments required to create the next generation of highly skilled technical workers for the American defense industry. The Task Force urges Congress to provide funding of \$398 million, consistent with the FY 2014 level of funding, for URI programs in FY 2016.

Reduced S&T Funding Threatens America's National Security

Science and technology have played a historic role in creating an innovative economy and a highly skilled workforce. Study after study has linked over 50 percent of our economic growth over the past 50 years to technological innovation. The DOD information sciences and basic research have a large role in producing technological innovation and workforce development. The DOD, for example, funds 40 percent of all engineering research performed at our universities. U.S. economic leadership depends on the S&T programs that support the nation's defense base, promote technological superiority in weapons system, and educate new generations of scientists and engineers.

U.S. national security is also directly impacted by these investments. There is a general belief among defense strategists and some members of Congress that the United States must have the industrial base to develop and produce the military systems required for national defense. A number of disconcerting trends, such as outsourcing of engineering activities and low participation of U.S. students in science and engineering, threaten to create a critical shortage of native, skilled, scientific and engineering workforce personnel needed to sustain our industrial base. Programs that boost the available number of highly educated workers who reside or are born in the U.S. are important to stem our growing reliance on foreign nations to fill the ranks of our defense industries and to ensure that we continue to produce the innovative, effective defense systems of the future.

Recommendations

In conclusion, we thank the committee for its ongoing support of Defense S&T. This Task Force is aware of the difficult choices that Congress must make within a tight budgetary environment. We believe, however, that there are critical shortages in the DOD S&T areas, particularly in those that support the basic research and technical education that are critical to U.S. military in the global war on terrorism and defense of our homeland.

The Task Force recommends the following:

- We urge the subcommittee to support increased funding across the board for Defense S&T (6.1, 6.2, and 6.3) programs, OT&E accounts, and URI programs in FY 2016. We urge Congress to continue to work towards the recommendations of the *Rising Above the Gathering Storm* report, which called for a 10 percent increase in defense basic research.

- This statement represents the views of the ASME Department of Department of Defense (DOD) Task Force of the Board of Government Relations Inter-Sector Committee on Federal R&D of the ASME Public Affairs and Outreach Sector and is not necessarily a position of ASME as a whole.**