

DEPARTMENT OF DEFENSE APPROPRIATIONS FOR FISCAL YEAR 2018

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

NONDEPARTMENTAL WITNESSES

[CLERK'S NOTE.—The subcommittee was unable to hold hearings on nondepartmental witnesses. The statements and letters of those submitting written testimony are as follows:]

PREPARED STATEMENT OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION

The American Psychological Association (APA) is a scientific and professional organization of more than 115,000 psychologists and affiliates.

For decades, psychologists have played vital roles within the Department of Defense (DoD), as providers of clinical services to military personnel and their families, and as scientific researchers investigating mission-targeted issues ranging from airplane cockpit design to counter-terrorism to Post-Traumatic Stress Disorder (PTSD) and Traumatic Brain Injury (TBI). More than ever before, psychologists today bring unique and critical expertise to meeting the needs of our military and its personnel. APA's testimony focuses on (1) reversing Administration cuts to the overall DoD Science and Technology (S&T) budget; (2) maintaining support for important behavioral sciences research within DoD; (3) continuing support for defense health research; and (4) addressing TRICARE cuts and contractor issues regarding mental health treatment.

(1) Reverse Fiscal Year 2018 Proposed Cuts to DoD Science & Technology Account

In line with the Coalition for National Security Research (CNSR), of which APA is one of 90 member organizations, we urge the Subcommittee to reverse the Administration's proposed step backwards and instead provide \$14.5 billion for DoD overall S&T in fiscal year 2018.

APA is concerned that the Administration's fiscal year 2018 request slashes the overall defense science and technology account (S&T) by 5.8 percent. Across the board, except for an increase in Navy basic (6.1) research, all of the critical Army, Navy, and Air Force basic and applied research (6.2) and advanced technology development (6.3) accounts would be cut. Within the Army research program alone, greater than 20 percent of both Army applied and advanced technology research support would be slashed in fiscal year 2018. Though APA is pleased to see the Administration propose a healthy 9.7 percent increase in fiscal year 2018 for the Defense Advanced Research Projects Agency (DARPA), this Presidential Budget Request fails to advance vital research throughout DoD, and the request would diminish our Nation's ability to keep up with scientific and technological innovations.

(2) Maintain Support for DoD Behavioral Science Research in Fiscal Year 2018

—“People are the heart of all military efforts. People operate the available weaponry and technology, and they constitute a complex military system composed of teams and groups at multiple levels. Scientific research on human behavior is crucial to the military because it provides knowledge about how people work together and use weapons and technology to extend and amplify their forces.”

—Human Behavior in Military Contexts

—Report of the National Research Council

Just as a large number of psychologists provide high-quality clinical services to our military service members stateside and abroad (and their families), psycho-

logical scientists within DoD conduct cutting-edge, mission-specific research critical to national defense. Within the S&T program, APA encourages the Subcommittee to follow recommendations from the National Academies and the Defense Science Board to fund priority research in the behavioral sciences in support of national security. Psychological scientists address a broad range of important issues and problems vital to our national defense, with expertise in modeling behavior of individuals and groups, understanding and optimizing cognitive functioning, perceptual awareness, complex decisionmaking, stress resilience, recruitment and retention, and human-systems interactions.

Within DoD, the majority of behavioral, cognitive and social science is funded through the Army Research Institute for the Behavioral and Social Sciences (ARI) and Army Research Laboratory (ARL); the Office of Naval Research (ONR); and the Air Force Research Laboratory (AFRL), with additional, smaller human systems research programs funded through the Office of the Secretary of Defense (OSD) and DARPA. The military service laboratories provide a stable, mission-oriented focus for science, conducting and sponsoring basic (6.1), applied/exploratory development (6.2) and advanced development (6.3) research. All of the services fund human-related research in the broad categories of personnel, training and leader development; warfighter protection, sustainment and physical performance; and system interfaces and cognitive processing.

(3) Support Defense Health Research and Programs Promoting Servicemember Mental Health and Well-Being

DoD also supports psychological research and programming beyond its service laboratories. APA urges the Subcommittee to fully fund Health Affairs and other offices addressing research and programming in the crucial areas of Servicemember mental health and well-being—particularly efforts addressing suicide prevention. APA, in line again with CNSR, requests that the Subcommittee increase its support for DoD's Peer-Reviewed Congressionally Directed Medical Research Programs from \$1.28 billion in fiscal year 2017 to \$1.33 billion in fiscal year 2018. The Subcommittee has shown extraordinary leadership in ensuring that these research programs are continued in mission-critical areas such as PTSD and TBI.

(4) Address TRICARE Cuts and Contractor Issues

As an organization that supports military personnel, veterans, and their families, as well as the psychologists who serve them, we are concerned about the Administration's proposed fiscal year 2018 cut to TRICARE, and about proposed reimbursement rate cuts by Humana and Health Net Federal Services (HNFS) for TRICARE mental health providers. These may have significant impacts on network adequacy and access to mental healthcare for highly-stressed military-connected families and communities.

As TRICARE assesses whether Humana and HNFS are complying with network adequacy obligations, we hope DoD considers the markers we hold as true indicators of adequacy, including: the number of psychologists a beneficiary has to call before getting an appointment, how long it takes to get an appointment, and how far the beneficiary has to travel for treatment. Even requiring beneficiaries to change mental health professionals (because the one with whom they have developed trust and rapport has left the network) is disruptive, and sometimes untenable. This is especially true for those who have developed a relationship with someone with the expertise to handle diagnoses such as PTSD.

[This statement was submitted by Howard Kurtzman, PhD, Acting Executive Director for Science, American Psychological Association.]

PREPARED STATEMENT OF THE CALGON CARBON CORPORATION

Chairman Cochran, Ranking Member Durbin, and members of the Senate Defense Appropriations Subcommittee, thank you for the opportunity to submit outside witness testimony. I am writing to tell you about Calgon Carbon Corporation, which is a world leader in the development and manufacturing of granular activated carbon products that make water safer and cleaner. More specifically, I am writing to describe the work Calgon Carbon is doing to remediate groundwater and drinking water contamination issues on U.S. military bases, as it pertains to perfluorinated chemicals (PFCs—including PFOA/PFOS).

CALGON CARBON CORPORATION

Calgon Carbon is a world leader in the development and manufacturing of technologies for the purification of drinking water, wastewater, odor control, pollution

abatement, and a variety of industrial and commercial manufacturing and food processes. We currently offer more than 100 different Activated Carbon products that are used in over 700 distinct applications from purifying air and drinking water, to purifying foods and pharmaceuticals, to separating gas and removing mercury emissions from power plants. Calgon Carbon's cost-effective, environmental remediation/recycle programs combine the proper mix of an effective activated carbon, ingenious adsorption systems, and professional field/technical services into economically efficient solutions for users.

THE ISSUE

Chemical contamination in ground water, and the potential for those chemicals to end up in drinking water of Department of Defense (DoD) facilities and nearby communities, is a significant concern across the DoD complex. Regulated chemicals are routinely monitored and efforts are taken to reduce their impact on the environment and human health. However, a growing list of emerging contaminants, many of which are not regulated but pose a significant risk to the environment and human health, are being identified in ground water and drinking water used by DoD and surrounding communities.

Congress and DoD have expressed concern about actual and potential instances of contaminated drinking water on and around military bases. For example, the use of firefighting foams during training exercises and actual incidents caused perfluorinated chemicals to enter the ground and drinking water supply.

Some of these emerging contaminants are making headlines across the country—including perfluorinated chemicals, or PFCs, (a group of chemicals used in fire fighting foams whose negative environmental and health impacts were studied as long ago as 1979), trichloroethylene/perchloroethylene, or TCE/PCE, (chemicals used in solvent degreasing operations, pharmaceutical chemicals (from improperly disposed prescription medication and other sources), and many more.

The environmental and human health issues arising from these situations, which are summarized in a 2015 report¹—prepared by the Association of State and Territorial Solid Waste Management Officials (ASTSWMO) Federal Facilities Research Center's Remediation and Reuse Focus Group with assistance from the U.S. Environmental Protection Agency—challenge DoD to promptly remove these chemicals from the ground water and drinking water.

IMPACT ON DOD

Some of these emerging contaminants—like PFCs—are making headlines across the country raising health and safety concerns of individuals on and off the military installation and distracting installations from their primary mission. In addition, the situations represent a potentially significant investment by DoD for corrective action.

The decentralized nature of DoD service organization acquisition complicates the implementation of optimum solutions for addressing these challenges in a technically as well as economically effective manner. Acquisition offices are faced with the need to procure and implement appropriate technology solutions and are, all too often, promised a solution which does not satisfy the requirements in a technically effective or economically efficient manner.

The need exists for a demonstration of a reliable, technically effective, and economically efficient technology solution, made in the U.S. by a U.S. manufacturer and from U.S. materials, to support smart acquisition action.

MOVING FORWARD

To support optimal acquisition initiatives related to technically effective and economically efficient solutions for PFC water contamination, a demonstration project is appropriate to address the requirements across all DoD service organizations (Air Force, Army, Marine Corps, and Navy) at sites across the U.S. One of the technologies that has emerged as technically effective and economical is Granular Activated Carbon (GAC). This technology is being used at a number of DoD installations to address the PFC contamination issues and Calgon Carbon has been a leading provider of those GAC solutions for DoD, municipalities, and manufacturing companies for more than 15 years. Calgon Carbon is the world's largest manufacturer of GAC and all of those materials used for PFC applications are manufactured in the U.S.—at plants in Kentucky and Mississippi.

¹ <https://clu-in.org/download/contaminantfocus/pops/POPs-ASTSWMO-PFCs-2015.pdf>.

Calgon Carbon manufactures more than 100 different GAC products—each focused toward a particular end use application. Since not all GAC products are the same, the selection of the proper GAC product is critical to achieve the desired technical and economic benefit. This has been determined for PFC water contamination and we continue to conduct research on how to improve and optimize our products for DoD benefit.

However, the challenge to DoD acquisition offices is exacerbated by the fact that, while there is high quality and effective GAC products manufactured and available from Calgon Carbon and two additional U.S. based manufacturers, the U.S. market (and other world markets) are flooded with low quality GAC materials available from Chinese and other Southeast Asia nations. In many instances, these materials do not work in PFC applications. In fact, the U.S. Internal Trade Commission has imposed a tariff on Chinese manufactured GAC because of their unfair trade practices in the U.S.—but unscrupulous vendors are circumventing the tariff.

The need exists for a demonstration of a reliable, technically effective, and economically efficient technology solution, made in the U.S. by a U.S. manufacturer and from U.S. materials, to support smart acquisition action.

A demonstration of U.S. produced GAC products (using U.S. based raw materials) for the removal of PFC, and other chemical contaminants, from ground water and drinking water impacting the environmental and human health associated with DoD facilities across the U.S. would advance DoD interests and optimize its technical approach and economic investment. The results of the demonstration will allow for more accurate budgeting and provide the rationale for a more proactive approach across DoD to implement technologies to address the PFC challenge.

Such a demonstration would address:

- removal of PFCs using U.S. produced GAC from groundwater and drinking water;
- effectiveness of U.S. produced GAC across DoD service organizations as well as across various site conditions throughout the U.S.;
- capacity to deliver fully operable systems to support the DoD mission;
- breadth and depth of technical staff to support DoD operational needs.

Chairman Cochran and Ranking Member Durbin, we greatly appreciate the opportunity to provide this input and stand ready to answer any of your questions and to move deliberately on our recommendation.

[This statement was submitted by John W. (Jack) Adams, Director of Government Affairs, Calgon Carbon Corporation.]

PREPARED STATEMENT OF THE COALITION FOR NATIONAL SECURITY RESEARCH

Chairman Cochran, Ranking Member Durbin, and distinguished Members of the subcommittee, thank you for the opportunity to submit outside witness testimony as you begin to craft the fiscal year 2018 Defense Appropriations bill. On behalf of the Coalition for National Security Research (CNSR), we respectfully request at least \$2.3 billion for the Defense basic research program elements (PE), \$14.5 billion for the Defense Science & Technology (S&T) program, \$3 billion for the Defense Advanced Research Projects Agency (DARPA), and \$1.3 billion for the Peer Reviewed Medical Research Programs among other defense medical research programs as outlined in this testimony. Throughout this statement you will find charts detailing specific recommendations for CNSR's priority PEs for fiscal year 2018.

CNSR is a broad-based alliance of nearly 90 research organizations including the nation's top research universities and institutes, scientific and professional organizations, and non-profits committed to advocating for a strong Defense S&T enterprise. Based on the most recent data available, coalition members performed more than \$4.7 billion in Department of Defense (DoD) sponsored scientific research and technology development. Broadly, colleges and universities performed 23 percent of all DoD sponsored scientific research including nearly 50 percent of all DoD sponsored basic scientific research.

With the Trump Administration priority of increasing defense spending to help rebuild and restore the U.S. military, most people naturally believe the funding is necessary for building weapons systems and platforms, such as aircraft carriers, fighter planes and providing our military with the necessary equipment to be the world's most dominate fighting force. While each of these activities is vitally important, we urge the subcommittee to continue to support funding for the Defense scientific research and development that underpins these aircraft carriers, fighter planes and our military's equipment but just as important provide for research and discoveries that will enable the warfighter for 2030 and beyond where he/she will face threats that we can only fear today.

Our fiscal year 2018 funding recommendations stem from Innovation: An American Imperative (Innovation Imperative), a statement signed by the CEOs of Northrop Grumman, Lockheed Martin, Boeing, Microsoft, and endorsed by over 500 other leading organizations from industry, research universities, and science and engineering organizations. Specifically, the Innovation Imperative urges Congress to end sequestration and provide steady and sustained growth in funding of at least 4 percent for basic scientific research at numerous agencies, including the DoD. As a cosigner of the Innovation Imperative, CNSR believes that if the U.S. is to maintain its technological superiority, we must prioritize Federal scientific research investments and support policies that promote innovation. With countries like China more than tripling their spending on research and development over the past 17 years, now more than ever we need to support basic scientific research to enable discoveries and innovations that will provide the necessary military capabilities of tomorrow and help offset any technological innovations made by competitor nations. It is vital to our national security that the United States maintains its technical superiority; investing in Defense basic research and Defense S&T now will ensure our national security well into the future.

DEFENSE BASIC RESEARCH PE RECOMMENDATIONS

Defense basic research provides the seed corn that enables discoveries that have led to paradigm shifts in the military's technological capabilities as well as trains our next generation science & engineering workforce. Basic scientific research is sometimes conducted with no specific technological product in mind, but has still led to the development of many tools used by today's warfighters. Night vision, lasers, stealth technology, missile defense capabilities, unmanned aerial and underwater vehicles, global positioning systems, and precision guided munitions all trace their roots to basic Defense research, and have helped ensure our national security for decades. We cannot underinvest in the long-term basic research that will provide the military with the foundation for technologies of tomorrow that will ensure our technological and military superiority in the decades ahead.

While this subcommittee has shown strong support for Defense basic research, we remain concerned about overall funding levels. While we are appreciative that the fiscal year 2017 Omnibus Appropriations bill did not align with the proposed reductions to Defense basic research in the fiscal year 2017 budget request, we remain concerned that Defense basic research funding has not been trending in a positive direction in recent years. If these funding trends continue, we are concerned that the Defense research enterprise will be unable to support the innovative research that will enable scientific discoveries allowing for continued U.S. technological superiority in the future. In addition, we are concerned that we will not be able to support the world's most productive and innovative workforce if Defense basic research funding continues to decline as basic research continuously attracts the best and brightest minds.

Making significant breakthroughs in basic scientific research requires sustained long-term growth in funding that keeps pace with inflation and other cost-driving factors. For two of DoD's key basic research programs, we are seeing evidence of flat and declining support. Since fiscal year 2014, the Multidisciplinary University Research Initiative (MURI) program has only been able to support slightly over 20 projects on an annual basis. Each year, there are roughly between 50 and 60 proposals that go unfunded. Additionally, fiscal year 2017 awarded funding declined by 2.5 percent from fiscal year 2014 and saw a decrease in university participation of approximately 16 percent. The MURI program is responsible for sponsoring research that led to the foundations in multidisciplinary research, such as artificial intelligence, created new possibilities for nano-manufacturing, and the software that formed the basis of computer-aided control of unmanned systems or military drones. From our perspective, underfunding this program could result in the military technologies of tomorrow being discovered by other nations willing to invest in fundamental scientific research.

Additionally, the Defense University Research Instrumentation Program (DURIP) sponsors the acquisition of state of the art equipment needed to support cutting edge defense research to enable discoveries for DoD technologies. Over the past three fiscal years, there has been a steady decline in support for DURIP. Awarded funding has declined by more than 44 percent from fiscal year 2015 to fiscal year 2017. Over the same time period, the number of researchers funded has dropped by more than 65 investigators and the number of institutions participating in the program has been reduced by more than 32 percent. DoD relies on colleges and universities to perform nearly 50 percent of its sponsored basic scientific research. Given the nature of DoD research, unless there is sufficient support provided to ac-

quire the necessary equipment to conduct DoD-needed scientific research, we are potentially jeopardizing future scientific discoveries that will ensure U.S. military technical superiority in the decades ahead.

We offer the following recommendations for the key Defense basic research PEs that serve as the foundation of the innovation pipeline.

[\$ in Thousands]

Agency/Account	Program Element (PE)	Fiscal Year		
		2016 Enacted	2017 Enacted	2018 Recommendation
Army RDT&E	Defense Research Sciences	279,118	293,116	304,841
Army RDT&E	University Research Initiatives	72,603	69,166	71,933
Army RDT&E	University and Industry Research Centers	104,340	112,280	116,771
Navy RDT&E	University Research Initiatives	146,196	121,714	146,196
Navy RDT&E	Defense Research Sciences	506,553	422,748	506,553
Air Force RDT&E	Defense Research Sciences	374,721	380,812	396,044
Air Force RDT&E	University Research Initiatives	141,754	150,044	156,046
Air Force RDT&E	High Energy Laser Research Initiatives	13,778	14,168	14,735
Defense-Wide RDT&E	DTRA Basic Research Initiatives	38,436	35,436	36,853
Defense-Wide RDT&E	Basic Research Initiatives	71,940	68,154	70,880
Defense-Wide RDT&E	National Defense Education Program	54,355	79,345	82,519

We would like to mention specific concerns with reductions in funding for the Navy's basic research programs. The fiscal year 2017 Omnibus Appropriations bill reduced Navy basic research funding by more than 16 percent or \$108 million from fiscal year 2016 enacted. Navy basic research funding provided in fiscal year 2017 is below levels appropriated in fiscal year 2010 enacted. This reduction came despite increases in the basic research accounts for the Army (+3.8 percent), Air Force (+2.8 percent) and Defense-Wide (+6.8 percent).

Specifically, the fiscal year 2017 Omnibus funds the Navy's University Research Initiatives program at levels below fiscal year 2012 enacted. This will limit the program's flexibility in supporting high-value scientific research of importance to the Navy. In addition, the Navy's Defense Research Sciences program is funded below fiscal year 2011 levels in the fiscal year 2017 Omnibus and reduced by more than \$83 million relative to fiscal year 2016 enacted. These reductions could result between 160 and 500 scientific research projects not being funded. This will likely impact research in key areas such as unmanned air vehicles, environmental quality, propulsion hydromechanics, power generation, human systems, bioinspired autonomous and surveillance systems, casualty care and management, and casualty prevention. Furthermore, the Navy may have to reduce its STEM activities, sponsor fewer graduate fellowships at HBCUs and decrease support for the Young Investigator Program.

Before new technologies can be developed, new knowledge must be created. This requires sustained investment across scientific disciplines to foster the internal (laboratory) and external (academic and industry) workforce and infrastructure that can anticipate and support the development of disruptive technologies while also ensuring superior knowledge of the battlespace environment, both above and below the ocean surface.

With much of the world's population living on or near the coast, 90 percent of global trade carried by ships, increasing access to the Arctic Ocean, a rapidly changing ocean environment—warming and changing circulation and weather patterns—and new anti-access, area denial challenges in critical regions, the need to advance and protect US maritime superiority is clear. We must ensure the Navy has the resources to support the necessary basic research required to develop the technologies that will help ensure the U.S. maintains its technological superiority in the seas.

APPLIED RESEARCH AND DEFENSE S&T RECOMMENDATIONS

Fundamental scientific research is just the first step in creating new military technologies. Researchers and scientists must apply the fundamental knowledge learned through basic research in order to solve military problems and develop the systems and components for potential solutions. The private sector is unable to assume the risk of applying fundamental knowledge to field the military technologies of tomorrow. In order to ensure that discoveries made through basic research are translated into practical military applications, we offer the following recommendations for our priority applied research PEs and overall S&T.

[\$ in Thousands]

Agency/Account	Program Element (PE)	Fiscal Year		
		2016 Enacted	2017 Enacted	2018 Recommendation
Army RDT&E	Materials Technology	68,314	82,533	General Support
Army RDT&E	Sensors and Electronic Survivability	58,374	51,109	General Support
Army RDT&E	Advanced Weapons Technology	38,028	53,803	General Support
Army RDT&E	Advanced Concepts and Simulation	27,862	30,688	General Support
Army RDT&E	Human Factors Engineering Technology	23,681	23,671	General Support
Army RDT&E	Computer and Software Technology	12,656	13,811	General Support
Army RDT&E	High Performance Computing Modernization	222,159	222,190	General Support
Navy RDT&E	Marine Corps Land Force Technology	51,708	69,765	General Support
Navy RDT&E	Common Picture Applied Research	42,551	41,185	General Support
Navy RDT&E	Warfighter Sustainment Applied Research	45,056	50,467	General Support
Navy RDT&E	Electromagnetic Systems Applied Research	115,051	120,941	General Support
Navy RDT&E	Ocean Warfighting Environmental Applied Research	72,252	81,618	General Support
Navy RDT&E	Future Naval Capabilities Applied Research	179,686	157,103	General Support
Navy RDT&E	Manufacturing Technology Program	57,074	56,712	General Support
Navy RDT&E	Advanced Undersea Prototyping	N/A	59,479	General Support
Air Force RDT&E	Materials	133,734	159,152	General Support
Air Force RDT&E	Human Effectiveness Applied Research	110,530	111,647	General Support
Air Force RDT&E	Aerospace Sensors	152,291	162,674	General Support
Air Force RDT&E	Directed Energy Technology	115,604	127,163	General Support
Air Force RDT&E	Dominant Information Sciences and Methods	169,409	166,650	General Support
Air Force RDT&E	High Energy Laser Research	41,855	42,300	General Support
Defense-Wide RDT&E	Cyber Security Research	13,701	12,183	General Support
Defense-Wide RDT&E	Defense-Wide Manufacturing S&T Program	156,743	158,398	General Support
Defense-Wide RDT&E	Engineering Science and Technology	18,341	22,659	General Support
—	Overall Defense Science & Technology Program	13,250,806	14,011,229	14,571,678

The coalition would like to specifically highlight its support for the Defense-Wide Manufacturing Science and Technology PE, which provides resources for DoD's contribution to the Manufacturing USA Network. The Network acts as a catalyst to spur private investment in our national security technology. In fact, every Federal dollar invested in the Manufacturing USA Network so far has spurred \$2.05 of private sector investment into technologies to further our national security. Initiatives such as Manufacturing USA allow the Federal Government to leverage its partnerships with industry to enable innovation throughout the entire manufacturing ecosystem, ensuring the U.S. is able to domestically manufacture the world's most respected and capable weapons systems, such as the F-35 fighter jet, the M1-A2 tank, and the Ohio Class submarine, while also securing our economic prosperity.

DARPA RECOMMENDATION

DARPA's ability to create truly revolutionary new capabilities is well documented. The Internet, stealth technology, nearly all the technologies found in mobile phones and more recently an upper-limb prosthesis for military amputees inspired by the limb that Luke Skywalker wore in the Star Wars films. The U.S. needs organizations like DARPA that specialize in undertaking high-risk, high-reward research and development to create game-changing technologies. DARPA's unique research model helps ensure that we remain ahead of our adversaries.

We recommend a funding level of \$3 billion for DARPA in fiscal year 2018.

DEFENSE MEDICAL RESEARCH RECOMMENDATIONS

In order to maintain a strong military, the U.S. must have healthy families and soldiers. It is imperative for DoD to contribute to curing diseases that affect not only men and women in the military, but also the public since we have an all-volunteer force. Defense medical research programs help ensure the United States has the medical technologies necessary to enable military readiness and serve those who have been wounded on the battlefield. Developments in battlefield medicine also contribute to significant advances which benefit civilian trauma-related medical practice, such as regenerative medicines, vaccine developments, battlefield dressings, and one-handed tourniquets. We offer the following recommendations for CNSR priority Defense medical research PEs.

[\$ in Thousands]

Agency/Account	Program Element (PE)	Fiscal Year		
		2016 Enacted	2017 Enacted	2018 Recommendation
Army RDT&E	Medical Technology	76,853	79,111	82,275
Army RDT&E	Medical Advanced Technology	108,584	107,365	111,660
Army RDT&E	Medical Systems Advanced Development	31,962	54,120	56,285
DHP RDT&E	Research, Development, Test and Evaluation Research	10,996	9,097	9,461
DHP RDT&E	Exploratory Development	59,471	58,517	60,858
DHP RDT&E	Undistributed Medical Research/Peer-Reviewed/CDMRPs	1,150,800	1,279,200	1,330,368

Again, thank you for allow us to submit outside testimony as you begin developing the fiscal year 2018 Defense Appropriations bill. Please do not hesitate to contact us if we can be of any assistance during the fiscal year 2018 appropriations process.

PREPARED STATEMENT OF THE CONSORTIUM FOR OCEAN LEADERSHIP

On behalf of the Consortium for Ocean Leadership (COL), I appreciate the opportunity to share our funding priorities for the fiscal 2018 Defense Appropriations Act. COL represents the nation's leading ocean science, technology, and education institutions, with the mission to shape the future of ocean science. Ocean science strengthens our national security, supports a safe and efficient marine transportation system, underpins our economy, and furthers understanding of complex ocean and coastal processes important to our everyday lives—today and tomorrow. Aligning with like-minded security science organizations and coalitions, we respectfully request the Subcommittee provide no less than \$2.3 billion for the Defense basic research program elements, \$14.5 billion for the Defense Science & Technology program, and \$3 billion for the Defense Advanced Research Projects Agency (DARPA). To ensure our nation can maintain maritime battlespace superiority in an increasingly unstable world, COL respectfully requests the subcommittee oppose the significant cuts in funding proposed in the President's fiscal year 2018 budget request and provide the Navy with no less than the science and technology funding levels appropriated in the fiscal year 2016 omnibus spending bill, which were \$671 million for basic research (6.1), \$967 million for applied research (6.2), and \$697 million for advanced technology development (6.3). Ensuring robust and sustained funding for Navy science and technology programs and partnerships (which represent a small fraction of the overall Navy budget) is key to ensuring the culture of innovation and initiative that DoD has prioritized (internally as well as with its non-Federal research partners). It is also needed to stem the erosion of the U.S. competitive advantage in ocean sciences and understanding and exploiting the ocean environment (USN Task Force Ocean Problem Statement).

Federal investment is required to meet the endstate goals of the U.S. Navy's Task Force Ocean:

- Navy-relevant ocean science infrastructure in the U.S. remains measurably ahead of our competitors
- The U.S. Navy's capability and capacity to understand and exploit the ocean environment remain measurably ahead of our competitors
- The U.S. Navy's capability and capacity to exploit the full range of science and technology development in the U.S. advance through increased permeability between the Navy and government, academia, and the private sector

The fiscal year 2017 omnibus appropriations bill cut Navy's basic research funding more than 16 percent, below the fiscal year 2010 enacted funding level. The fiscal year 2017 omnibus funded the Navy's University Research Initiative below fiscal year 2012 enacted funding, and Navy's Defense Research Sciences fiscal year 2017 funding fell below fiscal year 2011 levels (\$83 million cut from fiscal year 2016 funding). Reductions such as these could mean 160–500 research project not receiving funding, effectively limiting the Navy's ability to "exploit the full range of science and technology development" occurring through partnerships with academia. Additional to losses in critical research areas like observations and modelling, unmanned vehicles, power generation, propulsion hydromechanics, bioinspired autonomous and surveillance systems, environmental quality, casualty care and management, and casualty prevention, the Navy may be forced to reduce its STEM activities. Whether decreasing support for the Young Investigator Program or sponsoring fewer graduate fellowships at HBCUs and HSIs, this is a major loss to the human capital and tactical workforce development identified as a key issue by Navy's Task Force Ocean.

An Ocean Planet; A Maritime Nation

Earth is an ocean planet, with saltwater covering more than 71 percent of its surface. The ocean sustains life itself—providing the oxygen we breathe, the food we eat, water for drinking and farming, energy to run our societies, and even the warmth that has allowed humanity to thrive. One half of the oxygen on Earth comes from marine phytoplankton. Seafood contributes 15 percent of animal protein for three billion people (another billion rely on fisheries for their main source of protein). The ocean holds 97 percent of Earth's water, which then becomes freshwater for drinking, farming, and manufacturing. Roughly 80 percent of global energy comes from petroleum formed in ancient seas. Around the world, 350 million jobs are linked to the ocean, and coastal zones contribute \$26.8 trillion to the global economy each year.

The U.S. is a maritime nation, with more ocean area in our Exclusive Economic Zone than in our terrestrial 50 States combined. From the very beginning, the U.S. has turned to the sea for protection, exploration, lifestyle, economic security, food, recreation, and energy. Our country is protected by a Navy battle force of 275 ships, 118 Army watercrafts, 245 Coast Guard cutters, and over 80 coastal military bases. The ocean is an economic driver to more than three million Americans who work in ocean and coastal industries (which are worth \$359 billion annually). The ocean's role in food security is critical—it provides 20 percent of the animal protein we depend on for food, provides fishmeal that fertilizes the nation's crops, and is the major driver of the weather and water cycle that bring warmth and water to inland farms. Our nation's competitive security advantage doesn't rest solely on the best charts and finest navigation technologies but also upon the ability to predict and plan for threats on the horizon. Changes in ocean and atmospheric systems can quickly snowball into disturbances in food supplies, human population migrations, and geopolitical instability.

Ocean Science: Vital To The Nation's Security

Ocean science and technology provide the nation with a knowledge advantage against myriad maritime threats we face, both now and in the future. Basic ocean research forms the critical foundation needed to ensure continuity of our superior knowledge of the ocean, which in turn generates warfare advantage and ensures homeland security. However, the Navy's competitive advantage over key military competitors in understanding and exploiting the ocean environment has diminished and can only be reestablished through investments in science and technology research across all agencies. Asian and European ocean education and research enterprises have, in many cases, matched or exceeded that in the U.S. Admiral James Watkins, former Chief of Naval Operations, often remarked that oceanography was a key determinant in the U.S. Cold War "victory," due to the knowledge advantage provided to our forward deployed maritime forces, especially our submarines. We are firmly convinced that ocean science and technology today can and must provide us with the same knowledge advantage against the myriad maritime threats we face today.

The academic research community has enjoyed a long and productive partnership with the U.S. Navy in helping to ensure maritime military readiness, domain awareness, and warfighting advantage. This success has its foundation in sustained investment in supporting science and technology programs implemented through the 6.1, 6.2, and 6.3 programs. The 3rd Offset Strategy highlighted by Secretary of Defense Carter and other service leaders in congressional testimony acknowledges the challenge to U.S. military superiority through increasing competition in science and technology by other nations. Investments in science and technology now are crucial to ensuring future capabilities, which take time and sustained funding to nurture through the research and development process and to integrate into the operational battlespace. A good example of this is the continued acceleration of Autonomous Undersea Vehicles (AUV) and other ground-breaking submarine technology usage in the undersea environment by the Navy and Department of Defense (DoD). The impact of the ocean environment on these systems is even more pronounced than it was for the manned and tethered systems of the past. Acoustic advantage; endurance and energy consumption; autonomy; and effective command, control, and communications for AUV are heavily influenced by ocean conditions. These must be measured, modeled, and accurately predicted to ensure undersea warfare advantage is maintained against a global undersea threat that is ever-growing in complexity and proliferation. Basic ocean research provides the critical foundation to ensure continuity of our undersea knowledge superiority that generates warfare advantage. Simply put, our undersea forces must be able to win every "away game," and we therefore must be able to exploit the ocean environment to ensure "home field advantage" at those "away games."

Intelligence Advantage Through Ocean Knowledge—Understanding, Modeling and Predicting

As defined by the Navy, Maritime Domain Awareness (MDA) is the “effective understanding of anything associated with the maritime domain that could impact the security, safety, economy, or environment of the United States.”¹ MDA is comprised of situational awareness (observable and known) and threat awareness (anticipated or suspected)—a mix of operational intelligence and environmental data and information. Whether it is basic oceanographic research or ocean modelling, a better understanding of the ocean system significantly enhances MDA. The security advantage gained through increased ocean knowledge is not limited to the warfighting arena. Beyond situational awareness, contributions of forward-deployed naval forces and information and intelligence capacities of Navy and the intelligence community (e.g., CIA, NSA, DIA, NGA) benefit from basic and applied research programs, as well as partnerships with academic institutions supporting robust ocean observations and monitoring to enhance threat awareness. Understanding the ocean system and modelling scenarios form the foundation of trustworthy predictions, which in turn improve our nation’s security advantage by moving us along the spectrum from situational awareness to threat awareness and ultimately to threat prediction.

The Department of Defense Climate Change Adaptation Roadmap² and both of the most recent Quadrennial Defense Reviews^{3,4} have recognized that changing climate is a threat to national security, and its effects must be assessed and addressed through adaptation. The melting of sea ice and permafrost, acidification of the seas, and decay of large ice sheets are just some of the ways the polar regions have responded to changing ocean and atmospheric conditions. Half of the world’s population lives within 60 km of the ocean, 75 percent of all large cities are on the coast,⁵ and the U.S. coastal population is expected to increase by an additional 10 million people by 2020.⁶ As many as 650 million people across the world are at risk from rising seas by the end of the century.⁷ Just this year, we’ve begun to see a slowdown of ocean circulation in the Atlantic,⁸ which is symptomatic of broader changes in global ocean circulation patterns that directly impact military operations (e.g., anti-submarine warfare) while also affecting storm and drought intensity (and the concomitant humanitarian response implications) and the chronic -but significant- concerns surrounding the rate of sea level rise on naval installations and facilities.

Through threatened freshwater sources (due to saltwater intrusion), loss of protein sources, submerged land, and increases in disease and other human health concerns,⁹ human populations living within coastal zones across the globe are the groups to be impacted most directly by a changing ocean. Whether abroad or at home, displacement or abandonment, mass migrations, and conflict over resources are real security threats both on the coasts and inland.

Navigating Changing Ocean Conditions—Sensing and Observing

The Navy and DoD have a distinguished history of fostering the science and technology that has been responsible for U.S. military success and superiority. There is growing concern that this superiority is being challenged by a significant increase in investment by our rivals, while funding support for science and technology within DoD and the Navy has languished. This is particularly apparent in the proposed reduction in the Navy 6.2 and 6.3 funding included in the president’s budget request, which would result in an approximately 10–20 percent decrease in research and technology development resources.

With the ocean providing 20 percent of the animal protein in the human diet¹⁰ and 24 percent of global land degrading (25 percent rangeland, 20 percent cropland),¹¹ it is understandable that illegal, unregulated and unreported fishing (IUU) and desertification are not only food security issues but ultimately ones of national

¹ https://www.dhs.gov/sites/default/files/publications/HSPD_MDAPlan_0.pdf.

² <http://www.acq.osd.mil/ie/download/CCARprint.pdf>.

³ http://www.defense.gov/Portals/1/features/defenseReviews/QDR/QDR_as_of_29JAN10_1600.pdf.

⁴ http://archive.defense.gov/pubs/2014_Quadrennial_Defense_Review.pdf.

⁵ http://www.unep.org/urban_environment/issues/coastal_zones.asp.

⁶ <http://oceanservice.noaa.gov/facts/population.html>.

⁷ <http://www.climatecentral.org/news/new-analysis-global-exposure-to-sea-level-rise-flooding-18066>.

⁸ Rahmstorf, S., et al. 2015. Exceptional twentieth-century slowdown in Atlantic Ocean overturning circulation. *Nature Clim. Change* 5, 475–480 (2015).

⁹ <http://widenerlawreview.org/files/2010/04/07-KUNDIS-CRAIG-Final.pdf>.

¹⁰ http://www.education.noaa.gov/Ocean_and_Coasts/.

¹¹ http://www.un.org/en/events/desertification_decade/value.shtml.

security. Changes in ocean conditions directly associated with access in the Arctic lead to expanded navigation and commerce in the region (e.g., shipping, fishing, oil and gas exploration, bioprospecting, mining) and could result in disputes amongst nations or accidents requiring search and rescue or other response.

Whether considering ocean conditions to better understand drought forecasts or to model changes in fish distributions, data and information from the sea strengthen the Navy's awareness of conflict catalysts. However, these data and information must be gathered. Ocean observation platforms and sensor technology advancement allow for real-time characterization of ocean conditions as well as necessary data to assess trends. The basic and applied research lines, robust partnerships and collaborations with ocean science and technology institutions, and in-house surveying capabilities all support the increase of ocean knowledge for our nation's security advantage.

Given the critical importance of ocean knowledge in both the warfighting arena and in threat awareness, the ocean science community greatly appreciates the subcommittee's continuing recognition of the importance of the Auxiliary General Oceanographic Research (AGOR) research vessels fleet. COL strongly supports inclusion of adequate funds in the 6.2 account to complete the Service Life Extension Program of the AGOR-23 class, which adds 10–15 years of life to the vessels and ensures the availability of unique platforms capable of performing multidisciplinary, high endurance missions that support Navy information needs around the globe. There is also concern that the Navy does not have a long-term plan to recapitalize its operational oceanographic survey ship fleet. The T-AGS 60 Pathfinder class will begin to exceed their planned life expectancy within the next decade, and it is imperative that replacement ships be included in the Navy's long-term ship building plan.

Long-term Commitment to People, Platforms, and Partnerships—Human Capital and Tactical Workforce

It is hard to overemphasize the significant advantages that have resulted from Navy support for basic research, including highly trained people, cutting-edge technology, and innovative ideas. The advantage and benefits that have accrued to DoD and the Navy cannot be attributed solely to the amount of investment; equally important is the Office of Naval Research's culture that understood the importance of providing sustained support for technology development and the cultivation of researchers, including early career and established scientists (internally and among its academic partners). The cultivation of people and technology in support of national security priorities is well beyond the mission and role of other Federal agencies supporting ocean science, such as the National Science Foundation and the National Oceanic and Atmospheric Administration. For example, the U.S. Navy's competitive advantage in undersea warfare research relies on the ability to execute unique data collection systems and sea-going expertise. The backbone for these programs is comprised of partnering scientists, expert engineers, and technicians with decades of experience in executing research at sea.

It is also important to recognize the important role science and technology funding plays in the development of new technology (e.g., sensors, platforms, models, data analytics) that are essential to helping the Navy meet its mission requirements. Much of the oceanographic equipment in use today, for defense and nondefense research, observations, and modeling, has resulted from Navy investment in its development, as well as its integration to defense and non-defense at-sea platforms and in research labs through the Defense University Research Instrumentation Program. Unfortunately, the level of investment in technology development has seriously declined in recent years, with greater focus being placed on the transition of applied technology into operations. The negative impacts of this shift in emphasis and support has been realized as the flow of new technologies and their application to Navy mission requirements slows, just as the increased investments by rivals begin to bear fruit. Task Force Ocean specifically targets ocean related technology development through and with the Navy, academia, and the private sector.

Additional to the technology shortfalls, there is a human capital issue. Forty-seven percent of American geoscientists in the private sector and 43 percent in the Federal Government are over the age of 55, making them likely to retire in the next 10 years.¹² The Workforce Research team at the American Geosciences Institute calculated that there will be a shortfall of 135,000 geoscientists in the U.S. workforce over the next decade. Specifically Navy-focused, the Navy oceanography enterprise has lost more than half of its physicists and geophysicists and 12 percent of its

¹²Distribution of Geoscientists, Fedscope, March 2015, <https://www.fedscope.opm.gov/ibmcognos/cgi-bin/cognosisapi.dll>.

physical scientists and oceanographers in the last decade alone. In the last 20 years, the Naval Research Laboratory has lost approximately 50 percent of its acousticians and 13 percent of its oceanographers. We can ill afford to have a shortage of these workers, both military and civilian, who are vital for the national security community.

Conclusion

Ocean science and geosciences writ large impact every American every day. Across the nation, across science disciplines, and across the Federal family, it is clear that robust and sustained Federal investments in ocean and geosciences are key to addressing global and national challenges; underpinning new and growing economies while maintaining and supporting existing ones; and improving technologies that preserve lives and livelihoods, persons, and property. As the subcommittee drafts the fiscal year 2018 spending bill, we hope that you reflect on the Navy's concern with the erosion of competitive advantage in the ocean science and technology arena and the fact that the bulk of the intellectual capacity regarding the ocean resides within the academic research community. Peer-reviewed extramural research is the most efficient and effective vehicle for providing our policy makers and our commercial partners with the expertise, information, and data necessary to address the emerging challenges facing our nation.

To maintain global stability, it is critically important that the nation understands the factors of conflict catalysts. To successfully navigate a changing physical, chemical, and biological ocean while maintaining geopolitical establishments, the Navy must regain their competitive advantage in understanding the ocean and coastal baseline conditions, changing conditions, forecasted conditions, vulnerabilities of undersea and coastal infrastructure, and the threatened human population. The changing climate and ocean systems are altering when and where our military may be called to duty, but also how the military can respond. Rising sea levels affect amphibious landing opportunities, and extreme weather could impact deployment, intelligence, surveillance, and reconnaissance capabilities. It is through the robust Federal support of the Navy's basic and applied research, maintaining superiority in technology development and integration, and through collaborative partnerships with ocean science and technology institutions that this will happen.

Mr. Chairman and members of the subcommittee, the ocean science and technology community appreciates the support that the subcommittee provided for oceanographic research and technology advancement, and we hope that you will continue to prioritize science investments to ensure the U.S. can maintain its superiority at sea. We greatly appreciate your consideration of our recommendations and are available to discuss these recommendations with you further at your earliest convenience.

Below is a list of institutions that are represented by the Consortium for Ocean Leadership:

<i>Alabama</i>	University of California, Santa Cruz
Dauphin Island Sea Lab	University of Southern California
<i>Alaska</i>	<i>Colorado</i>
Alaska Ocean Observing System	Cooperative Institute for Research in
Arctic Research Consortium of the	Environmental Sciences
United States (ARCUS)	<i>Connecticut</i>
North Pacific Research Board	University of Connecticut
University of Alaska Fairbanks	<i>Delaware</i>
<i>California</i>	University of Delaware
Aquarium of the Pacific	Mid-Atlantic Regional Association
Bodega Marine Laboratory	Coastal Ocean Observing System
Esri	(MARACOOS)
L-3 MariPro, Inc.	<i>Florida</i>
Liquid Robotics, Inc.	Earth2Ocean
Monterey Bay Aquarium Research	FAU Harbor Branch Oceanographic
Institute	Institute
Moss Landing Marine Laboratories	Florida Institute of Oceanography
Romberg Tiburon Research Laboratory	Mote Marine Laboratory
Stanford University	Nova Southeastern University
Teledyne RD Instruments	University of Florida
U.S. Naval Postgraduate School	University of Miami
University of California, San Diego	University of South Florida
Scripps Institution of Oceanography	
University of California, Santa Barbara	

<i>Georgia</i> Savannah State University Skidaway Institute of Oceanography, University of Georgia	University of North Carolina, Wilmington
<i>Hawaii</i> University of Hawaii	<i>Oregon</i> Oregon State University
<i>Illinois</i> John G. Shedd Aquarium	<i>Pennsylvania</i> Pennsylvania State University
<i>Louisiana</i> ASV Global, LLC Louisiana State University Louisiana Universities Marine Consortium	<i>Rhode Island</i> University of Rhode Island
<i>Maine</i> Bigelow Laboratory for Ocean Sciences The IOOS Association University of Maine	<i>South Carolina</i> South Carolina Sea Grant Consortium University of South Carolina
<i>Maryland</i> Johns Hopkins University Applied Physics Lab National Aquarium Seymour Marine Technologies, LLC University of Maryland Center for Environmental Science	<i>Tennessee</i> Eastman Chemical Company
<i>Massachusetts</i> Massachusetts Institute of Technology University of Massachusetts, Dartmouth Woods Hole Oceanographic Institution	<i>Texas</i> Harte Research Institute For Gulf of Mexico Studies Shell Oil Company Sonardyne, Inc. Texas A&M University University of Texas at Austin
<i>Michigan</i> University of Michigan	<i>Virginia</i> College of William & Mary (VIMS) Institute for Global Environmental Strategies (IGES)
<i>Mississippi</i> University of Mississippi University of Southern Mississippi	Old Dominion University Teledyne CARIS U.S. Arctic Research Commission
<i>New Hampshire</i> University of New Hampshire	<i>Washington</i> Sea-Bird Scientific University of Washington
<i>New Jersey</i> Monmouth University Urban Coast Institute Rutgers University	<i>Washington, D.C.</i> Marine Technology Society (MTS) National Ocean Industries Association (NOIA) Southeastern Universities Research Association (SURA)
<i>New York</i> Columbia University Lamont-Doherty Earth Observatory Stony Brook University	<i>Wisconsin</i> University of Wisconsin, Milwaukee School of Freshwater Sciences
<i>North Carolina</i> Duke University East Carolina University North Carolina State University University of North Carolina, Chapel Hill	<i>Australia</i> Institute for Marine and Antarctic Studies (IMAS)
	<i>Bermuda</i> Bermuda Institute of Ocean Sciences
	<i>Canada</i> Dalhousie University University of Victoria Ocean Networks Canada

[This statement was submitted by RADM Jonathan White, USN (Ret.), President and CEO, Consortium for Ocean Leadership.]

PREPARED STATEMENT OF GALOIS, INC.

RECOMMENDATION

—Provide an additional \$5 million in RDTE, AF Aerospace Vehicle Technologies (R-1 line 5, PE 0602201F) for Formal Methods implementations in support of Trustworthy Flight Controls and Pilot Vehicle Interface.

Computer programs are based on algorithms, and are usually tested to see that they work safely, correctly, and securely by trying many data points. However, there is always the possibility that a program will malfunction under some untested condition—and testing every possible condition is virtually impossible. The resulting malfunctions can be as simple as a buffer overflow error, where a program copies a little more data than it should and overwrites a small piece of the computer's memory. It's a seemingly innocuous error that is hard to eliminate but provides an opening for hackers to attack a system. Any flaw anywhere in any piece of software can become a security vulnerability, and it is time and cost prohibitive to test every possible path of every possible input. The National Institute of Standards and Technology issued a report to the White House Office of Science and Technology Policy in November, 2016 entitled "Dramatically Reducing Software Vulnerabilities" which states "In the case of typical software, estimates are up to 25 errors per 1000 lines of code" and "nearly two thirds of vulnerabilities come from simple programming errors."

Breakthroughs have recently been made in using mathematics and logic to verify software. Instead of trying to individually test every possible condition, this approach uses a mathematical specification to define exactly what a computer program does, and a formal verification process to prove beyond a doubt that the program's code perfectly achieves that exact specification and only that specification. In the NIST report, this is called "Formal Methods". Formal methods include all software analysis approaches based on mathematics and logic, including parsing, type checking, correctness proofs, model-based development and correct-by-construction. Formal methods help software developers achieve greater assurance that entire classes of vulnerabilities are absent and also reduce the need for unpredictable cycles of expensive testing and bug fixing. Other advanced methods being explored by the Air Force include system level security, additive software analysis, domain specific software development frameworks, moving target defenses, and automatic software diversity.

The Aerospace Systems Autonomous Controls Branch of the Air Force Research Laboratory (AFRL) at Wright-Patterson Air Force Base in Dayton, Ohio is a government leader in developing and applying formal methods technology and tools for aerospace applications. AFRL is investing over \$2.5 million in fiscal year 2017 to accelerate formal methods implementations in support of key Air Force programs. An additional \$5 million is urgently needed in fiscal year 2018 to expand this work on identifying software vulnerabilities, retrofitting existing safety-critical systems, and developing new trustworthy systems applicable to remotely piloted aircraft, hypersonic aircraft, and extended-life legacy aircraft. This request is for a generic program increase to an existing, budgeted Air Force project, for which any industry contracts will be competitively awarded.

Thank you for the opportunity to submit this testimony for the record.

[This statement was submitted by Dr. Robert Wiltbank, Chief Executive Officer, Galois, Inc.]

PREPARED STATEMENT OF THE HUMAN FACTORS AND ERGONOMICS SOCIETY

On behalf of the Human Factors and Ergonomics Society (HFES), we are pleased to provide this written testimony to the Senate Subcommittee on Defense and Related Agencies for the official record. HFES urges the Subcommittee to provide robust funding levels for Research, Development, Test, and Evaluation (RDT&E) at the Department of Defense (DoD) in the fiscal year 2018 appropriations process. Specifically, we urge the Subcommittee to direct DoD to identify opportunities to transition human performance research to defense acquisition programs to reduce cost, strengths force protection, reduce potential for re-engineering, and enhance training.

HFES and its members recognize and appreciate the challenging fiscal environment in which we as a nation currently find ourselves; however, we believe strongly that investment in scientific research serves as an important driver for innovation

and the economy and for maintaining American global competitiveness. We thank the Subcommittee for its longtime recognition of the value of scientific and engineering research and its contribution to innovation in the U.S.

THE VALUE OF HUMAN FACTORS AND ERGONOMICS SCIENCE

HFES is a multidisciplinary professional association with over 4,500 individual members worldwide, including psychologists and other scientists, engineers, and designers, all with a common interest in designing safe and effective systems and equipment that maximize and adapt to human capabilities.

For over 50 years, the U.S. Federal Government has funded scientists and engineers to explore and better understand the relationship between humans, technology, and the environment. Originally stemming from urgent needs to improve the performance of humans using complex systems such as aircraft during World War II, the field of human factors and ergonomics (HF/E) works to develop safe, effective, and practical human use of technology. HF/E does this by developing scientific approaches for understanding this complex interface, also known as “human-systems integration.” Today, HF/E is applied to fields as diverse as transportation, architecture, environmental design, consumer products, electronics and computers, energy systems, medical devices, manufacturing, office automation, organizational design and management, aging, farming, health, sports and recreation, oil field operations, mining, forensics, and education.

With increasing reliance by Federal agencies and the private sector on technology-aided decisionmaking, HF/E is vital to effectively achieving our national objectives. While a large proportion of HF/E research exists at the intersection of science and practice—that is, HF/E is often viewed more at the “applied” end of the science continuum—the field also contributes to advancing “fundamental” scientific understanding of the interface between human decisionmaking, engineering, design, technology, and the world around us. The reach of HF/E is profound, touching nearly all aspects of human life from the healthcare sector, to the ways we travel, to the hand-held devices we use every day.

HUMAN FACTORS AND ERGONOMICS AT THE DEPARTMENT OF DEFENSE

HFES and its members believe strongly that Federal investment in DoD will have a direct and positive impact on the U.S. economy, national security, and the safety and well-being of Americans. It is for these reasons that HFES supports robust funding for DoD, especially for the Army Human Factors Engineering Technology applied research program and the Navy Personnel, Training, Simulation, and Human Factors program within Engineering and Manufacturing Development to encourage further advancements in the fields of technology, safety, and human factors, among others.

DoD has openly acknowledged the significance of human factors research and the potential for interagency collaboration through the creation of the Department of Defense Human Factors Engineering Technical Group (DoD HFE TAG). Composed of representatives from DoD, National Aeronautical and Space Association (NASA), Federal Aviation Administration (FAA), and the Department of Homeland Security (DHS), the scope of this working group is broad and its benefits are diverse.

In particular, the goals of DoD HFE TAG are to:

- Provide a mechanism for the timely exchange of technical information in the development and application of human factors engineering.
- Enhance coordination among government agencies involved in HF/E technology research, development, and application.
- Assist in the preparation and coordination of tri-service documents, and sponsor in-depth interaction, which aids in identifying HF/E technical issues and technology gaps.

This research undoubtedly affects the safety and well-being of American citizens and it is for this reason that we request robust funding levels for human factors research in DoD in fiscal year 2018.

CONCLUSION

Given DoD’s critical role in supporting fundamental research and development across defense and engineering disciplines, HFES supports robust funding levels for DoD RDT&E programs, especially those that specifically fund human factors, in fiscal year 2018 as well as improvements to the inclusion of human systems integration in acquisition programs. These investments fund important research studies, enabling an evidence base, methodology, and measurements for improving organizational function, performance, and design across sectors and disciplines.

On behalf of HFES, we would like to thank you for the opportunity to provide this testimony. Please do not hesitate to contact us should you have any questions about HFES or HF/E research. HFES truly appreciates the Subcommittee's long history of support for scientific research and innovation.

[This statement was submitted by Nancy J. Cooke, Ph.D., President, and Lynn Strother, Executive Director, Human Factors and Ergonomics Society.]

PREPARED STATEMENT OF THE MICHAEL J. FOX FOUNDATION FOR
PARKINSON'S RESEARCH

The Michael J. Fox Foundation for Parkinson's Research (MJFF) appreciates the opportunity to comment on fiscal year 2018 appropriations for the U.S. Department of Defense. Our comments focus on the importance of Federal investment in biomedical research at the Congressionally Directed Medical Research Program (CDMRP). MJFF supports appropriation of at least \$20 million to the CDMRP Parkinson's Research Program (PRP), which will go part of the way toward recovering money lost since 2010, when the program was funded at \$25 million, and bring us closer to better treatments and a cure for Parkinson's disease (PD).

As the world's largest nonprofit funder of PD research, MJFF is dedicated to accelerating a cure for Parkinson's and developing improved therapies for those living with the disease today. In funding more than \$700 million in PD research to date, the Foundation has fundamentally altered the trajectory of progress toward a cure. However, MJFF investments are a complement to, rather than a substitute for, federally funded research. With critically needed Parkinson's breakthroughs on the horizon, robust and reliable Federal funding is imperative to drive progress. Currently, there is no therapy to slow, stop or reverse the progression of PD. Additionally, existing treatments are limited in their abilities to address patients' medical needs and remain effective over time.

An estimated 80,000 veterans and one million people overall live in the United States with PD, the second most common neurodegenerative disease after Alzheimer's disease. Parkinson's results in an estimated annual economic burden of \$19.8 to \$26.4 billion. Investing in research on the front end to develop innovative therapies and cures can lower back-end costs. New treatments would relieve the burden on Medicare, Medicaid and the Department of Veteran Affairs.

PRP: EFFORTS TO PREVENT AND STOP PARKINSON'S PROGRESSION

Started in 1997, the CDMRP's Parkinson's Research Program aims to identify and understand risk factors associated with PD (such as chemical exposures, psychological stress and traumatic brain injury) in order to prevent or delay the onset of symptoms, as well as advance the development of new treatments. The program has granted more than 250 awards to investigate a variety of mechanisms of and factors influencing disease progression.

In recent years, program funding has significantly decreased (from \$25 million in fiscal year 2010 to \$16 million in fiscal year 2016). Reinstating funding at previous budget levels will ensure scientific progress of importance to our Nation's service members can continue.

For example, Parkinson's research has linked certain chemicals to the disease. Environmental chemical exposures are a potential health hazard to soldiers during deployments and through exposure to military materiel such as jet fuel and permethrin-impregnated uniforms. The Parkinson's Research Program has supported a range of studies on environmental chemical exposures to identify hazards to soldiers and the public. DoD-funded studies have found strong associations between organochlorine pesticides and neurodegenerative disease. In addition, fundamental advances in neurobiology made possible by DoD funding are providing new understanding and identifying biological markers to evaluate the role of chemical exposures, head injury and chronic psychological stress in neurodegenerative disease risk. Understanding possible environmental causes of Parkinson's will help the military reduce exposure for their soldiers through protective equipment or other mitigations and help civilians take action to reduce their risk.

CDMRP: UNIQUE RESEARCH WITH REACH BEYOND THE MILITARY

The research portfolio supported by the Congressionally Directed Medical Research Program fuels scientific discovery by propelling exploration of revolutionary ideas and concepts with potential impact for support and treatment for members of the military and the greater national population. The CDMRP funds highly innova-

tive projects—for which support is typically limited or unavailable—from research teams at top universities and medical centers.

It is important to note, as well, Department of Defense (DoD) programs neither duplicate nor supplant National Institutes of Health (NIH) research programs, but rather enhance those efforts. NIH-funded basic research serves as a foundation for groundbreaking, disorder-targeted research at the DoD. NIH and DoD program officers meet to ensure collaboration and prevent duplication.

The well-executed and efficient programs within the defense health research programs demonstrate responsible government stewardship of taxpayer dollars and benefit current and former military service members, the general patient population and our Nation's economy. DoD's biomedical research funding has led to many significant breakthroughs and achievements, contributing to national security and the health and welfare of U.S. Armed Forces personnel and their dependents.

Please continue investment in Americans' health and wellbeing by allocating \$20 million dollars for the PRP in fiscal year 2018 and supporting CDMRP programs generally.

PREPARED STATEMENT OF THE NATIONAL MULTIPLE SCLEROSIS SOCIETY

Dear Mr. Chairman and Members of the Subcommittee, thank you for this opportunity to provide testimony on behalf of the National Multiple Sclerosis Society (Society) regarding Department of Defense Appropriations for fiscal year 2018 and to discuss the importance of Federal research programs that impact those affected by multiple sclerosis (MS). As you consider priorities for fiscal year 2018, we urge the Subcommittee to provide \$10 million in discretionary spending for the MS Research Program (MSRP) within the Congressionally Directed Medical Research Programs (CDMRP).

MS is an unpredictable, often disabling disease of the central nervous system that interrupts the flow of information within the brain, and between the brain and body. Symptoms range from numbness and tingling to blindness and paralysis. The progress, severity, and specific symptoms of MS in any one person cannot yet be predicted. Most people with MS are diagnosed between the ages of 20 and 50, with at least two to three times more women than men being diagnosed with the disease.

The Society works to provide solutions to the challenges of multiple sclerosis (MS) so that everyone affected by this disease can live their best lives. To fulfill this mission, we fund cutting edge research, drive change through advocacy, facilitate professional education, collaborate with MS organizations around the world, and provide services designed to help people affected by MS move their lives forward. We see ourselves as a fundamental partner to the U.S. government in many critical areas—particular in the field of MS research. Last year, we dedicated approximately \$40 million in MS research that are complementary to research funded by the Federal government, including the MSRP within the CDMRP.

The CDMRP is a peer-reviewed program funded through the Department of Defense via the Defense Appropriations Act. Importantly, individual programs like the MSRP are funded at the direction of Congress and fill research gaps by funding high impact, high-risk and high gain projects that other research agencies—like the NIH, may not venture to fund. The CDMRPs are distinctive in that they involve active participation of people living with the program disease area. These patients and patient representatives are highly coveted roles, as they are involved in all areas of the program— from establishing the mission/vision of the program, to reviewing applications and making recommendations for funding, and evaluating the impact of the program. People living with MS value these opportunities within the MSRP as a way they can engage in the research process. Further, the Society applauds the way MSRP's design and believes that it aligns with the direction of patient centered drug development and care.

MS and Military Service

In the United States, there are approximately 32,870 veterans living with diagnosed MS. Out of that number, over 11,000 have MS that is deemed service-connected, meaning that their MS was incurred or aggravated during their military service. Each year, the Veterans Health Administration provides care to more than 20,000 veterans living with MS.

MS is considered a presumptive condition and veterans who have symptoms of MS in the military or within 7 years after honorable discharge are eligible for the service-connected status. An advisory committee by the Veterans Administration recently recommended further study into the potential link between combat service and increased risk of developing MS. As the underlying cause of MS is still un-

known, it is imperative that the Federal government fund basic research to help answer fundamental question, and research to help improve the lives of those serving in the military who may be called upon to service in areas and environments that may increase the risk of developing diseases like MS later in life. Research into the underlying causes of MS and improving methods of diagnosing, treating and potentially curing MS is critical to improving the lives of our military servicemen and servicewomen and all of those living with MS.

MULTIPLE SCLEROSIS RESEARCH PROGRAM

The MS Research Program (MSRP) was established by Congress in 2009. Its vision is to prevent, cure, reverse, or slow the progression, and lessen the personal and societal impact of MS. Like many of the other programs within the CDMRP, the MSRP specifically encourages applications that address critical needs of the MS community and concentrate on: the biological basis of disease progression, risk factors leading to the prevention of MS, drug discovery and biomarkers for preclinical detection of MS. To date, Congress has appropriated approximately \$40 million dollars to the MSRP, including \$6 million in 2017. From those appropriations, the MSRP has funded 74 awards that have funded studies that examine gap in MS from basic science to rehabilitation research. As this is a relatively new program, many studies are still in the publication process as biomarkers and other discoveries move through the scientific process and are incorporated into the drug discovery process.

A particular area of interest in MS research is imaging technology, as diagnosis of MS and tracking disease progression remains challenging, both for active duty military personnel, veterans and civilians. MRI's are often used by healthcare providers to track disease activity. Currently, MRI findings are not accepted by the Food and Drug Administration as indicators of clinical meaningfulness in the drug development and approval process and more research is needed in the form of more long-term studies correlating brain MRI with disability progression.

This is a critical body of research that will improve the drug development process, the ability of the healthcare system to better track disease progression and activity, and allow healthcare providers to better anticipate the needs of people living with MS. The National Institutes of Health, the nation's preeminent biomedical research facility, also conducts imaging research within the National Institute of Biomedical Imaging and Bioengineering; however, the emphasis on the research performed at that Agency is on technical development rather than detailed applications to specific diseases. The clinical application of the research done at MSRP is particularly important for those who are living with MS and diagnosed in the military, as it will facilitate better conversations surrounding troop readiness and the ability of an individual to deploy.

The MSRP has funded many studies that have examined methods to improve imaging technology to better track disease progression and to allow for direct detection and quantification of myelin changes in people living with MS. Two innovative ways that imaging improvements are being explored are summarized below:

- Researchers at Case Western Reserve University were funded by the MSRP in 2009 to examine in vivo imaging of myelination for drug discovery. Their goal was to develop novel therapeutics for MS. These researchers developed a myelin-imaging agent, Case Imaging Compound (CIC), which penetrates the blood-brain barrier and attaches to myelinated regions of the brain. CIC has been used for positron emission tomography (PET) imaging that allows for direct imaging of myelin changes in vivo. These studies indicate that this type of imaging could be used as an imaging marker of can be used as an imaging marker of myelination, which has the potential to be translated into clinical studies in MS and other myelin-related diseases for early diagnosis, sub-typing, and efficacious evaluation of therapeutic treatments aimed at myelin repair. The researchers plan to utilize this imaging to examine the efficacy of therapeutic agents in animal models of MS. Results from this study, and subsequent follow up studies, have been published in *Journal of Neuroscience* and the *Annals of Neurology*.
- A MSRP funded study that is currently underway at Vanderbilt University is examining ways to improve magnetic resonance imaging (MRI) techniques to quantifiably measure underlying tissue abnormality in brain gray matter areas that results in decreased cognitive performance. Conventional MRI methods are not well suited to measure tissue damage and lesions in the gray matter of the brain, if successful, this study may improve the ability of the healthcare community to diagnose, understand and treat cognitive issues. This study could be transformative for people living with MS, but also for individuals who suffer from other diseases and conditions that result in cognitive impairment.

Because of the tremendous impact the MS CDMRP has on research and development of potential therapies for MS, the National MS Society requests that Congress provide \$10 million in discretionary appropriations. This funding will allow the CDMRP to continue the innovative research that will improve the lives of those living with MS. Because of limited funding, on average, fewer than 15 percent of research applications submitted to the MSRP were able to be funded annually between fiscal years 2009–2014.

The Society thanks the Committee for its investment in the CDMRP, and in particular the MSRP. We appreciate the opportunity to provide written testimony and our recommendations for fiscal year 2018 appropriations for the program. The MS CDMRP is of vital importance to people living with MS and we look forward to continuing to working with the Committee to help move us closer to a world free of MS.

[This statement was submitted by Leslie Ritter, MA, National Multiple Sclerosis Society.]

PREPARED STATEMENT OF THE NEUROFIBROMATOSIS NETWORK

Thank you for the opportunity to submit testimony to the Subcommittee on the importance of continued funding for the Department of Defense's Peer-reviewed Neurofibromatosis (NF) Research Program (NFRP). NF is a terrible genetic disorder closely linked to many common diseases widespread among the American population. The highly successful Neurofibromatosis Research Program has shown tangible results and direct military application with broad implications for the general population.

On behalf of the Neurofibromatosis (NF) Network, a national organization of NF advocacy groups, I speak on behalf of the 120,000 Americans who suffer from NF as well as approximately 175 million Americans who suffer from diseases and conditions linked to NF such as cancer, brain tumors, heart disease, memory loss, bone abnormalities, deafness, blindness, and psychosocial disabilities, such as autism and learning disabilities. Thanks in large part to this Subcommittee's strong support, scientists have made enormous progress since the discovery of the NF1 gene in 1990 resulting in clinical trials now being undertaken by the NFRP.

In fiscal year 2018, we are requesting \$15 million to continue the Army's highly successful Neurofibromatosis Research Program (NFRP). The NFRP is now conducting clinical trials at nation-wide clinical trials centers created by NFRP funding. These clinical trials involve drugs that have already succeeded in eliminating tumors in humans and rescuing learning deficits in mice. Administrators of the Army program have stated that the number of high-quality scientific applications justify a much larger program.

WHAT IS NEUROFIBROMATOSIS?

NF is an unpredictable genetic disorder of the nervous system that affects almost every organ system in the body. There are three types of NF: NF1, which is more common, NF2, which initially involves tumors causing deafness and balance problems, and Schwannomatosis, the hallmark of which is severe pain. NF causes tumors to grow along nerves including in the skin, just below the skin, and in the brain and spinal cord. NF is the most common neurological disorder caused by a single gene and affects more people than Cystic Fibrosis, hereditary Muscular Dystrophy, Huntington's disease and Tay Sachs combined. It strikes worldwide, without regard to gender, race or ethnicity. Approximately 50 percent of new NF cases result from a spontaneous mutation in an individual's genes and 50 percent are inherited.

NF can cause a myriad of devastating clinical problems including nerve and brain tumors; disfiguring skin growths; inability to heal after bone fracture, which may ultimately require amputation; psychosocial disabilities, including autism and learning disabilities; unmanageable chronic pain; deafness; blindness; cardiovascular defects; vascular disease; muscle weakness; and paralysis. NF gene mutations are also important 'drivers' of cancers in the lungs, liver, brain and breast.

NF'S CONNECTION TO THE MILITARY

Neurofibromatosis (NF) has become a clinical 'model' for advancing medical research. The genetic information learned from NF holds the key to understanding a number of health issues that benefit the war fighter, as well as the general population, including cancer, bone fracture and repair, vascular disease, wound healing and nerve regeneration, behavior and psychosocial issues, muscle weakness, and pain.

The Neurofibromatosis Research Program (NFRP) is providing critical research that directly benefits the War Fighter including:

Bone Repair.—At least a quarter of children with NF1 have abnormal bone growth in any part of the skeleton. In the legs, the long bones are weak, prone to fracture and unable to heal properly; this can require amputation at a young age. Adults with NF1 also have low bone mineral density, placing them at risk of skeletal weakness and injury. The NFRP is a strong supporter of NF1 bone defects research and as a result this field has made significant progress in the past few years. Bone fractures sustained by the war fighter and how to repair them is of interest to the military. Research studies will identify new information about understanding bone biology and repair, and will pave the way to new strategies to enhancing bone health and facilitating repair.

Pain Management.—Severe and unmanageable pain is seen in all forms of NF, particularly in schwannomatosis, and significantly impacts quality of life. NF research has shown similarities between NF pain and phantom limb pain. NFRP funding has been critical in supporting this. Chronic pain, and how to treat it effectively, is one of the most poorly understood areas of medicine, but has very high relevance to those in the military recovering from service-related injuries. NF Research in this area could help identify new ways to target pain effectively with the right drugs or therapies.

Vascular Disease and Wound Healing.—NF1 elevates the risk of vascular disease including aneurysm, stroke and vessel occlusive disease. This can cause premature death, particularly in younger patients. In addition NF1 seems to make small blood vessels around wounds less able to heal. This research will help develop markers for early detection of vascular changes that can predict those at risk of potential forthcoming cardiovascular events as well as developing treatments for this and to increase wound healing capacity which is of great relevance to the warfighter.

Psychosocial Disabilities.—In the last couple of years, NFRP research has revealed common threads between NF1 learning disabilities, autism and other related disabilities. Research being done within the NF Clinical Trials Consortium, NFRP created clinical centers, has led to important findings and expanded research in this area. This research contributes to our broadening understanding of how brain signaling can impact on behavior and psychosocial difficulties. Members of the military returning from service can suffer from psychological trauma and it is not easy to understand how this can be effectively treated. As we learn more from the NF population about psychosocial function, we will be able to shed light on this area for the benefit of the military.

Muscle Weakness.—There is growing evidence that children with NF1 have inherent low muscle tone and muscle weakness which impacts on quality of life. This emerging area of NF research has potentially broad relevance. This research opens up a new area of NF research and has potential broader application for recovery from military injuries in particular restoring optimal muscle function.

THE ARMY'S CONTRIBUTION TO NF RESEARCH

While other Federal agencies support medical research, the Department of Defense (DoD) fills a special role by providing peer-reviewed funding for innovative and rewarding medical research through the Congressionally Directed Medical Research Program (CDMRP). CDMRP research grants are awarded to researchers in every State in the country through a competitive two-tier review process. These well-executed and efficient programs, including the NFRP, demonstrate the government's responsible stewardship of taxpayer dollars.

Recognizing NF's importance to both the military and to the general population, Congress has given the Army's NF Research Program strong bipartisan support. From fiscal year 1996 through fiscal year 2016 funding for the NFRP has amounted to \$302.85 million, in addition to the original \$8 million appropriated in fiscal year 1992. In addition, between fiscal year 1996 and fiscal year 2015, 353 awards have been granted to researchers across the country.

The Army program funds innovative, groundbreaking research which would not otherwise have been pursued, and has produced major advances in NF research, including conducting clinical trials in a nation-wide clinical trials infrastructure created by NFRP funding, development of advanced animal models, and preclinical therapeutic experimentation. Because of the enormous advances that have been made as a result of the Army's NF Research Program, research in NF has truly become one of the great success stories in the current revolution in molecular genetics. In addition, the program has brought new researchers into the field of NF. However, despite this progress, Army officials administering the program have indicated that

they could easily fund more applications if funding were available because of the high quality of the research applications received.

In order to ensure maximum efficiency, the Army collaborates closely with other Federal agencies that are involved in NF research, such as the National Institutes of Health (NIH). Senior program staff from the National Institute of Neurological Disorders and Stroke (NINDS), for example, sit on the Army's NF Research Program Integration Panel which sets the long-term vision and funding strategies for the program. This assures the highest scientific standard for research funding, efficiency and coordination while avoiding duplication or overlapping of research efforts.

Thanks in large measure to this Subcommittee's support; scientists have made enormous progress since the discovery of the NF1 gene. Major advances in just the past few years have ushered in an exciting era of clinical and translational research in NF with broad implications for the general population. These recent advances have included:

- Phase II and Phase III clinical trials involving new drug therapies for both cancer, hearing tumors, vision tumors, bone graft and cognitive disorders;
- Establishment of the Neurofibromatosis Clinical Trial Consortium which includes an operation center and 19 clinical sites. Allows for partnerships with well-established NF Centers, pooling expertise and resources, quicker turn arounds of scientific reviews and regulatory approvals, leveraged work with pharmaceutical companies all towards the common goal of new treatments and a cure for Neurofibromatosis;
- Successful elimination of tumors in NF1 and NF2 mice with the same drug;
- Development of advanced mouse models showing human symptoms;
- Rescue of learning deficits in mice with an already existing well known drug;
- Determination of the biochemical, molecular function of the NF genes and gene products;
- Connection of NF to numerous diseases because of NF's impact on many body functions.

FISCAL YEAR 2018 REQUEST

The Army's highly successful NF Research Program has shown tangible results and direct military application with broad implications for the general population. The program has now advanced to the translational and clinical research stages, which are the most promising, yet the most expensive direction that NF research has taken. Therefore, continued funding is needed to continue to build on the successes of this program, and to fund this promising research thereby continuing the enormous return on the taxpayers' investment.

We respectfully request that you include \$15 million in the fiscal year 2018 Department of Defense Appropriations bill for the Peer-reviewed Neurofibromatosis Research Program. With this subcommittee's continued support, we will prevail. Thank you for your support.

PREPARED STATEMENT OF U.S. BIOLOGIC, INC.

Addressing: Fiscal year 2018 appropriation for the Defense Health Agency Congressionally Directed Medical Research Program (CDMRP) for Tick Borne Disease Research.

Tick-borne diseases affect the lives of hundreds of thousands of Americans each year. Lyme disease stands as the most common vector-borne disease and the second most commonly reported bacterial infectious disease in the United States, with 380,690 new cases in 2015 at an annual economic cost of more than \$4.1 billion. Lyme disease can cause lifelong, debilitating effects, and in some cases, death from direct and indirect health impacts.

The impact on the military can be especially devastating, understanding that many of the U.S.'s largest military installations (e.g., Fort Drum, New York) are located in Lyme-endemic areas. In one recent study conducted by the USAPHC (2014), between 19.7 percent–37.5 percent of ticks collected from service members across three States were infected by Lyme disease.

At the same time, while Lyme disease carries an enormous public-health risk and burden, it receives only a fraction of research funding as compared to other diseases.

The fiscal year 2017 appropriations that created the Tick-Borne Disease Research Program was an important achievement in that it provided at least some funding to study new preventative methods for Lyme disease.

Additional and expanded funds are necessary for the continued research and development of novel technologies that may fundamentally impact the way we protect our service members, their families, and the U.S. population at large.

Please give this appropriations request every due consideration.

Sincerely,

[This statement was submitted by Chris Przybyszewski, Executive Vice President, U.S. Biologic, Inc.]