March 3, 2020

The Honorable Richard Shelby
Chairman
Subcommittee on Defense
Committee on Appropriations
United States Senate
Washington, DC 20510

The Honorable Pete Visclosky
Chairman
Subcommittee on Defense
Committee on Appropriations
U.S. House of Representatives
Washington, DC 20515

The Honorable Richard Durbin
Ranking Member
Subcommittee on Defense
Committee on Appropriations
United States Senate
Washington, DC 20510

The Honorable Ken Calvert
Ranking Member
Subcommittee on Defense
Committee on Appropriations
U.S. House of Representatives
Washington, DC 20515

Dear Chairmen Shelby and Visclosky, and Ranking Members Durbin and Calvert,

As Congress begins the fiscal year (FY) 2021 appropriations process, enclosed please find recommendations from the Coalition for National Security Research (CNSR) for funding levels for the Defense Science and Technology (S&T) program and select program elements (PEs) that drive innovations to ensure continued global U.S. military technological superiority.

CNSR is a coalition with more than 100 members from industry, academia, scientific and professional associations, and non-profits conducting vital scientific research to create new and improve existing technologies and capabilities to support the U.S. Department of Defense's (DoD) operations. With support from the Defense S&T program, CNSR members are making discoveries and advancing technologies in the DoD's highest priority areas, including hypersonics, artificial intelligence (AI), quantum information sciences, and directed energy.

As noted in the Ronald Reagan Institute's *The Contest for Innovation*, generational technological advances, including developing military-relevant technologies, require federal investments in basic and applied research; private-sector research and development (R&D) is an inadequate replacement[1]. Consequently, it is absolutely essential Congress provides robust funding for the Defense S&T program as near-peer competitor nations, such as China and Russia, vie for dominance in military technologies.

FY 2021 Budget Request for the Defense S&T Program

The *National Defense Strategy (NDS)* lays out numerous defense objectives and goals for the U.S. to remain the preeminent military power in the world. Investing in the Defense S&T program is not only consistent with the *NDS*, it is critical to its successful implementation.

[1] https://www.reaganfoundation.org/reagan-institute/centers/peace-through-strength/reagan-institute-task-force/

Ultimately, the Defense S&T program is the foundation of the DoD's mission to meet the objectives of deterring adversaries, sustaining Joint Force military advantages, establishing an unmatched twenty-first century National Security Innovation Base (NSIB), and continuously improve and develop military technologies and capabilities that provide technological overmatch and anticipate the future needs of our Armed Forces. Simply put, you cannot fight tomorrow's conflicts with yesterday's weapons.

Unfortunately, the FY 2021 budget request fails to provide the resources to meet the objectives of the *NDS*. While the budget includes the largest Research, Development, Test and Evaluation (RDT&E) top line request ever, it simultaneously calls for cutting Defense S&T funding within the larger portfolio by more than *$2 billion* including defense basic research by approximately *$285 million* compared to FY 2020 enacted levels. In fact, according to Office of Management and Budget (OMB), the FY 2021 budget request would result in a cut of *7 percent* for Defense R&D portfolio, producing an *11 percent* cut for basic research and *12 percent* cut to applied research[2] compared to the previous year. ***With China likely to become the world's top R&D performer in the near future[3], now is not the time to cut funding for the Defense S&T program that will create the new technologies and capabilities – as well as help train the next generation workforce - to ensure the U.S. military maintains its dominance.***

The FY 2021 budget proposes to do more than just cut funding below FY 2020 congressionally enacted levels; it proposes to cut funding below the levels DoD requested in FY 2020. FY 2021 resources for the following are proposed to be cut below the FY 2020 budget request:

- Overall Defense S&T Program
- Overall 6.1 basic research
- Overall Navy basic research
- Navy Defense Research Sciences
- Navy University Research Initiatives
- Overall Air Force basic research
- Air Force Defense Research Sciences
- DTRA Basic Research Initiatives
- Defense-Wide Basic Research Initiatives

We cannot expect to meet the *NDS* objectives by dramatically cutting resources from the scientific research programs that underpin and provide DoD's technological edge against global competitors such as China and Russia. ***CNSR urges Congress to reject these cuts and increase Defense S&T funding consistent with recommendations of the National Defense Strategy Commission[4] and more than 500 leading organizations from American industry, higher education, and science and engineering[5].***

Defense Basic Research Program Element (PE) Recommendations

For decades, the defense basic research programs have provided the scientific breakthroughs to give the warfighter the weapons and equipment needed to succeed. Capabilities that help ensure our national security – such as stealth technology, night vision, near-real-time delivery of battlefield information, GPS, communication and weather satellites, laser technology, nuclear propulsion, counter-stealth technology, and precision munitions – all derive from defense basic

[2] https://www.whitehouse.gov/wp-content/uploads/2020/02/ap_17_research_fy21.pdf
[3] https://ncses.nsf.gov/pubs/nsb20203
[4] https://www.usip.org/sites/default/files/2018-11/providing-for-the-common-defense.pdf
[5] https://innovation-imperative.herokuapp.com/index.html

research. If we want to succeed in future global competition, we cannot underinvest in the long-term basic research that will provide the military with new transformational capabilities. Defense basic research is currently exploring future military capabilities in many areas of interest to DoD, such as quantum materials, biologically enhanced sensing and computing, autonomous reasoning, and adaptive materials. The FY 2021 budget undermines the DoD-NSIB partnership to develop future military capabilities and maintain American global preeminence by proposing to slash the defense basic research PEs.

Furthermore, the FY 2021 budget harms DoD's ability to build capacity in its research programs and workforce by proposing to eliminate funding for efforts such as Defense Established Programs to Stimulate Competitive Research (DEPSCoR). DoD often relies on scientists and engineers on as needed basis and not supporting communities in states that typically are not involved in defense research could slow innovation efforts. In addition, in order to meet the scientific workforce needs of the future, DoD should be seeking to develop talent in every state in the nation. As such, CNSR supports Congress restoring funding for DEPSCoR.

University Research Initiatives (URIs)

University Research Initiatives (URIs) would be absolutely devastated from funding levels proposed in the FY 2021 budget. Overall URI funding would be funded at levels below FY 2010 in real dollars. Compared to FY 2020 enacted levels, Army URI is proposed to be cut by more than *23 percent*, Navy URI by *30 percent* and Air Force URI by almost *10 percent*. We are concerned that cuts of this magnitude would harm fundamental technological developments critical to maintain our military superiority across the air, land, sea, space, and cyber domains.

Within the URI programs, the FY 2021 budget proposes to fund the Multidisciplinary University Research Initiative (MURI) program and Defense University Research Instrumentation Program (DURIP) below FY 2010 levels in real dollars. The MURI program regularly sponsors university basic research that produces revolutionary new military technologies. Drones, nanotechnology, biological detection capabilities and stealth detection sensors all stem from MURI-sponsored scientific research. DURIP helps ensure universities have the appropriate equipment needed to conduct cutting edge research of importance to DoD. The FY 2021 request for these programs would only exacerbate the problem that both are dramatically underfunded. ***In FY 2020, 339 MURI proposals were unfunded[6]. In FY 2020, DURIP received proposals requesting $295 million but was only able to award $49 million, which is less than FY 2019[7].*** It seems unlikely that competitor nations are underfunding scientific research programs in a similar way.

According to data collected by the National Science Foundation, colleges and universities perform more than 50 percent of all DoD basic research[8]. While industry may be picking up some of this slack given the underfunding as noted above, it is more likely that this research is simply not being done or, worse, is being conducted by competitor nations. Despite historic levels for RDT&E, it is clear the FY 2021 budget does not adequately prioritize or support the

[6] https://www.defense.gov/Newsroom/Releases/Release/Article/2099273/fiscal-year-2020-university-research-funding-awards/source/GovDelivery/

[7] https://www.defense.gov/Newsroom/Releases/Release/Article/2021937/dod-awards-489-million-to-universities-for-major-research-equipment/

[8] https://ncsesdata.nsf.gov/fedfunds/2017/html/ffs17-dt-tab009.html

basic research programs that will produce the foundation for future technologies necessary to maintain the U.S. military's global superiority.

Given the *NDS* priority of not fighting tomorrow's conflicts with yesterday's weapons, ***we respectfully request that you increase each URI PE and require that the additional dollars be used to support the MURI & DURIP programs.*** We request that these increases not come at the expense of the other initiatives funded under these PEs. We strongly encourage you to direct DoD to maintain and grow funding for both programs in the Future Years Defense Program.

Minerva Research Initiative

The FY 2021 budget proposes to eliminate Defense-Wide funding for Minerva, which is housed within the Basic Research Initiatives PE. In addition, the FY 2021 budget proposes to cancel 23 ongoing Minerva projects being conducted by more than 30 universities.

The Minerva Research Initiative is the Department's signature social science basic research program that funds university-led teams to address problems of strategic importance to U.S. national security. Minerva has aligned its research with the *NDS* in support of Department-wide priorities. Recently funded Minerva projects, such as "Russian Disinformation and Propaganda Campaigns" and "Empirical Analysis for Meeting Great Power Challenges" have given DOD unique insights that help shape future national security policies and better position the warfighter in a complex global environment. In FY 2018, Minerva only funded 12 projects but received approximately 175 applications. As noted by DoD officials, many of the challenges we face are social or have social elements to them and Minerva research is an important source of new ideas to better understand social, behavioral, cultural, and political aspects that are inherent to our security and stability. By only funding 7 percent of applications, we are missing out on new ideas that will enable us to maintain U.S. superiority with competitor nations and more astutely predict and deter the precursors of conflict. ***CNSR urges Congress to restore Defense-wide funding for Minerva and increase its overall budget to $17 million.***

Defense Applied Research PE Recommendations

Basic scientific research is just the first step in creating new military technologies. Researchers and scientists must apply the fundamental knowledge learned from basic research in order to solve military problems and develop the systems and components for potential solutions. To that end, we would like to highlight the success of the Defense-Wide Manufacturing Science & Technology PE, which provides resources for DoD's contribution to the Manufacturing USA Network. The Network's institutes form public-private partnerships that help move discoveries from the nation's universities and research laboratories to the defense industrial base while enhancing the workforce. For example, Manufacturing USA created technologies and solutions for reducing weight in aerospace parts by up to 40 percent, built light-based communications systems enabling more effective and safe clandestine operations, developed cybersecurity awareness and compliance tools targeted at securing small- and medium-sized manufacturers and universities, and provided workforce training opportunities for more than 200,000 individuals in FY 2018. The *NDS* says, "Support for a vibrant domestic manufacturing sector, a solid defense industrial base, and resilient supply chains is a national priority." The Manufacturing USA

Network is an example of a program consistent with the *NDS* in support of domestic manufacturing and the defense industrial base.

Defense Advanced Research Projects Agency (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 all started as DARPA projects. CNSR supports funding for DARPA of $3.6 billion to further lead scientific research in areas such as AI, hypersonics, biological technologies, microelectronics, autonomous systems, and long-range anti-ship capabilities.

Defense Medical Research Recommendations

In order to maintain a strong military, the U.S. must have healthy families and soldiers. Therefore, it is imperative for DoD to contribute to curing diseases that affect the men and women in the military, their families, veterans, and the broader public. Additionally, defense medical research programs help ensure the U.S. 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 advances that benefit civilian medical practices, such as regenerative medicines, vaccine developments, and emergency field treatments. For all these reasons, CNSR is particularly supportive of the Congressionally Directed Medical Research Programs (CDMRPs) and respectfully requests Congress provide robust funding for CDMRPs in FY 2021.

Thank you for your commitment to a robust Defense S&T program. Please do not hesitate to contact me if CNSR can be of any service to you.

Sincerely,

John Latini
Chairman
Coalition for National Security Research (CNSR)

CNSR FY 2021 Appropriations Priorities

PBR Line	PE Number	Agency - RDT&E	Program Element (PE) *($ in Thousands)*	FY20 Enacted	FY21 PBR		CNSR FY21 Request
Army Basic Research Program Elements							
2	601102A	Army	Defense Research Sciences	$354,480	$303,257		$375,749
3	601103A	Army	University Research Initiatives	$87,858	$67,148		$93,129
4	601104A	Army	University and Industry Research Centers	$127,164	$87,877		$134,794
5	601121A	Army	Cyber Collaborative Research Alliance	$4,982	$5,077		$5,281
Army Applied Research Program Elements							
10	602141A	Army	Lethality Technology	$69,961	$42,425		General Support
12	602143A	Army	Soldier Lethality Technology	$145,900	$125,435		General Support
13	602144A	Army	Ground Technology	$146,399	$28,047		General Support
14	602145A	Army	Next Generation Combat Vehicle Technology	$263,547	$217,565		General Support
60	603461A	Army	High Performance Computing Modernization	$224,755	$188,024		General Support
Navy Basic Research Program Elements							
1	601103N	Navy	University Research Initiatives	$167,850	$116,816		$177,921
3	601153N	Navy	Defense Research Sciences	$463,829	$467,158		$491,659
Navy Applied Research Program Elements							
6	602131M	Navy	Marine Corps Land Force Technology	$69,104	$50,623		General Support
7	602235N	Navy	Common Picture Applied Research	$42,846	$48,001		General Support
8	602236N	Navy	Warfighter Sustainment Applied Research	$95,825	$67,765		General Support
9	602271N	Navy	Electromagnetic Systems Applied Research	$88,497	$84,994		General Support
10	602435N	Navy	Ocean Warfighting Environmental Applied Research	$82,582	$63,392		General Support
13	602750N	Navy	Future Naval Capabilities Applied Research	$152,012	$167,590		General Support
22	603680N	Navy	Manufacturing Technology Program	$65,138	$60,122		General Support
87	604536N	Navy	Advanced Undersea Prototyping	$187,187	$115,858		General Support
Air Force Basic Research Program Elements							
1	601102F	Air Force	Defense Research Sciences	$356,107	$315,348		$377,473
2	601103F	Air Force	University Research Initiatives	$178,859	$161,861		$189,591
3	601108F	Air Force	High Energy Laser Research Initiatives	$14,795	$15,085		$15,683
Air Force Applied Research Program Elements							
4	602102F	Air Force	Materials	$215,851	$140,781		General Support
6	602202F	Air Force	Human Effectiveness Applied Research	$134,795	$115,222		General Support
8	602204F	Air Force	Aerospace Sensors	$219,912	$211,301		General Support
13	602605F	Air Force	Directed Energy Technology	$124,379	$128,113		General Support
14	602788F	Air Force	Dominant Information Sciences and Methods	$216,062	$178,668		General Support
15	602890F	Air Force	High Energy Laser Research	$48,221	$45,088		General Support
Defense-Wide Basic Research Program Elements							
1	601000BR	Defense-Wide	DTRA Basic Research Initiatives	$26,000	$14,617		$27,560
3	601110D8Z	Defense-Wide	Basic Research Initiatives	$70,874	$35,565		$75,126
5	601120D8Z	Defense-Wide	National Defense Education Program	$144,074	$100,241		$152,718
Defense-Wide Applied Research Program Elements							
16	602668D8Z	Defense-Wide	Cyber Security Research	$25,118	$15,255		General Support
47	603680D8Z	Defense-Wide	Defense-Wide Manufacturing S&T Program	$197,397	$93,817		$209,241
61	603833D8Z	Defense-Wide	Engineering Science and Technology	$19,376	$0		General Support
DARPA Total							
		Defense-Wide	***DARPA Total***	***$3,458,321***	***$3,566,397***		***$3,665,820***
Medical Research Program Elements							
40	602787A	Army	Medical Technology	$112,955	$95,496		General Support
42	603002A	Army	Medical Advanced Technology	$83,030	$38,896		General Support
86	603807A	Army	Medical Systems Advanced Development	$36,975	$28,520		General Support
		DHP	Research, Development, Test and Evaluation Research	$12,621	TBD		General Support
		DHP	Exploratory Development	$84,266	TBD		General Support
		DHP	CDMRPs	$1,615,600	$0		$1,712,536

To learn more or contact the Coalition for National Security Research (CNSR), please visit https://cnsr4research.org or email cnsr.dodresearch@gmail.com.