Testimony of the Coalition for National Security Research (CNSR)
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Subcommittee on Defense, Committee on Appropriations, U.S. House of Representatives

Defense Science & Technology (S&T) Program and Basic Research Funding for FY 2021

Chairman Visclosky, Ranking Member Calvert and distinguished Members of the subcommittee, thank you for the opportunity to submit public witness testimony as you begin to craft the fiscal year (FY) 2021 Defense Appropriations bill. The Coalition for National Security Research (CNSR) (https://cnsr4research.org/) is a broad-based alliance of 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.

As you would expect, CNSR members are diligently working to help combat the COVID-19 pandemic. From conducting research on vaccines and other therapeutics, 3D printing personal protective equipment, and creating emergency ventilators, we are working to support the federal response and our local communities. In many cases, prior DoD-sponsored research has helped create the expertise and capabilities we are now utilizing during the global pandemic. We thank the subcommittee for its role in providing supplemental appropriations to fight the pandemic including the funds provided to the Defense Health Program. CNSR is eager to work with the subcommittee on future supplemental appropriations bills to provide emergency support to the nation's research enterprise not only to combat the pandemic, but to ensure that negative impacts to existing national security relevant research and workforce are minimal.

Going forward, as hopefully the pandemic subsides, CNSR urges the subcommittee to provide robust support for the Defense Science and Technology (S&T) program in the FY 2021 Defense Appropriations bill. 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 that Congress provides not only robust funding for Research, Development, Test & Evaluation (RDT&E) but specifically 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 as 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. The Defense S&T program serves as the foundation of the DoD's mission to meet the *NDS's* objectives of deterring adversaries, sustaining Joint Force military advantages, establishing an unmatched twenty-first century National Security Innovation Base (NSIB), and continuously improving and developing military technologies and capabilities that provide technological

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

overmatch while anticipating the future needs of our Armed Forces. Simply put, you cannot fight tomorrow's conflicts with yesterday's weapons and technologies.

Unfortunately, the FY 2021 budget request fails to provide the resources to meet the objectives of the *NDS*. While the budget includes the largest 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 the Office of Management and Budget (OMB), the FY 2021 budget request would result in a cut of *7 percent* to the Defense R&D portfolio, producing an *11 percent* cut for basic research and a *12 percent* cut to applied research compared to the previous year[2]. ***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 designed to create the new technologies and capabilities – as well as help train the next generation workforce - to ensure the U.S. military maintains its global 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

CNSR urges Congress to reject these cuts and increase Defense S&T funding consistent with recommendations of the National Defense Strategy Commission[4] and the 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 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

[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

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 an 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[6]. Drones, nanotechnology, biological detection capabilities and stealth detection sensors all stem from MURI-sponsored scientific research[7]. 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[8] and DURIP received proposals requesting $295 million but was only able to award $49 million, which is less than FY 2019[9].*** It seems unlikely that competitor nations are underfunding scientific research programs in a similar way.

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.

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[6] https://www.ida.org/idamedia/Corporate/Files/Publications/IDA.../STD/D-5361.pdf
[7] Ibid
[8] https://www.defense.gov/Newsroom/Releases/Release/Article/2099273/fiscal-year-2020-university-research-funding-awards/source/GovDelivery/
[9] https://www.defense.gov/Newsroom/Releases/Release/Article/2021937/dod-awards-489-million-to-universities-for-major-research-equipment/

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[10]. 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.***

Finally, below please find the remainder of CNSR's basic research PE recommendations:

PE Number	Agency/RDT&E	Program Element	FY 21 Request (Thousands)
601102A	Army	Defense Research Sciences	$375,749
601103A	Army	University Research Initiatives	$93,129
601104A	Army	University and Industry Research Centers	$134,794
601121A	Army	Cyber Collaborative Research Alliance	$5,281
601103N	Navy	University Research Initiatives	$177,921
601153N	Navy	Defense Research Sciences	$491,659
601102F	Air Force	Defense Research Sciences	$377,473
601103F	Air Force	University Research Initiatives	$189,591
601108F	Air Force	High Energy Laser Research Initiatives	$15,683
601000BR	Defense-Wide	DTRA Basic Research Initiatives	$27,560
601110D8Z	Defense-Wide	Basic Research Initiatives	$75,126
601120D8Z	Defense-Wide	National Defense Education Program	$152,718

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

[10] https://www.defense.gov/Newsroom/Releases/Release/Article/1787646/dod-announces-fy2018-minerva-research-initiative-awards/

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.

Below please find CNSR's applied research PE recommendations along with DARPA and priority medical research programs.

PE Number	Agency/RDT&E	Program Element	FY 21 Request (Thousands)
602141A	Army	Lethality Technology	General Support
602143A	Army	Soldier Lethality Technology	General Support
602144A	Army	Ground Technology	General Support
602145A	Army	Next Generation Combat Vehicle Technology	General Support
603461A	Army	High Performance Computing Modernization	General Support
602131M	Navy	Marine Corps Land Force Technology	General Support
602235N	Navy	Common Picture Applied Research	General Support
602236N	Navy	Warfighter Sustainment Applied Research	General Support
602271N	Navy	Electromagnetic Systems Applied Research	General Support
602435N	Navy	Ocean Warfighting Environmental Applied Research	General Support
602750N	Navy	Future Naval Capabilities Applied Research	General Support
603680N	Navy	Manufacturing Technology Program	General Support
604536N	Navy	Advanced Undersea Prototyping	General Support
602102F	Air Force	Materials	General Support
602202F	Air Force	Human Effectiveness Applied Research	General Support
602204F	Air Force	Aerospace Sensors	General Support
602605F	Air Force	Directed Energy Technology	General Support
602788F	Air Force	Dominant Information Sciences and Methods	General Support
602890F	Air Force	High Energy Laser Research	General Support
602668D8Z	Defense-Wide	Cyber Security Research	General Support
603680D8Z	Defense-Wide	Defense-Wide Manufacturing S&T Program	$209,241
603833D8Z	Defense-Wide	Engineering Science and Technology	General Support
	Defense-Wide	DARPA Total	$3,665,820
602787A	Army	Medical Technology	General Support
603002A	Army	Medical Advanced Technology	General Support
603807A	Army	Medical Systems Advanced Development	General Support
	DHP	Research, Development, Test and Evaluation Research	General Support
	DHP	Exploratory Development	General Support
	DHP	CDMRPs	$1,712,536

Again, thank you for the opportunity to submit public witness testimony as you develop the FY 21 Defense Appropriations bill. Please do not hesitate to contact me if we can be of any service to you.