

**Coalition for National Security Research (CNSR)**  
**Prepared for the Subcommittee on Defense, Committee on Appropriations, U.S. Senate**  
**Defense Science & Technology (S&T) and Basic Research Funding for Fiscal Year 2022**

Dear Chairman Tester and Ranking Member Shelby, and distinguished Members of the subcommittee, thank you for the opportunity to submit outside witness testimony as you begin to craft the fiscal year (FY) 2022 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.

With nearly 70 percent of Research, Development, Test and Evaluation (RDT&E) conducted extramurally<sup>1</sup>, DoD relies on its partners such as CNSR members to perform the RDT&E that will provide the Department the technologies and capabilities it needs to secure our national security. If the United States military is to maintain its technological advantage during great power competition, it is imperative that we make robust investments in the Defense Science and Technology (S&T) enterprise, including strengthening the future defense workforce. *As noted by the Defense Science Board (DSB), lower funding levels for Defense S&T could threaten the dominance of the U.S. military*<sup>2</sup>.

**FY 2022 Budget Request for the Defense S&T Program**

The Biden-Harris Interim National Security Strategic Guidance states that the United States will double down on science and technology investments and support cutting-edge technologies and capabilities that will advance our military and national security in the future<sup>3</sup>. In addition, the National Defense Strategy (NDS) calls for establishing an unmatched twenty-first century national security innovation base and sustaining Joint Force military advantages<sup>4</sup>. *Unfortunately, the FY 2022 budget fails to meet the commitment in the Interim National Security Strategic Guidance and request the appropriate resources to implement the NDS.*

While the budget requests the RDT&E top line ever, it simultaneously calls for cutting Defense S&T funding within the larger portfolio by **13%** or more than **\$2.1 billion**. The budget also requests cutting defense basic research, the type of research that makes discoveries to enable future technologies and military capabilities, by **14.5%** or more than **\$388 million**. With China investing three times more annually in R&D than the U.S. and likely to be the world's top R&D performer in the near future<sup>5</sup>, now is not the time to cut funding for the DoD's primary programs that create new technologies and capabilities – as well as to help train the next generation defense workforce – to ensure the U.S. military maintains its global dominance.

The FY 2022 budget proposes more than just cutting the Defense S&T program below FY 2021 Congressionally enacted levels, it proposes to cut certain research programs below levels requested in the FY 2021 budget request. More specifically, DoD requested fewer resources compared to its last budget request for overall 6.1 defense basic research; Army University Research Initiatives; Army applied research; Navy basic research; Air Force basic research; Air Force applied research; DTRA Basic Research Initiatives; and Defense-Wide basic research. This de-emphasis on supporting the kind of research that maintains our technological and strategic advantage over adversaries developing advanced

---

<sup>1</sup> <https://nces.nsf.gov/pubs/nsf21329>

<sup>2</sup> <https://dsb.cto.mil/reports/1990s/DefenseScienceandTechnologyBaseforthe21stCentury.pdf>

<sup>3</sup> <https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/03/interim-national-security-strategic-guidance/>

<sup>4</sup> <https://dod.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf>

<sup>5</sup> <https://nces.nsf.gov/pubs/nsb20203>

capabilities puts the military at a competitive disadvantage. Condoning this proposed budget will have many negative, sustained implications for our national security in the short-term and long-term.

***CNSR urges Congress to reject cuts requested in the FY 2022 budget for the Defense S&T program and increase funding by least 6% over FY 2021 consistent with the recommendations from the National Defense Strategy Commission<sup>6</sup>; DSB<sup>7</sup>; National Security Commission on Artificial Intelligence (NSCAI)<sup>8</sup>; National Academies<sup>9</sup>; Center for a New American Security (CNAS)<sup>10</sup>; House Armed Services Committee’s Future of Defense Task Force<sup>11</sup>; Council on Competitiveness<sup>12</sup>; and American Academy of Arts and Sciences<sup>13</sup>.***

**Defense Basic Research PE Recommendations**

For decades, the defense basic research programs have provided the scientific breakthroughs to give the warfighter the weapons and infrastructure needed to succeed. Capabilities that help ensure our national security – such as advances in hypersonics testing, various quantum technologies, semiconductors critical to defense radar systems, solar cell efficiency, laser technologies, stealth capabilities, night vision, GPS, sonar, radar, precision munitions, biosensors, and near-real-time delivery of battlefield information – all derive from defense basic research.

We offer the following recommendations for the key defense basic research PEs that serve as the foundation of the defense innovation pipeline necessary to maintaining the U.S military’s global technological superiority.

<b>Agency - RDT&amp;E</b>	<b>Program Element (PE) (\$ in Thousands)</b>	<b>FY21 PBR</b>	<b>FY21 Enacted</b>	<b>FY22 PBR</b>	<b>CNSR FY22 Request</b>
Army	Defense Research Sciences	\$303,257	\$367,457	\$297,241	\$389,504
Army	University Research Initiatives	\$67,148	\$97,148	\$66,981	\$102,977
Army	University and Industry Research Centers	\$87,877	\$121,877	\$94,003	\$129,190
Army	Cyber Collaborative Research Alliance	\$5,077	\$5,077	\$5,067	\$5,382
Army	Artificial Intelligence and Machine Learning Basic Research	N/A	N/A	\$10,183	N/A
Navy	University Research Initiatives	\$116,816	\$144,816	\$117,448	\$153,505
Navy	Defense Research Sciences	\$467,158	\$489,984	\$484,421	\$519,383
Air Force	Defense Research Sciences	\$315,348	\$325,348	\$328,303	\$344,869
Air Force	University Research Initiatives	\$161,861	\$196,861	\$162,403	\$208,673
Air Force	High Energy Laser Research Initiatives	\$15,085	\$15,085	\$0	\$15,990
Defense-Wide	DTRA Basic Research Initiatives	\$14,617	\$14,617	\$11,828	\$15,494
Defense-Wide	Basic Research Initiatives	\$35,565	\$75,565	\$39,828	\$80,099
Defense-Wide	National Defense Education Program	\$100,241	\$137,241	\$112,195	\$145,475

***University Research Initiatives***

The FY 2022 budget request would cut University Research Initiatives (URIs) by more than **20%** which means funding at levels below 2005, adjusted for inflation. Given that universities and colleges perform the majority (55%) of DoD-funded basic research<sup>14</sup>, the type of research that creates paradigm shifts in DoD’s technological capabilities, cutting URIs this significantly will not only harm defense innovation

<sup>6</sup> <https://www.usip.org/sites/default/files/2018-11/providing-for-the-common-defense.pdf>

<sup>7</sup> <http://www.dtic.mil/dtic/tr/fulltext/u2/a403874.pdf>

<sup>8</sup> <https://www.nsc.gov/wp-content/uploads/2021/03/Full-Report-Digital-1.pdf>

<sup>9</sup> <https://www.nap.edu/catalog/11463/rising-above-the-gathering-storm-energizing-and-employing-america-for>

<sup>10</sup> <https://www.cnas.org/publications/commentary/sharpening-the-u-s-militarys-edge-critical-steps-for-the-next-administration>

<sup>11</sup> <https://armedservices.house.gov/cache/files/2/6/26129500-d208-47ba-a9f7-25a8f82828b0/6D5C75605DE8DDF0013712923B4388D7.future-of-defense-task-force-report.pdf>

<sup>12</sup> <https://www.compete.org/reports/all/202>

<sup>13</sup> [https://www.amacad.org/sites/default/files/publication/resources/Perils-of-Complacency\\_Full-Report\\_1.pdf](https://www.amacad.org/sites/default/files/publication/resources/Perils-of-Complacency_Full-Report_1.pdf)

<sup>14</sup> <https://nces.nsf.gov/pubs/nsf21329>

efforts, but also workforce development since basic research funding often attracts the most creative minds in fields of critical interest to DoD<sup>15</sup>.

A program within URIs, the Multidisciplinary University Research Initiative (MURI) regularly produces revolutionary new military technologies and has become an essential skunkworks for create innovation<sup>16</sup>. Unfortunately, the FY 2022 budget request proposes to fund MURIs at levels below FY 2005, adjusted for inflation. This will only exacerbate the fact that the program is already dramatically underfunded. *According to DoD, the MURI program received 365 proposals in FY 2020 but was only able to make 26 awards – leaving 339 proposals unfunded including 32 potentially game-changing research projects that were determined to be worthy of funding but were not due to a lack of appropriations.* Not funding potentially revolutionary defense scientific research will hurt our ability to maintain global military technological superiority.

In addition, the situation is similar for the Defense University Research Instrumentation Program (DURIP), which provides infrastructure and equipment support to build universities' capacity to conduct defense-relevant research. The FY 2022 budget request proposes to fund DURIP at levels below FY 2010, adjusted for inflation, further underfunding this program. *According to DoD, the DURIP program received 724 proposals in FY 2020 but was only able to make 172 awards – leaving a staggering 552 proposals unfunded including 229 critical infrastructure and equipment projects that were determined to be worthy of funding but were not funded due to a lack of appropriations.* If universities and colleges do not have the infrastructure and equipment necessary to do unique defense research, the DoD will potentially lose its biggest source of support for developing new capabilities.

#### ***Minerva Research Initiative***

The Minerva Research Initiative is DoD's signature social science basic research program that funds university-led teams to address problems of strategic importance to U.S. national security. As noted by DoD officials, because many national security challenges are driven by complex social dynamics, Minerva is an important source of new ideas to better understand social, behavioral, cultural, and political considerations that are inherent to our security and stability. Despite its importance, the FY 2022 budget request cuts funding for Minerva from \$17 million to only **\$4 million** within the Defense-Wide Basic Research Initiatives PE.

This cut is shortsighted for two main reasons. First, Minerva's research is aligned with and critical to carrying out 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 to navigate a complex global environment. Second, Minerva is another underfunded defense basic research program. *According to DoD, in FY 2019, Minerva received 180 applications but only funded 15 – at least 6 projects were determined to be worthy of funding but were not funded due to a lack of appropriations.*

#### **Defense Applied Research PE Recommendations**

Basic scientific research is just the first step in creating new or improving existing military technologies. Researchers, scientists, and engineers must apply the fundamental knowledge learned from basic research to solve complex military problems and develop the systems and components for potential solutions. To that end, we propose to highlight the success of the Defense-Wide Manufacturing Science & Technology PE, which the FY 2022 budget requests cuts of **45%**. This PE provides DoD's contributions to the Manufacturing USA Institutes that help move discoveries from the nation's universities and research

---

<sup>15</sup> <https://dsb.cto.mil/reports/2010s/BasicResearch.pdf>

<sup>16</sup> <https://www.ida.org/idamedia/Corporate/Files/Publications/IDA.../STD/D-5361.pdf>

laboratories to the defense industrial base while strengthening the U.S. workforce. For example, DoD-funded institutes have demonstrated enhanced heat exchange capabilities for additive manufacturing, addressed cybersecurity supply chain issues, reduced weight of armor for military ground vehicles, and developed a first-of-its-kind advanced functional fiber to enable underwater communications<sup>17</sup>. In FY 2019, the Manufacturing USA Institutes conducted 561 major applied research and development projects of high priority to broad industry sectors. In addition, the network had more than 32,000 workers and students participate in education and workforce development activities. The Manufacturing USA Network is an example of a program supporting implementation of the *NDS* to enhance the domestic manufacturing and the defense industrial base. In order to ensure that discoveries made through basic research are translated into practical military technologies and capabilities, we offer the following recommendations for our priority applied research PEs.

<b><u>Agency - RDT&amp;E</u></b>	<b><u>Program Element (PE) (\$ in Thousands)</u></b>	<b><u>FY21 PBR</u></b>	<b><u>FY21 Enacted</u></b>	<b><u>FY22 PBR</u></b>	<b><u>CNSR FY22 Request</u></b>
Army	Lethality Technology	\$42,425	\$108,925	\$64,126	General Support
Army	Soldier Lethality Technology	\$125,435	\$204,435	\$105,168	General Support
Army	Ground Technology	\$28,047	\$154,047	\$56,400	General Support
Army	Next Generation Combat Vehicle Technology	\$217,565	\$265,565	\$172,166	General Support
Army	High Performance Computing Modernization	\$188,024	\$228,024	\$189,123	General Support
Navy	Marine Corps Land Force Technology	\$50,623	\$55,623	\$51,112	General Support
Navy	Common Picture Applied Research	\$48,001	\$43,703	\$51,477	General Support
Navy	Warfighter Sustainment Applied Research	\$67,765	\$116,255	\$70,547	General Support
Navy	Electromagnetic Systems Applied Research	\$84,994	\$92,994	\$85,157	General Support
Navy	Ocean Warfighting Environmental Applied Research	\$63,392	\$80,284	\$70,086	General Support
Navy	Future Naval Capabilities Applied Research	\$167,590	\$170,724	\$173,356	General Support
Navy	Manufacturing Technology Program	\$60,122	\$60,122	\$57,263	General Support
Navy	Advanced Undersea Prototyping	\$115,858	\$89,812	\$58,473	General Support
Air Force	Materials	\$140,781	\$238,281	\$113,460	General Support
Air Force	Human Effectiveness Applied Research	\$115,222	\$134,122	\$136,273	General Support
Air Force	Aerospace Sensors	\$211,301	\$233,301	\$174,683	General Support
Air Force	Directed Energy Technology	\$128,113	\$130,613	\$121,869	General Support
Air Force	Dominant Information Sciences and Methods	\$178,668	\$215,668	\$169,110	General Support
Air Force	High Energy Laser Research	\$45,088	\$29,208	\$0	General Support
Defense-Wide	Cyber Security Research	\$15,255	\$25,255	\$15,380	General Support
Defense-Wide	Defense-Wide Manufacturing S&T Program	\$93,817	\$245,817	\$134,022	\$260,566

### ***Defense Advanced Research Projects Agency (DARPA) Recommendations***

DARPA's ability to create truly revolutionary new capabilities is well documented. AI, microelectronics, speech recognition, touchscreen displays, unmanned aerial vehicles, and advanced wireless capabilities all stem from DARPA-funded research. DARPA has worked with the academic community to create the Internet, computer chips critical to AI systems, self-driving cars, stealth technologies, metamaterials, and neuro-prosthetics. More recently, DARPA's research was partially responsible for developing RNA-based vaccines, which have been critical in the global response to COVID-19<sup>18</sup>. It is safe to say that the world would be a different place without DARPA-enabled research. CNSR strongly supports robust funding for DARPA. *We recommend a funding level of \$3.7 billion for DARPA to continue supporting game-changing scientific research.*

Again, thank you for the opportunity to submit outside witness testimony as you develop the FY 2022 Defense Appropriations bill. Please do not hesitate to contact us if we can be of any assistance during the FY 2022 appropriations process.

<sup>17</sup> <https://www.nist.gov/publications/manufacturing-usa-20192020-highlights-report>

<sup>18</sup> <https://www.appropriations.senate.gov/imo/media/doc/Tompkins%20Statement%20For%20The%20Record.pdf>