

Defense Policy Update: Congress Releases Conferenced FY 2021 National Defense Authorization Act (NDAA)

Lewis-Burke Associates LLC – December 7, 2020

Congress released a conferenced bill for the fiscal year (FY) 2021 *National Defense Authorization Act* (NDAA) after negotiating more than 2,200 different provisions between the House and Senate versions of the bill. Although President Trump threatened to veto this year's bill for multiple reasons, it is unclear if these threats will impact the NDAA's passage, as both the House and Senate passed their respective versions of the bill by veto-proof majorities earlier this year and are expected to do so again without the provisions for which the President advocated. The NDAA is an annual bipartisan bill that authorizes programs and sets policies pertaining to the Department of Defense (DOD) and U.S. national security.

The bill would authorize \$740.5 billion in discretionary funding, including \$635.5 billion for DOD for base functions and \$69 billion for Overseas Contingency Operations (OCO). The FY 2021 NDAA would authorize \$104.7 billion in research, development, test, and evaluation (RDT&E) funds, a 2.3 percent increase over the FY 2020 authorized level. The science and technology accounts would see a 9.8 percent increase above the FY 2020 authorized level, though the basic research accounts would see a smaller increase of about 1.1 percent. While NDAA authorizes funding levels and sets policy and program priorities, funding is directed through the defense appropriations bill, which is still being negotiated for FY 2021.

The provisions in the FY 2021 NDAA reflect several congressional priorities for addressing national security challenges from China facing the U.S. research and innovation enterprise as well as science and technology (S&T) areas, including the industries of the future. These S&T areas include emerging technologies such as artificial intelligence (AI), cybersecurity, microelectronics, 5G, quantum, hypersonics, directed energy, and biotechnology. The bill also contains provisions that address efforts to strengthen the DOD STEM workforce; protect the research enterprise from foreign espionage; and fix vulnerabilities in the domestic supply chain and defense industrial base, an issue that has become even more prominent given the COVID-19 pandemic. Other provisions would enact protections for the Minerva Research Initiative, DOD's flagship social science research program, and establish initiatives to prepare for emerging climate-related national security issues. A summary of provisions relevant to research and higher education is below.

STEM Workforce and Talent Development

Leadership of the Senate and House Armed Services Committees (SASC and HASC) have emphasized the importance of a robust STEM workforce that can lead the U.S. in key technology areas and industries of the future that impact national security. Provisions in the conferenced bill would:

- Direct DOD to conduct a study of mechanisms and incentives the Department can use to retain and properly vet foreign scientific talent in the United States
- Codify the National Security Innovation Network, which seeks to connect DOD with innovators in academia and the private sector, to create new models to recruit talent and adopt new concepts and technologies more quickly through programs, such as Hacking for Defense
- Establish a scholarship for service pilot program under DOD's Science, Mathematics, and Research for Transportation (SMART) Defense Education Program for students at Minority-

Serving Institutions (MIs) to pursue internships or other temporary employment opportunities with DOD

- Establish a program to create opportunities for part-time employment at DOD for faculty and students at institutions of higher education to expedite DOD's access to talent at universities
- Direct DOD to establish a program to partner with industry contractors to carry out community service activities to promote interest in STEM careers
- Direct the Secretary of Defense to partner with the National Academies of Sciences, Engineering, and Medicine (NASEM) to conduct a comparative analysis of efforts by China and the U.S. to recruit and retain domestic and foreign researchers. This would include comparing Chinese talent programs and incentives to those in the U.S., as well as posing recommendations for U.S. improvement
- Provisions to establish a traineeship program in the Office of the Undersecretary of Defense for Research and Engineering (OUSD(R&E)) to strengthen DOD's access to talent in scientific and technological areas important to national security were not included. However, the conference report would direct the OUSD(R&E) to work with the National Science Foundation (NSF) to provide a cost benefit analysis of different training and educational models to expand access to scientific talent

Science and Security

Several provisions in the conferenced FY 2021 NDAA would address science and security issues, as both Democrats and Republicans in Congress are concerned about the Chinese government's espionage and theft of intellectual property from U.S. institutions and federally funded research. Provisions in the bill would:

- Require principal investigators (PI) applying for grants from any federal research agency to disclose foreign funding sources. The amendment also lays out potential actions that agencies could implement, such as rejecting applications, discontinuing funding for a PI, or referring cases to law enforcement. The provision would require the organization applying for funding to make all PIs aware of this requirement. An amendment to the House's earlier version lists conditions under which a federal agency may act against an entity, as well as an individual PI, that does not fulfill these requirements. The bill would direct the White House Office of Science and Technology Policy (OSTP) to ensure that federal agencies implement this requirement in a consistent manner
- Designate an official within OUSD(R&E) to establish an initiative to work with the academic community to protect research from foreign influence and espionage
- Restrict DOD from providing funding to institutions of higher education with Confucius Institutes, except for funds provided directly to students, unless DOD issues waivers. The waivers would be issued by the Secretary of Defense, in consultation with NASEM. The waiver process would be managed by the new Academic Liaison, noted above. The limitation would apply 24 months after the date of the enactment of the NDAA. The conference report also lays out conditions for waivers, including ensuring that academic freedom and defense-funded research activities at the institution are protected
- Require background checks as a prerequisite for individuals who want to participate in the DOD Technology and National Security Fellowship program

U.S. Defense Industrial Base and Supply Chain Security

The bill reflects Congress' concerns over vulnerabilities in the U.S. supply chain, especially where DOD relies on either a sole domestic or foreign producer, such as those based in China. This issue was

highlighted in recent hearings as a significant challenge for the federal COVID-19 response. To address this issue, the bill would:

- Direct the Under Secretary of Defense for Acquisition and Sustainment (USD(A&S)) to develop policy recommendations to better implement Executive Order 13806, *Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency*
- Require a report from the Secretary of Defense on strategic and critical minerals and metals for DOD that may be vulnerable to supply chain disruptions
- Direct the Deputy Secretary of Defense to conduct an assessment and provide recommendations to strengthen the national security innovation base
- Authorize DOD to work with the NIST to assist small manufacturers with cybersecurity practices and compliance with cybersecurity standards
- Direct the Director of NIST to carry out a study to evaluate the feasibility of establishing a supply chain database under the Manufacturing Extension Partnership (MEP) program. Another provision would require each Manufacturing USA institute to contract with a Hollings MEP Center to provide outreach to small and medium sized manufacturers
- Provisions prohibiting procurement of foreign made unmanned aircraft systems (UAS) were not included in the bill. Several organizations in the research community expressed concern over the inability to procure affordable UAS to conduct research domestically. Report language would direct the Department to continue to address supply chain vulnerabilities for UAS and provide a report on projected demand for small UAS components
- Direct the Secretary of Defense to submit a report on the new Defense Manufacturing Communities Support Program, examining the programs impact on diversifying DOD's supply chains and procurement costs

Emerging Technologies

Congress continues to push the federal government to increase and coordinate investments to ensure U.S. leadership emerging technology areas critical to national security and the industries of the future. This interest is clearly reflected in many of the provisions of the NDAA. One provision would direct OSTP to submit a plan to double investments in AI and quantum information science by FY 2022 and increase investments in other industries of the future by \$10 billion. This provision, which reflects [language](#) from the Senate Commerce, Science, and Transportation Committee's *Industries of the Future Act of 2020*, would also establish an interagency Industries of the Future Coordination Council to organize agency investments in these technology areas. Another provision would direct NIST to conduct a study and make recommendations on addressing China's efforts to influence international standards for these emerging technologies. Below is additional information on provisions related to these emerging technologies

Artificial Intelligence

The FY 2021 NDAA includes an amendment from the House bill, put forward by Rep. Kendra Horn (D-OK), to establish a National AI Initiative. This language was based on the House Science, Space, and Technology Committee's [National Artificial Intelligence Initiative Act](#), which would:

- Establish an interagency coordination office for AI research
- Authorize the AI research institutes, as well as AI research activities at NSF, Department of Energy (DOE), and National Institutes of Standards and Technology (NIST)
- Mandate a report on AI impacts on the U.S. workforce, among other actions

The bill also includes many recommendations issued by the National Security Commission on Artificial Intelligence (NSCAI), which was established by the FY 2019 NDAA and focused on addressing workforce and talent initiatives underpinning technology efforts. Some of these recommendations included elevating the reporting structure of the Joint Artificial Intelligence Center (JAIC) and establishing a Steering Committee on Emerging Technologies within the DOD to assess emerging threats and technology capabilities. The bill would direct a briefing from the JAIC on its established and prospective relationships with universities, academic consortia, and private sector institutions, as well as direct the JAIC to assess whether DOD has the capability to ensure AI technology acquired by the Department is ethically and responsibly developed.

Cybersecurity

Strengthening cybersecurity continues to be a priority for Congress. The conferenced bill included 17 recommendations from the Cyber Solarium Commission (CSC) that would establish a Principal Cyber Advisor to help coordinate all federal cyber efforts. Several publications have speculated that CSC co-chairman Chris Inglis, former Deputy Director of the National Security Agency, or former National Security Council Cyber Director Michael Daniel could be potential nominees for the Biden Administration. The FY 2021 NDAA would extend the authority of the CSC to monitor and assess federal implementation of the recommendations from its final report and any new issues that emerge during that time. Other provisions in the NDAA would:

- Direct DOD to submit a report on recommendations to better align and harmonize federal cyber education and training programs
- Require a report on the Cyber Institutes program and opportunities to expand to additional institutions of higher education that have a Reserve Officers' Training Corps (ROTC) program
- Reauthorize DHS's Cybersecurity Education and Training Assistance Programs (CETAP)
- Direct USD(A&S) to brief the Armed Services Committees on its plan to implement the Cybersecurity Maturity Model Certification (CMMC) framework

Next Generation Wireless (5G)

The FY 2021 NDAA reflects Congress' continued emphasis on the importance of U.S. leadership in 5G, as well as concerns over potential threats to 5G networks posed by Chinese companies, such as Huawei or ZTE. Several provisions would direct and encourage the Department to continue to consider risks posed by networks operated by these companies. Other provisions would seek to advance U.S. 5G capabilities, which would:

- Adopt language from the *Utilization Strategic Allied (USA) Telecommunications Act*, a bipartisan, bicameral bill that seeks to ensure U.S. leadership in 5G networks. Among other provisions, this language would establish a "Public Wireless Supply Chain Innovation Fund," funded through the appropriations process and managed by the National Telecommunications and Information Administration (NTIA) for ten years. Under this fund, NTIA would make grants of up to \$50 million to advance 5G technologies that enable open interface network architectures
- Establish a Department-wide cross-functional team to develop and implement a plan to transition 5G technology for operational uses. This team, which would be led by USD(R&E) until it is transitioned to the Chief Information Officer in 2023, would coordinate policy, oversight, research, integration with other DOD technology efforts and initiatives. An amendment included by the House would also direct DOD to establish a telecommunications security program communicate threats and assess internal telecommunications systems for vulnerabilities

- Direct the Secretary to demonstrate specific technologies critical to next generation wireless, including virtualized radio access networking (RAN) and massive multiple input multiple output (MIMO) radio assays, a technology that allows many devices to send data signals simultaneously
- Task the National Academies of Sciences, Engineering, and Medicine (NASEM) to conduct an independent technical review of the Federal Communications Commission’s decision to allow Ligado to establish a 5G network adjacent to DOD-managed spectrum and its potential impact to DOD’s GPS-enabled systems. Additional background on this issue can be found in Lewis-Burke’s analysis [here](#)

Microelectronics

The conference bill also contains language from the *Creating Helpful Incentives to Produce Semiconductors (CHIPS) for America Act*, a bipartisan bicameral bill introduced by Senators Mark Warner (D-VA) and John Cornyn (R-TX) and Reps. Doris Matsui (D-CA) and Mike McCaul (R-TX), which would establish initiatives and incentives to foster a cutting-edge, domestic microelectronics industry, including \$15 billion in R&D funding at DOD, NSF, DOE, to ensure U.S. leadership in semiconductor technology and innovation. However, all these efforts would require funding through the FY 2022 appropriations process. To advance microelectronics R&D, the bill would:

- Form a subcommittee under the National Science and Technology Council focused on microelectronics, which would be tasked with developing a National Strategy on Microelectronics Research
- Require DOD to assess the feasibility, usefulness, efficacy, and cost for establishing a national laboratory with a commercial incubator “exclusively focused on the research and development of microelectronics to serve as a center for Federal Government expertise in high-performing, trusted microelectronics and as a hub for Federal Government research into breakthrough micro-electronics technologies”
- Establish a new manufacturing institute focused on microelectronics
- Establish an Industrial Advisory Committee with representatives from industry, academia, and the federal laboratories

A separate provision in the bill would establish an Advisory Panel on Microelectronics Leadership and Competitiveness, which would be tasked with developing a government-wide microelectronics strategy and implementation plan. The conference report notes the importance of making this an interagency effort, beyond DOD’s ongoing efforts to develop a strategy to meet its own needs and would direct the Secretary of Defense to consider different public-private partnership models, including a semiconductor manufacturing corporation.

Biotechnology

Provisions in the conference bill related to biotechnology would:

- Direct USD(R&E) and the Under Secretary of Defense for Intelligence to develop an assessment of U.S. R&D efforts in emerging biotechnologies compared to U.S. adversaries, including health, materials, and manufacturing applications
- Direct the White House Office of Management and Budget (OMB) to develop a comprehensive analysis of federal biodefense programs. Another provision would require federal agencies including DOD, the U.S. Department of Agriculture (USDA), the Department of Homeland Security (DHS), and the Department of Health and Human Services (HHS), among others, to update the National Biodefense Implementation Plan and conduct biennial biothreat assessments

Quantum

Provisions in the bill would develop an annual list of technical problems and scientific challenges that could be addressed and solved by quantum computers within one to three years. The bill would establish programs to work with small businesses to provide quantum computing capabilities to government and other researchers working on relevant activities. Another provision would require the Secretary of Defense to produce an assessment of potential threats and risks posed by quantum computing, including code-breaking capabilities that may be enabled by those technologies, and develop recommendations for R&D activities to secure DOD and national security systems against such threats.

Climate and National Security

Policymakers in the national security community, both in Congress and the relevant agencies, have expressed concern over the potential impact of climate change on DOD installations, operations in new environments, and the potential for new conflicts stemming from climate related disasters. Despite the contentious debate over broader climate policies in Congress, the FY 2021 NDAA contains several provisions to prepare for these emerging issues, including provisions that would:

- Direct the Secretary of Defense, if the Secretary determines it in the interests of the U.S., to begin planning and implementing changes needed for the military to operate in the Arctic and establish a research and development program for current and future requirements. A separate provision would require a plan to establish the “Ted Stevens Center for Arctic Security Studies,” a DOD Regional Center that would be in proximity to other academic institutions that study security implications of the Arctic region, as well as other DOD elements managing Arctic operations. Report language notes that the Secretary may consider Alaska as a potential location for the center
- Direct the Under Secretary of Defense for Intelligence and Security and the Director of National Intelligence (DNI) to enter into a joint agreement with NASEM to create a National Academies Climate Security Roundtable. The roundtable would have representation from the Climate Security Advisory Council; government representatives from the research and national security agencies; and other stakeholders from industry, academia, and nonprofit organizations. The roundtable would seek to develop best practices on the exchange of expertise and knowledge pertaining to climate security, identify knowledge gaps and analytic priorities, and provide additional assistance and expertise to DNI and DOD
- Direct DOD to conduct R&D for advanced technologies that support water sustainment by capturing humidity and harvesting, recycling, and reusing water and transitioning those capabilities to the warfighter by 2025

Space

Under the FY 2021 NDAA, space would remain prominent in the national security enterprise. Following its codification of the U.S. Space Force (USSF) in the FY 2020 NDAA, Congress would further shape the sixth and newest Service Branch’s organizational structure, as well as its research, acquisitions, and workforce development activities. To that end, the FY 2021 NDAA would include provisions governing the transfer of personnel and installations from other Branches, recommendations regarding a future reserve component, and the reestablishment of the U.S. Space Command. In addition, the conference report would adopt Senate language tasking the Space Development Agency (SDA) with developing a resilient low-Earth orbit (LEO)-based sensing, tracking, and data transport architecture and integrating next-generation space capabilities into this architecture. The Pentagon would be required to transfer SDA from the Office of the Secretary of Defense to USSF by October 1, 2022.

Perhaps most relevant to academic and industry stakeholders, the conference bill includes provisions articulating specific RDT&E priorities to be pursued by USSF in FY 2021. These include mandates for USSF to leverage commercial partnerships to advance space domain awareness and remote sensing capabilities, as well as to establish a policy for ensuring responsive and reliable access to space for small satellites (smallsats) and other small payloads. Pertinent to this last directive, the bill would authorize \$16 million above the USSF request for space technology to support the rapid development of low-cost smallsat capabilities and the implementation of a smallsat mission operations center.

Other Provisions of Interest to the Research Community

Other provisions related to scientific research in the bill would:

- Strengthen and protect the Minerva Research Initiative, DOD's signature extramural social science research program, in alignment with the *Social Sciences Protect Our Nation Act* ([H.R. 7106](#)). This was a priority of House members including Rep. Dan Lipinski (D-IL), Rep. Jim Langevin (D-RI), and Rep. David McKinley (R-WV). The bill would require that DOD maintain a social science research program as well as management science and information science research centers
- Reauthorize the National Oceanographic Partnership Program (NOPP) and establish an Ocean Policy Committee to provide an annual report and briefing to Congress on the program
- Direct OSTP to establish an interagency effort to advance sustainable chemistry. Agencies participating in this effort include DOD, DOE, NIST, NSF, the National Institutes of Health (NIH), USDA, and the Environmental Protection Agency, among others
- Modify disclosure requirements to require any entity that receives a DOD R&D grant and releases public communication on that project to include the amount of funding provided by DOD. This excludes tweets and statements of less than 280 characters
- Codify the role of the USD(R&E) Assistant Directors, who were created under USD(R&E)'s recent reorganization to coordinate R&D activities across the Department for high priority technology areas
- Direct USD(R&E) to conduct a study on the feasibility of establishing an energetics research program office
- Establish a Directed Energy Working Group to coordinate and accelerate R&D and other directed energy efforts across the Services
- Direct DOD to support annual reports to Congress on the awards made under its Small Business Innovation Research (SBIR) programs and related transition activities

Note: The conference did not adopt the provision clarifying whether international students enrolled in educational programs at colleges or universities offering courses online, to ensure safety during the COVID-19 pandemic, will be able to remain in their educational program and will continue to meet the requirements of their visa.

Sources and Additional Information:

- The FY 2021 NDAA conference report and bill text can be found at <https://docs.house.gov/billsthisweek/20201207/CRPT-116hrpt617.pdf>.
- A summary of the bill can be found at <https://republicans-armedservices.house.gov/news/press-releases/thornberry-fy21-national-defense-authorization-act>.
- Lewis-Burke's previous analyses of the House and Senate bills can be found [here](#) and [here](#).

National Defense Authorization Act, FY 2021

As reported by the House Armed Services Committee

December 3, 2020

(In thousands of \$)

	FY 2020 NDAA	FY 2021 SASC	FY 2021 HASC	FY 2021 NDAA	NDAA vs. SASC	NDAA vs. HASC	FY 2021 vs. FY 2020 NDAA
RDT&E, total	102,309,845	106,674,670	106,532,628	104,708,901	1,965,769 (1.8%)	-1,823,727 (1.7%)	2,399,056 (2.3%)
S&T, Total	14,558,462	15,680,741	16,084,416	15,985,196	304,455 (1.9%)	-99,220 (0.6%)	1,426,734 (9.8%)
6.1, Total	2,430,019	2,419,151	2,411,126	2,456,126	36,975 (1.5%)	45,000 (1.9%)	26,107 (1.1%)
6.2, Total	5,508,027	5,569,869	5,654,069	5,626,982	57,113 (1.0%)	-27,087 (0.5%)	118,955 (2.2%)
6.3, Total	6,620,416	7,691,721	8,019,221	7,902,088	210,367 (2.7%)	-117,133 (1.5%)	1,281,672 (19.4%)
Army RDT&E	11,857,473	12,710,343	12,397,906	12,478,059	232,284 (1.8%)	80,153 (0.6%)	620,586 (5.2%)
Army 6.1	483,980	475,359	487,359	497,359	22,000 (4.6%)	10,000 (2.1%)	13,379 (2.8%)
Army 6.2	964,290	984,381	994,881	1,007,881	23,500 (2.4%)	13,000 (1.3%)	43,591 (4.5%)
Army 6.3	1,192,564	1,262,590	1,258,090	1,290,590	28,000 (2.2%)	32,500 (2.6%)	98,026 (8.2%)
Navy RDT&E	19,674,604	21,036,806	21,152,948	20,733,589	303,217 (1.4%)	-419,359 (2.0%)	1,058,985 (5.4%)
Navy 6.1	635,978	618,087	613,087	625,087	7,000 (1.1%)	12,000 (2.0%)	-10,891 (1.7%)
Navy 6.2	1,006,953	995,975	1,042,175	1,021,475	25,500 (2.6%)	-20,700 (2.0%)	14,522 (1.4%)
Navy 6.3	769,237	763,396	815,396	776,707	13,311 (1.7%)	-38,689 (4.7%)	7,470 (1.0%)
Air Force RDT&E	45,584,743	37,829,306	37,060,337	36,639,037	1,190,269 (3.1%)	-421,300 (1.1%)	-8,945,706 (19.6%)
Air Force 6.1	534,761	502,294	502,294	512,294	10,000 (2.0%)	10,000 (2.0%)	-22,467 (4.2%)
Air Force 6.2	1,487,626	1,439,249	1,492,749	1,482,749	43,500 (3.0%)	-10,000 (0.7%)	-4,877 (0.3%)
Air Force 6.3	985,153	737,548	755,548	746,048	8,500 (1.2%)	-9,500 (1.3%)	-239,105 (24.3%)

Space Force RDT&E	--	10,301,095	10,414,484	10,412,569	111,474 (1.1%)	-1,915 (0.0%)	--
Space Force 6.2	--	133,874	164,874	146,874	13,000 (9.7%)	-18,000 (10.9%)	--
Space Force 6.3	--	1,291,311	1,276,311	1,356,409	65,098 (5.0%)	80,098 (6.3%)	--
Defense Wide RDT&E	24,971,825	24,560,030	25,296,863	24,235,557	324,473 (1.3%)	-1,061,306 (4.2%)	-736,268 (2.9%)
Defense Wide 6.1	775,300	823,411	808,386	821,386	-2,025 (0.2%)	13,000 (1.6%)	46,086 (5.9%)
Defense Wide 6.2	2,049,158	2,016,390	1,959,390	1,968,003	-48,387 (2.4%)	8,613 (0.4%)	-81,155 (4.0%)
Defense Wide 6.3	3,673,462	3,636,876	3,913,876	3,732,334	95,458 (2.6%)	-181,542 (4.6%)	58,872 (1.6%)
Defense Health R&D*	732,273	562,465	582,465	567,465	5,000 (0.9%)	-15,000 (2.6%)	-164,808 (22.5%)

**Traditionally, NDAA does not authorize funds for the Congressionally Directed Medical Research Programs (CDMRP) within Defense Health R&D*