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Defense Policy Update: SASC Approves FY 2021 National Defense Authorization Bill

Lewis-Burke Associates LLC – June 26, 2020

The Senate Armed Services Committee (SASC) passed its version of the fiscal year (FY) 2021 *National Defense Authorization Act (NDAA)*, a bipartisan bill that annually authorizes programs and sets policies pertaining to the Department of Defense (DOD) and U.S. national security. If passed prior to the end of the fiscal year on September 30, this would be the 60th consecutive year the bill has been passed by Congress. The bill reflects Congress' continued concern that American military superiority is currently at risk or declining in several areas due to the threats posed by potential adversaries such as China and Russia, and would enact a variety of proposals to further the implementation of the 2018 *National Defense Strategy* (NDS) to deter future threats from adversaries. While the Senate voted June 25 to move the FY 2021 NDAA to the floor for debate with the intent of passage before the July 4 holiday, the House Armed Services Committee will begin consideration of its version of the NDAA starting July 1.

The FY 2021 NDAA would authorize DOD to spend $740.5 billion in discretionary funding, including $636.4 billion for base funding and $69 billion for Overseas Contingency Operations (OCO). The bill would authorize $106 billion in research, development, test, and evaluation (RDT&E) funds, a four percent increase over the FY 2020 level. The science and technology accounts would see a 1.3 percent decrease below FY 2020 levels, with the only increase coming from the applied research portfolio, which would see an increase of 1.1 percent over FY 2020. In total, basic research would be funded at $2.4 billion, applied research would be funded at $5.6 billion, and advanced technology development would be funded at $6.4 billion. The bill would also authorize a $17 million increase for Minerva, DOD's university-based social science research initiative, to restore cuts proposed in the Department's defense-wide review. It also would provide an increase of $20 million for the Defense Established Program to Stimulate Competitive Research (DEPSCoR) program, which augments basic research awards to increase research capacity throughout the country. To send a message to DOD leadership, Senate authorizers noted "the importance of robust basic research in science and technology to NDS implementation," and the bill would authorize an increase of $10 million each for the Army, Navy, and Air Force for basic research. However, the funding for those DOD programs will ultimately be determined by the FY 2021 Defense appropriations bill, which has not yet been introduced by the House or Senate.

The bill reflects several congressional priorities including addressing vulnerabilities of the supply chain and strengthening the resiliency of the Defense Industrial Base, better positioning the military to maintain technological superiority, and addressing a wide variety of threats from China. The bill would also take actions to position the Department to maintain leadership in science and technological development in critical technology areas with national security implications, including fifth-generation wireless technologies (5G), biotechnology, artificial intelligence and machine learning (AI/ML), quantum information science (QIS), and cybersecurity. More information on these provisions can be found below.

Competition with China

The SASC NDAA addresses China's efforts to surpass the U.S. in critical technology areas through several provisions. Though the bill does not contain provisions placing further security restrictions on DOD-funded research, it does address China's theft of U.S. intellectual property and recruitment of foreign talent. One provision in the bill would direct the Secretary to establish and enforce actions to prevent the Chinese government from stealing U.S. intellectual property in critical technologies, including restricting employees or former employees of the defense industrial base from working with companies connected to the Chinese government.

The bill would also direct the Secretary to enter into an agreement with the National Academies of Sciences, Engineering, and Medicine to develop recommendations for DOD through producing a comparative analysis of efforts by China and the U.S. to recruit and retain domestic and foreign researchers and subsequently. This would include comparing specific talent programs and incentives used by China to federal incentives used by the U.S. The bill would also include a provision that would require background checks as a prerequisite for individuals wo 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 U.S. vulnerabilities in its supply chain where DOD may rely on either a sole domestic or foreign producer. This issue was highlighted in recent hearings as a significant challenge in the federal response to the COVID-19 pandemic. 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." The bill would specifically require recommendations regarding prize-based technology challenges, foreign talent acquisition and retention, and graduate education policies, among other areas.
- Direct the Deputy Secretary of Defense to conduct an assessment and provide recommendations to strengthen the national security innovation base. Another provision would direct DOD to define intelligence requirements and organizational responsibilities for assessing foreign adversaries' national technological and industrial bases compared to the U.S.
- Direct the Department to develop a three- to five-year microelectronics manufacturing strategy.
- Require a report on strategic and critical minerals and metals for DOD that may be vulnerable to supply chain disruptions.
- Authorize DOD to work with the National Institute of Standards and Technology (NIST) to assist small manufacturers with cybersecurity practices and compliance with cybersecurity standards.

Emerging Technologies

SASC's NDAA reflects the continued interest of Congress in emerging technology areas ranging from quantum computing to biotechnology to next-generation wireless. Information on specific provisions can be found below.

Biotechnology

The bill 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, material, and manufacturing applications.

Artificial Intelligence (AI)

The bill includes a section noting the importance of artificial intelligence (AI) and machine learning (ML) to increase warfighter capability, decrease operational costs, and increase civilian safety, and encourages DOD to develop, adopt, and deploy AI/ML-enabled technologies to gain tactical and strategic advantage. Senate authorizers also focused much of their interest on AI as an enabler to increase efficiency and reduce bureaucracy in DOD's "back office" operations. The bill would:

- Encourage the Department to partner with research universities to develop undergraduate and graduate curricula and research fellowship opportunities focused on threat identification and mitigation for AI/ML-enabled systems.
- Direct the Director of the Joint Artificial Intelligence Center (JAIC) to brief Congress on military occupational specialties and capabilities, including business processes and business IT systems, that could leverage AI, as well as future plans for the JAIC's alignment, leadership, and reporting structure.
- Urge the DOD to review and refine a detailed code of ethics for the use of AI and encourage the JAIC to coordinate with the White House AI Task Force and NIST to develop standards for the use of AI across the U.S. government.
- Require DOD to develop at least five use cases for existing AI technologies that can be used to advance reform efforts in the Department. The bill would also require the Department to pilot a technology development and prototyping activity that leverages commercially available artificial intelligence technologies and systems in the context of these use cases.
- Recommend establishment of the Human Development Ecosystem, which would investigate application of AI to the physiological, cognitive, and emotional needs of the warfighter.
- Recommend the DOD consider establishing joint U.S.-allied partner ventures, as well as joint DOD ventures with state-level AI-based economic development activities, that address shared needs in AI/ML-enabled capabilities.

Hypersonics

The bill would direct USD(R&E) to develop and field hypersonic weapons within three years and improve the ground-based testing facilities for and the test rate of hypersonic weapons.

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, and establish programs to work with small businesses to provide quantum computing capabilities to government and other researchers working on relevant activities. The bill would also 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 these threats.

Space

The bill would transfer the Space Development Agency (SDA) to the Space Force by October 1, 2022 and task SDA to lead in developing a resilient low-Earth orbit (LEO)-based sensing, tracking, and data transport architecture and integrate next-generation space capabilities into this architecture. In addition, the bill directs the Space Force to "develop partnerships with academic research institutions in different geographic regions and with different military and intellectual assets in order to establish critical research infrastructure and to develop the necessary workforce of the future." Research areas of

focus for the Space Force and academic institutions include autonomous platforms and policy, supply chains, and cybersecurity.

Cybersecurity

Strengthening cybersecurity continues to be a priority for Congress. The bill would:

- Extend the authority of the Cyberspace Solarium Commission to monitor and assess federal implementation of the recommendations from its final report and any new issues in cybersecurity that emerge during that time.
- 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.
- Create a university consortium with well-established education and research programs in cybersecurity and critical infrastructure protection for national cybersecurity education, training, and workforce development efforts.

Next Generation Wireless (5G)

The FY 2021 NDAA reflects Congress' continued concern over potential threats to 5G networks posed by Chinese companies such as Huawei and ZTE, and requires the Secretary to produce a report on the risk to DOD personnel, systems, and operations from Huawei 5G architecture in other nations. The Secretary would have to take these risks into consideration when making basing decisions. This builds on language in the FY 2019 NDAA, which prohibited DOD from contracting with institutions that used equipment or services from Huawei, ZTE, and other untrusted networking companies.

Other provisions would seek to advance U.S. 5G capabilities or assess other 5G related issues:

- Establish a Department-wide cross-functional team for 5G, led by the Chief Information Officer, to coordinate policy, oversight, research, integration with other DOD technology efforts, and other 5G-related activities.
- 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 a large number of devices to send data signals simultaneously.
- Task the National Academies of Sciences, Engineering, and Medicine to carry out 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.

Other Provisions of Interest

The SASC's NDAA would also:

- Provide an additional $4 million to the Army for pandemic vaccine response research.
- Codify the role of the Under Secretary of Defense for Research and Engineering's (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.
- Establish a program for providing part-time or term employment for faculty or students from institutions of higher education at DOD laboratories. The Department would be required to establish at least ten new positions, with at least five focused on AI/ML-related activities.

- 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.
- Modify disclosure requirements to require any entity that receives a DOD R&D grant that 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.
- Extend pilot programs for RDT&E centers and technology transfer incentives at DOD laboratories until 2025.
- 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 and in proximity to DOD elements managing Arctic operations.

Sources and Additional Information:

- The SASC FY 2021 NDAA is available at https://www.armed-services.senate.gov/imo/media/doc/S4049%20-%20FY%202021%20NDAA.pdf.
- The SASC Committee report to accompany the bill is available at https://www.armed-services.senate.gov/imo/media/doc/FY%202021%20NDAA%20-%20Report.pdf.
- Funding tables are available at https://www.armed-services.senate.gov/imo/media/doc/S4049%20-%20FY%202021%20NDAA%20Funding%20tables.pdf.

Senate National Defense Authorization Act, FY 2021

As reported by the Senate Armed Services Committee
June 24, 2020
(In thousands of $)

	FY 2020 Enacted	FY 2021 Request	FY 2021 SASC	SASC v. FY 2020	SASC v. Request
RDT&E, total	**102,309,845**	**106,014,703**	**106,423,555**	**4,113,710 (3.9%)**	**408,852 (0.4%)**
S&T, Total	**14,558,462**	**14,592,520**	**15,666,716**	**1,108,254 (7.1%)**	**1,074,196 (6.9%)**
6.1, Total	2,430,019	2,319,126	2,405,126	-24,893 (1.0%)	86,000 (3.6%)
6.2, Total	5,508,027	5,391,069	5,569,869	61,842 (1.1%)	178,800 (3.2%)
6.3, Total	6,620,416	6,882,325	7,691,721	1,071,305 (13.9%)	809,396 (10.5%)
Army RDT&E	**11,857,473**	**12,587,343**	**12,710,343**	**852,870 (6.7%)**	**123,000 (1.0%)**
Army 6.1	483,980	463,359	475,359	-8,621 (1.8%)	12,000 (2.5%)
Army 6.2	964,290	920,881	984,381	20,091 (2.0%)	63,500 (6.5%)

Army 6.3	1,192,564	1,203,590	1,262,590	70,026 (5.5%)	59,000 (4.7%)
Navy RDT&E	**19,674,604**	**21,427,048**	**21,036,806**	**1,362,202 (6.5%)**	**-390,242 (1.9%)**
Navy 6.1	635,978	603,087	618,087	-17,891 (2.9%)	15,000 (2.4%)
Navy 6.2	1,006,953	953,175	995,975	-10,978 (1.1%)	42,800 (4.3%)
Navy 6.3	769,237	760,396	763,396	-5,841 (0.8%)	3,000 (0.4%)
Air Force RDT&E	**45,584,743**	**37,391,826**	**37,829,306**	**-7,755,437 (20.5%)**	**437,480 (1.2%)**
Air Force 6.1	534,761	492,294	502,294	-32,467 (6.5%)	10,000 (2.0%)
Air Force 6.2	1,487,626	1,409,749	1,439,249	-48,377 (3.4%)	29,500 (2.0%)
Air Force 6.3	985,153	778,548	737,548	-247,605 (33.6%)	-41,000 (5.6%)
Space Force RDT&E	**N/A**	**10,327,595**	**10,301,095**	**--**	**-26,500 (0.3%)**
Space Force 6.2	N/A	130,874	133,874	--	3,000 (2.2%)
Defense Wide RDT&E	**24,971,825**	**24,280,891**	**24,546,005**	-425,820 (1.7%)	265,114 (1.1%)
Defense Wide 6.1	775,300	760,386	809,386	34,086 (4.2%)	49,000 (6.1%)
Defense Wide 6.2	2,049,158	1,976,390	2,016,390	-32,768 (1.6%)	40,000 (2.0%)
Defense Wide 6.3	3,673,462	3,588,876	3,636,876	-36,586 (1.0%)	48,000 (1.3%)
Defense Health R&D	**732,273**	**562,465**	**562,465**	**-169,808 (30.2%)**	**N/A**