

LOG ID	REV	MEMBER	MARKUP LOC	DESCRIPTION	MARKUP ACT
731	1	Wittman, Robert	CIT	Would require a report on the critical shortage of STEM professionals. Specifically, on competing pay with private industry.	EB 1
734	1	Langevin, James	CIT	Directs Secretary of Defense to report on power and thermal management capabilities, risk mitigation and competition for high energy laser systems.	EB 1
766	0	Panetta, Jimmy	CIT	Authorizes the establishment of multi-institution arrangements to facilitate expedited access to university technical expertise in support of Department of Defense missions in certain specified areas.	EB 1
785	2	Slotkin, Elissa	CIT	Directs the Secretary of Defense to provide a briefing to the House Armed Services Committee regarding the implementation of the Department of Defense's strategy to strengthen the diversity of the science, technology, research, and engineering workforce.	EB 1
824	0	Langevin, James	CIT	Directs the DOT&E to submit an implementation plan on how the DOT&E will support and implement both a test and evaluation software and cyber Center of Excellence and commensurate scholarships and internships.	EB 1
859	1	Brown, Anthony G.	CIT	Department of Defense research activities with HBCUs.	EB 1
869	2	Waltz, Michael	CIT	Report on effectiveness of the cyber institutes program and opportunities to expand such program to additional institutions of higher learning with ROTC programs	EB 1
879	3	Banks, Jim	CIT	Briefings on Teamable Attributable Air Vehicles.	EB 1
905	1	Gallagher, Mike	CIT	Establishing standard operating procedures for electronic emissions control (EMCON) across the joint force in order to enhance defensive readiness and force protection against a peer threat in a contested EW environment and reporting on their implementation in training	EB 1
922	0	Slotkin, Elissa	CIT	CYBER-Direct the Secretary of Defense to conduct a feasibility study regarding the establishment within DoD of a single clearinghouse or point of contact responsible for cyber recruitment and retention across the Department.	EB 1
952	1	Turner, Michael	CIT	DRL encouraging the DoD to invest in Digital Engineering Infrastructure and Workforce Development and to establish partnerships with academic institutions for the purpose of creating DE Centers of Excellence.	EB 1
971	1	Langevin, James	CIT	Directs Secretary of Defense to submit a copy of the Electromagnetic Spectrum Superiority Strategy to the committee and a report how the Secretary will ensure success of the implementation.	EB 1
979	2	Wittman, Robert	CIT	Would encourage DOD to continue to find ways for the use of commercial virtualization technology, such as was used in the AEGIS system, in weapon systems and for deployed forces.	EB 1

LOG ID	REV	MEMBER	MARKUP LOC	DESCRIPTION	MARKUP ACT
1004	3	Moulton, Seth	CIT	This DRL directs the Department of Defense and Principal Information Operations Advisor (PIOA) to submit their upcoming report in a timely manner, with an emphasis on the importance of organizational structure for info ops. It also calls for a briefing from PIOA in FY22.	EB 1
1009	2	Banks, Jim	CIT	Secretary of Defense Report on Integration of the Future of Defense Center and Naval Tech Bridges.	EB 1
1011	2	Banks, Jim	CIT	DoD strategy for maneuver autonomy capability in major weapon systems by 2025.	EB 1
1015	1	Fallon, Pat	CIT	The Committee directs the Under Secretary of Defense for Acquisition and Sustainment, to provide a report to the Committee on the Armed Services regarding the steps the Department is taking to support O-RAN and avoid proprietary systems.	EB 1
1028	0	Larsen, Rick	CIT	Limits the Office of the Secretary of Defense travel funding until the DoD submits information operations strategy and posture review required by Section 1631 of the FY20 NDAA.	EB 1
1075	1	Houlahan, Chrissy	CIT	This requests a study on the current status of DoD workforce development and training programs on innovation and technology adoption for the active duty and DoD civilian workforce and how to scale it up	EB 1
1085	1	Kim, Andy	CIT	Directs the Director of the National Security Agency (NSA) to evaluate and report on existing and potential impediments to the effective use of directive authorities by the NSA over National Security Systems for cybersecurity.	EB 1
1159	1	Moore, Blake D.	CIT	21st Century Integrated Digital Experience Act Compliance	EB 1
1237	0	Escobar, Veronica	CIT	Directs the Defense Innovation Unit to expand their outreach to economically disadvantaged communities where they do not otherwise have a presence.	EB 1
1239	1	Brown, Anthony G.	CIT	Software acquisition cadre.	EB 1
1340	1	Carl, Jerry L.	CIT	The Joint Staff shall provide a report to the Committees on Armed Services of the House of Representatives and the Senate assessing JADC2 interoperability.	EB 1
1347	0	Gallego, Ruben	CIT	Directs the Secretary of Defense to submit a report on efforts to establish a national network for microelectronics research and development.	EB 1
1351	0	Gallego, Ruben	CIT	Requires the Department of Defense to establish a national network for microelectronics research and development.	EB 1

LOG ID	REV	MEMBER	MARKUP LOC	DESCRIPTION	MARKUP ACT
1396	1	Franklin, C. Scott	CIT	Bill Language - Protective DNS for DoD	EB 1
1431	0	Crow, Jason	CIT	Directs the Chief of Space Operations, in coordination with the Chief Scientist of the Space Force, to establish a university consortium for space technology development that will support the Space Force's research, development and demonstration needs.	EB 1
1432	2	Morelle, Joseph D.	CIT	Directs Army to provide a briefing on how other regionally-aligned Army elements can incorporate best practices of the Africa Data Science Center	EB 1
1437	0	Langevin, James	CIT	Prohibit the CIO from being dual-hatted as PCA	EB 1
1452	0	Langevin, James	CIT	Enhancing Department of Defense Innovation Efforts Focused on Policy Analytics and Insights	EB 1
1453	0	Langevin, James	CIT	Comptroller General Report on STEM and AI Workforce Development	EB 1
1454	0	Langevin, James	CIT	Additional Software Acquisition Contracting Mechanism	EB 1
1468	0	Langevin, James	CIT	Would require the Secretary of Defense to develop a strategy to ensure superiority in the Information Environment and articulate how the Department intends to support the larger United States government effort.	EB 1
1470	0	Langevin, James	CIT	This section would direct the Secretary of Defense to develop a plan detailing the requisite investments required to develop and implement Department of Defense strategy and guidance documents for a modern, robust digital ecosystem	EB 1
1474	0	Langevin, James	CIT	This section would require the Secretary of Defense to establish a short course on emerging technologies for senior executive-level civilian leaders.	EB 1

Amendment to H.R. 4350
National Defense Authorization Act for Fiscal Year 2022

Offered by: Robert J. Wittman (VA-01)

In the appropriate place in the report to accompany H.R. 4350, insert the following new Directive Report Language:

Critical Shortage of STEM Professionals

The committee remains concerned that the Department of Defense continues to face a critical shortage of science, technology, engineering, and mathematics (STEM) professionals, both among the uniformed military and the Department civilian workforce. As the Department continues its modernization efforts, these shortages will only increase in severity. High demand among private technology companies has dramatically increased the average salaries for STEM professionals, making recruiting and retention for the government even more challenging.

The committee notes that, until now, the Department has compensated for many of these critical shortages by relying on contractors to provide needed support in critical STEM fields. However, contractors are now having difficulty attracting and retaining STEM talent because statutory caps on allowable contractor compensation have not kept pace with salary inflation in certain in demand STEM fields. Congress contemplated this problem might occur when establishing the caps, and therefore included section 2324(p) of Title 10, United States Code, which enables the Secretary of Defense to establish an exception to the compensation limit for “positions in the science, technology, engineering, mathematics, medical, and cybersecurity fields and other fields requiring unique areas of expertise upon a determination that such exceptions are needed to ensure that the Department of Defense has continued access to needed skills and capabilities.” Yet the committee is unclear as to whether this exception has been effectively used.

Section 245 of the National Defense Authorization Act for Fiscal Year 2021 (P. Law 116-283) directed the Department to develop programs and incentives to ensure the Department’s contractors are engaging with schools and universities to encourage students to pursue STEM education. However, once students are educated in STEM fields, they tend to gravitate toward jobs at private technology firms that do not

have restrictions on how much they can be paid. Therefore, the committee directs the Secretary of Defense to provide a report to the Committee on Armed Services of the House of Representatives by March 1, 2022, on the following matters:

- (1) For Calendar Years 2019 and 2020, the number of times the exception under 10 U.S.C. § 2324(p) been used by an executive agency and the specific circumstances under which it was used.
- (2) How the Federal Acquisition Regulation, which requires an agency head using the exception to analyze each individual contractor employee to determine whether that individual's position should be exempted, rather than allowing the general exemption of certain types or classes of positions, affects the Department's use of this exception.
- (3) How is the Department engaging with contractors to address rapidly rising wages in the competitive STEM labor market?
- (4) Any other matters the Secretary determines relevant to the issue of compensation for STEM professionals.

Amendment to H.R. 4350
National Defense Authorization Act for Fiscal Year 2022

Offered by: Mr. Langevin of Rhode Island

In the appropriate place in the report to accompany H.R. 4350, insert the following new Directive Report Language:

High Energy Laser System Power and Thermal Management

The Committee notes with concern the recent decision by a major defense contractor to exit the Directed Energy Mobile Short-Range Air Defense program following repeated failure of its power and thermal management system. The Committee recognizes the need for expanded investment in power and thermal management systems as the Office of the Secretary of Defense (OSD) and the military services seek to increase the power of high energy laser systems. The Committee supports OSD and service efforts to increase high energy laser power levels, but remains concerned about the strength and breadth of the industrial base in key enabling technology areas, including power and thermal management.

Therefore, the Committee directs the Secretary of Defense to brief the House Armed Services Committee not later than June 1, 2022 on plans to budget for and invest in the development of power and thermal management subsystems, as well as the integration of those subsystems with OSD and service-led high energy laser activities in the timeframes described in the Directed Energy Roadmap.

AMENDMENT TO H.R. 4350
OFFERED BY MR. PANETTA OF CALIFORNIA

At the appropriate place in title II, insert the following new section:

1 **SEC. 2__ . MODIFICATION OF MECHANISMS FOR EXPE-**
2 **DITED ACCESS TO TECHNICAL TALENT AND**
3 **EXPERTISE AT ACADEMIC INSTITUTIONS TO**
4 **SUPPORT DEPARTMENT OF DEFENSE MIS-**
5 **SIONS.**

6 Section 217 of the National Defense Authorization
7 Act for Fiscal Year 2018 (Public Law 115–91; 10 U.S.C.
8 2358 note) is amended—

9 (1) by amending subsection (c) to read as fol-
10 lows:

11 “(c) CONSULTATION WITH OTHER ORGANIZA-
12 TIONS.—For the purposes of providing technical expertise
13 and reducing costs and duplicative efforts, the Secretary
14 of Defense and the Secretaries of the military departments
15 shall work to ensure and support the sharing of informa-
16 tion on the research and consulting that is being carried
17 out across the Federal Government in Department-wide
18 shared information systems including the Defense Tech-
19 nical Information Center.”;

1 (2) in subsection (e)—

2 (A) by redesignating paragraph (31) as
3 paragraph (33); and

4 (B) by inserting after paragraph (30) the
5 following new paragraphs:

6 “(31) Nuclear science, security, and non-
7 proliferation.

8 “(32) Chemical, biological, radiological, and nu-
9 clear defense.”; and

10 (3) in subsection (g), by striking “2026” and
11 inserting “2028”.



Amendment to H.R. 4350
National Defense Authorization Act for Fiscal Year 2022

Offered by: Ms. Slotkin of Michigan

In the report to accompany H.R. 4350, the following new text:

Strengthening the diversity of the science, technology, research, and engineering workforce.

The committee notes that diversity remains an issue within the Department of Defense, particularly in the Department's science, technology, research, and engineering workforce. Increasing diversity brings new ideas and perspectives into the innovation and technology development processes. Section 229 of House Report 116-333 for the National Defense Authorization Act of Fiscal Year 2020 required the Secretary of Defense, acting through the Under Secretary of Defense for Research and Engineering and in consultation with the Under Secretary for Personnel and Readiness, to conduct an assessment of critical skill sets required across, and the diversity of, the research and engineering workforce of the Department, including the science and technology reinvention laboratories, to support emerging and future warfighter technologies. Based on this assessment, the Secretary of Defense, acting through the Under Secretary of

Defense for Research and Engineering and in consultation with the Under Secretary for Personnel and Readiness, was tasked with developing and implementing a plan to diversify and strengthen the science, technology, research, and engineering workforce of the Department of Defense. To that end, the committee has been pleased to see the release of the Department of Defense's STEM Strategic Plan for Fiscal Year 2021 through Fiscal Year 2025.

The committee now directs the Secretary of Defense to submit a briefing to the congressional defense committees no later than September 1, 2022, regarding the progress the Secretary has made towards implementing the Department's plan to strengthen the diversity of the science, technology, research, and engineering workforce. In this briefing, the Secretary should highlight all recruitment efforts carried out in cooperation with minority-serving institutions of higher education to create talent pipelines and all retention efforts to ensure that underrepresented communities are fully supported within the Department.

Amendment to H.R. 4350
National Defense Authorization Act for Fiscal Year 2022

Offered by: Mr. Langevin of Rhode Island

In the appropriate place in the report to accompany H.R. 4350, insert the following new Directive Report Language:

Director of Operational Test & Evaluation Software Academic Technical Expertise

The Fiscal Year 2019 Director of Operational Test and Evaluation's (DOT&E) annual report to Congress argues that a wealth of software and cyber expertise is available in the United States' academic sector, but that the Department of Defense has yet to apply significant resources to harness the capabilities of American universities. Alternatively, the report notes that competing nations have been harnessing United States academic capabilities for decades and recommends that the Department make a concerted effort to employ more of the software and cyber experts in academia in the defense of our Nation. To this end, the committee recommends that the Director of Operational Test and Evaluation support a university-based test and evaluation software and cyber Center of Excellence to modernize assessments of, and improve confidence in, the operational effectiveness, suitability, and survivability of software intensive and cyber physical systems. Additionally, the committee encourages the Director to support commensurate scholarships and internships to grow a workforce pipeline into the software and cyber test and evaluation workforce. Therefore, the committee directs the DOT&E to submit an implementation plan to the congressional defense committees by March 31, 2022 on how the DOT&E will support and implement both a test and evaluation software and cyber Center of Excellence and commensurate scholarships and internships.

AMENDMENT TO H.R. 4350
OFFERED BY MR. BROWN OF MARYLAND

At the appropriate place in title II, insert the following new section:

1 **SEC. 2** _____. **MINORITY INSTITUTE FOR DEFENSE RE-**
2 **SEARCH.**

3 (a) **PLAN TO ESTABLISH MINORITY INSTITUTE FOR**
4 **DEFENSE RESEARCH.—**

5 (1) **IN GENERAL.—**Not later than 1 year after
6 the date of the enactment of this section, the Sec-
7 retary shall submit to the congressional defense com-
8 mittees a plan (in this section referred to as the
9 “Plan”) for the establishment of the Minority Insti-
10 tute for Defense Research (in this section referred to
11 as the “Consortium”).

12 (2) **ELEMENTS.—**The Plan shall include the fol-
13 lowing:

14 (A) Information relating to the projected
15 needs of the Department for the next twenty
16 years with respect to essential engineering, re-
17 search, or development capability.

1 (B) An assessment relating to the engi-
2 neering, research, and development capability of
3 each minority institution.

4 (C) Information relating to the advance-
5 ments and investments necessary to elevate a
6 minority institution or a consortium of minority
7 institutions to the research capacity of a Uni-
8 versity Affiliated Research Center.

9 (D) Recommendations relating to actions
10 that may be taken by the Department, Con-
11 gress, and minority institutions to establish the
12 Consortium within 10 years.

13 (3) PUBLICLY AVAILABLE.—The Plan shall be
14 posted on a publicly available website of the Depart-
15 ment.

16 (b) NAMING OF THE CONSORTIUM.—With respect to
17 the naming of the Consortium, the Secretary shall—

18 (1) establish a process to solicit and review pro-
19 posals of names from—

20 (A) minority institutions;

21 (B) nonprofit institutions that advocate on
22 behalf of minority institutions; and

23 (C) members of the public;

24 (2) develop a list of all names received pursuant
25 to paragraph (1);

1 (3) provide opportunity for public comment on
2 the names included on such list; and

3 (4) choose a name from such list to name the
4 Consortium.

5 (c) GRANT PROGRAM FOR MINORITY INSTITU-
6 TIONS.—

7 (1) IN GENERAL.—The Secretary may establish
8 a program to award grants, on a competitive basis,
9 to minority institutions for the purposes described in
10 paragraph (2).

11 (2) PURPOSES.—The purposes described in this
12 paragraph are the following:

13 (A) Establishing a legal entity for the pur-
14 pose of entering into research contracts or
15 agreements with the Federal Government or the
16 Consortium.

17 (B) Developing the capability to bid on
18 Federal Government or Consortium contracts.

19 (C) Requesting technical assistance from
20 the Federal Government or a private entity with
21 respect to contracting with the Federal Govern-
22 ment or the Consortium.

23 (D) Recruiting and retaining research fac-
24 ulty.

1 (E) Advancing research capabilities relat-
2 ing to the national security of the United
3 States.

4 (F) Any other matter determined appro-
5 priate by the Secretary.

6 (3) APPLICATION.—To be eligible to receive a
7 grant under this section, a minority institution shall
8 submit to the Secretary an application in such form,
9 and containing such information, as the Secretary
10 may require.

11 (4) PREFERENCE.—In awarding grants pursu-
12 ant to paragraph (1), the Secretary may give pref-
13 erence to a minority institution with a R1 or R2 sta-
14 tus on the Carnegie Classification of Institutions of
15 Higher Education.

16 (d) SUBCONTRACTING REQUIREMENTS FOR MINOR-
17 ITY INSTITUTIONS.—

18 (1) IN GENERAL.—Section 2304 of title 10,
19 United States Code, is amended by adding at the
20 end the following new subsection:

21 “(m)(1) The head of an agency shall require that a
22 contract awarded to Department of Defense Federally
23 Funded Research and Development Center or University
24 Affiliated Research Center includes a requirement to es-
25 tablish a partnership to develop the capacity of minority

1 institutions to address the research and development
2 needs of the Department. Such partnerships shall be
3 through a subcontract with one or more minority institu-
4 tions for a total amount of not less than 5 percent of the
5 amount awarded in the contract.

6 “(2) For the purposes of this subsection, a minority
7 institution means—

8 “(A) a part B institution (as such term is de-
9 fined in section 322(2) of the Higher Education Act
10 of 1965 (20 U.S.C. 1061(2))); or

11 “(B) any other institution of higher education
12 (as such term is defined in section 101 of such Act
13 (20 U.S.C. 1001)) at which not less than 50 percent
14 of the total student enrollment consists of students
15 from ethnic groups that are underrepresented in the
16 fields of science and engineering.”.

17 (2) EFFECTIVE DATE.—The amendments made
18 by paragraph (1) shall—

19 (A) take effect on October 1, 2026; and

20 (B) apply with respect to funds that are
21 awarded by the Department of Defense on or
22 after such date.

23 (e) DEFINITIONS.—In this section:

24 (1) The term “Department” means the Depart-
25 ment of Defense.

1 (2) The term “institution of higher education”
2 has the meaning given such term in section 101 of
3 the Higher Education Act of 1965 (20 U.S.C.
4 1001).

5 (3) The term “minority institution” means—

6 (A) a part B institution (as such term is
7 defined in section 322(2) of the Higher Edu-
8 cation Act of 1965 (20 U.S.C. 1061(2))); or

9 (B) any institution of higher education at
10 which not less than 50 percent of the total stu-
11 dent enrollment consists of students from ethnic
12 groups that are underrepresented in the fields
13 of science and engineering.

14 (4) The term “Secretary” means the Secretary
15 of Defense.

16 (5) The term “University Affiliated Research
17 Center” means a research organization within an in-
18 stitution of higher education that—

19 (A) provides or maintains Department es-
20 sential engineering, research, or development
21 capabilities; and

22 (B) receives sole source contract funding
23 from the Department pursuant to section
24 2304(c)(3)(B) of title 10, United States Code.



Amendment to H.R. 4350
National Defense Authorization Act for Fiscal Year 2022

Offered by: Mr. Waltz

In the appropriate place in the report to accompany H.R. 4350, insert the following new Directive Report Language:

Cyber Institutes Program

The Committee directs the Principal Cyber Advisor to submit a report to the House Committee on Armed Services by May 31, 2022 on the effectiveness of the cyber institutes program under section 1640 of the John S. McCain National Defense Authorization Act for Fiscal Year 2019 (10 U.S.C. 2200 note; Public Law 115–232). The report should include information about the number of students within that school's Reserve Officers' Training Corps (ROTC) who participate in the institutes' activities, the occupational specialties of ROTC students having participated in the institutes' activities, and information related to research by professors and students affiliated with the institutes' activities.

Amendment to H.R. 4350 National Defense Authorization Act for Fiscal Year 2022

Offered by: Mr. Jim Banks

In the appropriate place in the report to accompany H.R. 4350, insert the following new Directive Report Language:

Teamable Attributable Air Vehicles

The committee is aware of progress made regarding the development of teamable attributable air vehicles and believes they will play an important role in effectively countering anti-access area denial threats. While the Committee encourages the continued rapid development of these vehicles under the Skyborg Vanguard program, it is concerned by the absence of available propulsion systems with cost-optimized limited-life design, high-speed maneuverability, and high electrical power generation capacity. Modified commercial jet engines currently used on Skyborg experimentation demonstrator vehicles do not provide the electrical power generation and high-G maneuverability necessary for fighter aircraft teaming missions, without significant modification. These commercial engines are also designed for thousands of flight hours, which are excessive compared to the Department's requirements for attributable vehicles, resulting in unnecessarily high acquisition and operating costs.

The committee is encouraged by the Air Force Research Laboratory's effort to develop long-term propulsion solutions for attributable air vehicles under the Attributable Cost-Optimized Limited-Life Engine Technologies program and believes these activities must be appropriately funded in Fiscal Year 2022 (FY22) and beyond to ensure parity with ongoing airframe systems development. Therefore, the committee directs the Under Secretary of Defense for Research and Engineering to provide a briefing to the congressional defense committees by June 30, 2022 on a roadmap for the development of teamable attributable aircraft and high-speed attributable propulsion starting in FY22.

AMENDMENT TO H.R. 4350
OFFERED BY MR. GALLAGHER OF WISCONSIN

At the appropriate place in title III, insert the following:

1 **SEC. 3___ . ESTABLISHMENT OF EMISSIONS CONTROL**
2 **STANDARD OPERATING PROCEDURES.**

3 (a) REVIEW.—Not later than 180 days after the date
4 of the enactment of this Act, the Secretary of Defense
5 shall conduct a review of current electromagnetic spectrum
6 emissions control standard operating procedures across
7 the joint force.

8 (b) STANDARDS REQUIRED.—Not later than 60 days
9 after completing the review under subsection (a), the Sec-
10 retary of Defense shall direct the Secretary of each of the
11 military departments to establish standard operating pro-
12 cedures, down to the battalion or equivalent level, per-
13 taining to emissions control discipline during all manner
14 of operations.

15 (c) REPORT.—Not later than one year after the date
16 of the enactment of this Act, the Secretary of Defense
17 shall submit to the Committees on Armed Services of the
18 Senate and House of Representatives a report on the im-
19 plementation status of the standards required under sub-

1 section (b) by each of the military departments, includ-
2 ing—

3 (1) incorporation into doctrine of the military
4 departments;

5 (2) integration into training of the military de-
6 partments; and

7 (3) efforts to coordinate with the militaries of
8 partner countries and allies to develop similar stand-
9 ards and associated protocols, including through the
10 use of working groups.



AMENDMENT TO H.R. 4350
OFFERED BY MS. SLOTKIN OF MICHIGAN

Add at the end of subtitle D of title XV the following:

1 **SEC. 15 ____ . FEASIBILITY STUDY REGARDING ESTABLISH-**
2 **MENT WITHIN THE DEPARTMENT OF DE-**
3 **FENSE A DESIGNATED CENTRAL PROGRAM**
4 **OFFICE, HEADED BY A SENIOR DEPARTMENT**
5 **OFFICIAL, RESPONSIBLE FOR OVERSEEING**
6 **ALL ACADEMIC ENGAGEMENT PROGRAMS**
7 **FOCUSING ON CREATING CYBER TALENT**
8 **ACROSS THE DEPARTMENT.**

9 (a) IN GENERAL.—Not later than 270 days after the
10 date of the enactment of this Act, the Secretary of Defense
11 shall submit to the congressional defense committees a
12 feasibility study regarding the establishment within the
13 Department of Defense of a designated central program
14 office, headed by a senior Department official, responsible
15 for overseeing all academic engagement programs focusing
16 on creating cyber talent across the Department. Such
17 study shall examine the following:

18 (1) The manner in or through which such a
19 designated central program office would obligate and

1 expend amounts relating to cyber education initia-
2 tives.

3 (2) The manner in or through which such a
4 designated central program office would interact
5 with the consortium or consortia of universities (es-
6 tablished pursuant to section 1659 of the National
7 Defense Authorization Act for Fiscal Year 2020 (10
8 U.S.C. 391 note)) to assist the Secretary on cyberse-
9 curity matters.

10 (3) The reasons why cyber has unique pro-
11 grams apart from other science, technology, engi-
12 neering, and math programs.

13 (4) Whether the creation of the designated cen-
14 tral program office will have an estimated net sav-
15 ings for the Department.

16 (b) CONSULTATION.—In conducting the feasibility
17 study required under subsection (a), the Secretary of De-
18 fense shall consult with and solicit recommendations from
19 academic institutions and stakeholders, including primary,
20 secondary, and post-secondary educational institutions.

21 (c) DETERMINATION.—

22 (1) IN GENERAL.—Upon completion of the fea-
23 sibility study required under subsection (a), the Sec-
24 retary of Defense shall make a determination re-
25 garding the establishment within the Department of

1 Defense of a designated central program office re-
2 sponsible for each covered academic engagement
3 program across the Department.

4 (2) IMPLEMENTATION.—If the Secretary of De-
5 fense makes a determination under paragraph (1) in
6 the affirmative, the Secretary shall establish within
7 the Department of Defense a designated central pro-
8 gram office responsible for each covered academic
9 enrichment program across the Department. Not
10 later than 180 days after such a determination in
11 the affirmative, the Secretary shall promulgate such
12 rules and regulations as are necessary to so establish
13 such an office.

14 (3) NEGATIVE DETERMINATION.—If the Sec-
15 retary determines not to establish a designated cen-
16 tral program office under subsection (a), the Sec-
17 retary shall submit to Congress notice of such deter-
18 mination together with a justification for the deter-
19 mination.

20 (d) COMPREHENSIVE REPORT.—Not later than 270
21 days after the date of the enactment of this Act, the Sec-
22 retary of Defense shall submit to the congressional defense
23 committees a comprehensive report that updates the mat-
24 ters required for inclusion in the reports required pursu-
25 ant to section 1649 of the National Defense Authorization

1 Act for Fiscal Year 2020 (Public Law 116–92) and sec-
2 tion 1726(c) of the William M. (Mac) Thornberry National
3 Defense Authorization Act for Fiscal Year 2021 (Public
4 Law 116–283).

5 (e) DEFINITION.—In this section, the term “covered
6 academic engagement program” means each of the fol-
7 lowing:

- 8 (1) Any primary, secondary, or post-secondary
9 education program.
- 10 (2) Any recruitment or retention program.
- 11 (3) Any scholarship program.
- 12 (4) Any academic partnerships.
- 13 (5) Any general enrichment program.



Amendment to H.R. 4350 National Defense Authorization Act for Fiscal Year 2022

Offered by: Mr. Turner

In the appropriate place in the report to accompany H.R. 4350, insert the following new Directive Report Language:

Digital Engineering Infrastructure and Workforce Development

The Committee is concerned about the pace of weapon systems development at the Department of Defense and the ability of the Department's acquisition system to overcome the increasing threats posed by our adversaries. Current model-based system engineering, as a part of digital engineering practices, offers the Department transparency, flexibility, rigor in communication, analysis, quality control, and an increase in the efficiency in engineering and acquisition practices.

The committee urges Department components to embrace and resource their digital engineering infrastructure and workforce skill development needed to practically implement digital practices using state-of-the-practice methods and techniques. The Committee encourages the services to consider establishing partnerships with academic institutions to create consortia which can act as centers of excellence and promulgate best practices across the Department's research and development programs.

Therefore, the Committee directs the Under Secretary of Defense for Research and Engineering to provide a briefing to the House Committee on Armed Services by March 1, 2022, on the status of the Department's adoption and implementation of digital engineering, including, but not limited to:

- (1) The workforce skill development required;
- (2) Implementation best practices from across the Department's research and development ecosystem, grouped by domain, enterprise, or functional area;
- (3) Efforts to increase adoption and improve the use of digital engineering across the Department and the defense industrial base; and
- (4) The amount of funding provided across the Department for this effort.

AMENDMENT TO H.R. 4350
OFFERED BY MR. Langevin

In section 901 (Log 72975), insert after subsection (c) the following new subsections (and redesignate the subsequent subsection accordingly):

1 (d) IMPLEMENTATION PLAN.—

2 (1) SUBMISSION.—Not later than 15 days after
3 the date of the enactment of this Act, the Secretary
4 shall submit to the congressional defense committees
5 a complete copy of the implementation plan signed
6 by the Secretary of Defense in July 2021 for the
7 Electromagnetic Spectrum Superiority Strategy pub-
8 lished in October 2020.

9 (2) REPORT.—Not later than 45 days after the
10 date of the enactment of this Act, the Secretary
11 shall submit to the congressional defense committees
12 a report on the implementation plan specified in
13 paragraph (1). The report shall include—

14 (A) an evaluation of the additional per-
15 sonnel, resources, and authorities the Secretary
16 determines will be needed by the senior official
17 of the Department of Defense designated under
18 subsection (a) who is responsible for imple-

1 menting the Electromagnetic Spectrum Superi-
2 ority Strategy published in October 2020; and

3 (B) a description of how the Secretary will
4 ensure that such implementation will be suc-
5 cessful.

6 (e) LIMITATION ON AVAILABILITY OF FUNDS; QUAR-
7 TERLY BRIEFINGS.—

8 (1) LIMITATION.—Of the funds authorized to
9 be appropriated or otherwise made available for fis-
10 cal year 2022 for the Office of the Under Secretary
11 of Defense for Acquisition and Sustainment for the
12 travel of persons—

13 (A) not more than 25 percent may be obli-
14 gated or expended until the Secretary provides
15 to the congressional defense committees the
16 first quarterly briefing under paragraph (2);

17 (B) not more than 50 percent may be obli-
18 gated or expended until the Secretary provides
19 to such committees the second quarterly brief-
20 ing under such paragraph; and

21 (C) not more than 75 percent may be obli-
22 gated or expended until the Secretary provides
23 to such committees the third quarterly briefing
24 under such paragraph.

1 (2) QUARTERLY BRIEFINGS.—On a quarterly
2 basis during the one-year period beginning on the
3 date of the enactment of this Act, the Secretary
4 shall provide to the congressional defense commit-
5 tees a briefing on the status of the implementation
6 plan specified in subsection (d)(1). Each briefing
7 shall include the following:

8 (A) An update on the efforts of the De-
9 partment of Defense to—

10 (i) achieve the strategic goals set out
11 in the electromagnetic spectrum superiority
12 strategy; and

13 (ii) implement such strategy through
14 various elements of the Department.

15 (B) An identification of any additional au-
16 thorities or resources relating to electro-
17 magnetic spectrum operations that the Sec-
18 retary determines is necessary to implement the
19 strategy.



Amendment to H.R. 4350
National Defense Authorization Act for Fiscal Year 2022

Offered by: Robert J. Wittman (VA-01)

In the appropriate place in the report to accompany H.R. 4350, insert the following new Directive Report Language:

Virtualization Technology

The committee is aware of the important role that weapons system virtualization technology can play in reducing size and weight, streamlining hardware requirements, increasing efficiency, and improving capability. Using virtualization technology, the Navy was able to run AEGIS Weapon System code in a successful live fire engagement in a fraction of the original hardware space, allowing that space to be used for other purposes. As the information technology needs of deployed forces and weapons systems increases, it is important that virtualization technology be utilized where appropriate to reduce unnecessary hardware requirements while providing safe, secure, and interoperable capabilities to the battlefield edge. Therefore, the committee directs the Secretary of Defense, in consultation with the Under Secretary of Defense for Research and Engineering, the Under Secretary of Defense for Acquisition and Sustainment, and the Director of Operational Test and Evaluation, to submit a briefing to the congressional defense committees not later than March 1, 2022, on a plan to use commercial virtualization technology, such as was used in the AEGIS system, in weapon systems and for deployed forces. This briefing can accompany or be included in the Digital twin assessment required elsewhere in this bill.

Amendment to H.R. 4350

National Defense Authorization Act for Fiscal Year 2022

Offered by: Mr. Seth Moulton of Massachusetts

In the appropriate place in the report to accompany H.R. 4350, insert the following new Directive Report Language:

Strategy and Posture Review for Information Operations

The committee notes that Information Operations (IO) play a critical role in military advantage. Our national security depends on our ability to influence and disrupt adversary information flow and decision-making, as well as defend and bolster our own. IO can include a range of capabilities, from electromagnetic warfare and cyber operations to operations security and information assurance. Near-peer competitors are currently using IO to achieve objectives below the threshold of armed conflict. Russia has repeatedly leveraged cyberattacks and disinformation campaigns to undermine U.S. institutions and allies and China has invested heavily in electronic warfare capabilities to counter our own.

These tactics are particularly effective in “gray zone” warfare, where adversaries operate below the level of armed conflict. Department of Defense leadership has acknowledged China and Russia’s extremely effective use of gray zone warfare and the risk to the Department of Defense if it doesn’t learn to operate in that space effectively. IO will play a critical role in making the Department more competitive in the “gray zone.”

Currently, the Department defines IO inconsistently across components of the organization and does not have clear policy for it. In the National Defense Authorization Act for Fiscal Year 2020, Section 1631(g), the House Armed Services Committee directed the Secretary of Defense to submit a Strategy and Posture Review to the House Armed Services Committee no later than 270 days after the Act was enacted. The committee notes that this report has not yet been submitted to the House Armed Services Committee.

Accordingly, the committee directs the Secretary of Defense, acting through the Principal Information Operations Advisor under Section 397 of Title 10, United States Code, to submit this report to the House Armed Services Committee as soon as possible. This report should make sure to complete a detailed evaluation of any organizational changes that may be necessary within the Office of the Secretary of Defense including changes to the role of the Principal Information Operations Advisor in IO governance and leadership as required in Section 1631(g)(3)(B) of the National Defense Authorization Act for Fiscal Year 2020.

Additionally, the committee directs the Principal Information Operations Advisor to brief the House Armed Services Committee no later than February 1, 2022, on the progress of the Principal Information Operations Advisor's office stand-up and ongoing IO efforts, as well as the Department of Defense's broader efforts in IO.

Amendment to H.R. 4350

National Defense Authorization Act for Fiscal Year 2022

Offered by: Mr. Jim Banks

In the appropriate place in the report to accompany H.R. 4350, insert the following new Directive Report Language:

Implementation of the National Security Innovation Partnerships and Integration of the Future of Defense Center and Naval Tech Bridges

The committee notes that the United States has entered an era of great power competition. As the 2021 Interim Strategic Guidance suggests: “We face a world of rising nationalism, receding democracy, growing rivalry with China, Russia, and other authoritarian states, and a technological revolution that is reshaping every aspect of our lives... China, in particular, has rapidly become more assertive. It is the only competitor potentially capable of combining its economic, diplomatic, military, and technological power to mount a sustained challenge to a stable and open international system.”

To meet the demands of great power competition, the United States must not only compete on the battlefield, but also in the technological sphere. To effectively compete and out-innovate strategic competitors such as China, the committee believes the Department of Defense should harness, organize, and integrate the talent within the Department, universities, and the private sector around critical national security problems.

The committee believes that Hacking for Defense continues to be an innovative educational model that could underpin other Department innovation efforts. The committee notes that the National Defense Authorization Act for Fiscal Year 2018 (Public Law 115-91) authorized the Secretary of Defense to support national security innovation and entrepreneurial education including the Hacking for Defense program. The committee further notes that the Department has adopted and scaled the program and applauds the Department’s expansion of this and other efforts to scale innovation at the speed of relevance.

The committee further notes that section 219 of the National Defense Authorization Act for Fiscal Year 2021 (Public Law 116-283) National Security Innovation Partnerships directed the Secretary of Defense to facilitate engagement with academic institutions, private sector firms in defense and commercial sectors, commercial accelerators and incubators, commercial innovation hubs, public sector organizations, and nonprofit entities with missions relating to national security innovation for the purpose of developing solutions to national

security and defense problems articulated by entities within the Department, including through programs such as the Hacking for Defense program. The Office of Naval Research (ONR) has been engaged in innovation efforts that are consistent with the Hacking for Defense model, and the committee encourages ONR to continue supporting the Secretary in executing the direction in this section.

Further, the committee supports the ONR's efforts to train and deploy innovation leaders and leverage the Department of the Navy's tech bridges to bring new and innovative capabilities to the warfighter. Through such efforts, the committee believes the Navy will inculcate the foundational principles of problem definition and build operational concepts through methods such as Lean Startup to allow for faster delivery of capability to the warfighter.

In addition, the committee supports the ONR's establishment of the Future for Defense Center. The committee believes such a center will help the Department of the Navy study, improve, and institutionalize processes that will build and harness the national security innovation base.

Therefore, the committee directs the Secretary of Defense to submit a report to the congressional defense committees by April 1, 2022 on how the Department of Defense is integrating the Future of Defense Center, the training and deployment of innovation leaders, and the Department of the Navy's NavalX Tech Bridges and the Centers for Adaptive Warfighting to achieve new and innovative technologies at scale. The report should include, but not be limited to, the following:

- (1) The authorities the Department of the Navy requires for such efforts;
- (2) The required budget to sustain such efforts in the ONR in future fiscal years;
- (3) The partnerships that the ONR is undertaking to further such efforts;
- (4) Similar efforts within the other United States Armed Forces and across the Department of Defense ecosystem;
- (5) A status on the implementation of Section 219 of the National Defense Authorization Act for Fiscal Year 2021 (Public Law 116-283) *National Security Innovation Partnerships*; and,
- (6) Any other information the Secretary deems relevant."

AMENDMENT TO H.R. 4350
OFFERED BY MR. BANKS OF INDIANA

At the appropriate place in title II, insert the following new section:

1 **SEC. 2 ____ . STRATEGY FOR AUTONOMY INTEGRATION IN**
2 **MAJOR WEAPON SYSTEMS.**

3 (a) STRATEGY REQUIRED.—Not later than one year
4 after the date of the enactment of this Act the Secretary
5 of Defense shall submit to the Committees on Armed Serv-
6 ices of the Senate and House of Representatives a strategy
7 to resource and integrate, to the maximum extent possible,
8 autonomy software that enables full operational capability
9 in high threat, communications and GPS-denied environ-
10 ments into major weapons systems of the Department of
11 Defense by fiscal year 2025.

12 (b) ELEMENTS.—The strategy required under sub-
13 section (a) shall include—

14 (1) a list of weapon systems and programs, to
15 be selected by the Secretary of Defense, which can
16 be integrated with autonomy software as described
17 in subsection (a) by fiscal year 2025;

1 (2) timelines for autonomy software integration
2 into the weapon systems and programs as identified
3 under paragraph (1);

4 (3) funding requirements related to the develop-
5 ment, acquisition, and testing of autonomy software;

6 (4) plans to leverage commercially-available ar-
7 tificial intelligence software, universal common con-
8 trol software, and autonomy software and related
9 self-driving or self-piloting technologies, where ap-
10 propriate; and

11 (5) plans to include autonomy software, artifi-
12 cial intelligence, and universal common control.

13 (c) CONSULTATION.—The Secretary shall develop the
14 strategy required under subsection (a) in consultation
15 with—

16 (1) the Under Secretary of Defense for Re-
17 search and Engineering;

18 (2) the Secretaries of the military departments;
19 and

20 (3) such other organizations and elements of
21 the Department of Defense as the Secretary deter-
22 mines appropriate.

23 (d) REPORT.—

24 (1) IN GENERAL.—Not later than one year
25 after the date on which the strategy required under

1 subsection (a) is submitted to the Committees on
2 Armed Services of the Senate and House of Rep-
3 resentatives, and not later than October 1 of each of
4 the five years thereafter, the Secretary of Defense
5 shall submit to the Committees on Armed Services
6 of the Senate and House of Representatives a report
7 that describes the status of the implementation of
8 the strategy.

9 (2) CONTENTS.—The report required under
10 paragraph (1) shall—

11 (A) identify any substantial changes made
12 in the strategy during the preceding calendar
13 year; and

14 (B) describe the progress made in imple-
15 menting the strategy.

16 (e) FORM.—The strategy required under subsection
17 (a) and the report required under subsection (d) shall be
18 submitted in unclassified form but may contain a classi-
19 fied annex.



Amendment to H.R. 4350
National Defense Authorization Act for Fiscal Year 2022

Offered by: Pat Fallon

In the appropriate place in the report to accompany H.R. 4350, insert the following new Directive Report Language:

5G Open Radio Access Network

The Committee notes that the Department of Defense and the military Services manage a number of 5G programs. The Committee further notes that 5G offers the potential for significant strategic and tactical improvements and advantages for the Department of Defense as well as the American people. The Committee is concerned that to date, the Department of Defense does not appear to have developed a well-coordinated 5G effort.

The Committee is aware that the Executive Order on Promoting Competition in the American Economy reads in part that the Administration supports the “continued development and adoption of 5G Open Radio Access Network (O-RAN) protocols and software, continuing to attend meetings of voluntary and consensus-based standards development organizations, so as to promote or encourage a fair and representative standard-setting process, and undertaking any other measures that might promote increased openness, innovation, and competition in the markets for 5G equipment;”

The Committee believes continued support and increased attention on the development and adoption of O-RAN in 5G could result in a downstream effect, whereby the United States becomes less dependent on foreign sourced technology. The Committee believes O-RAN, if more broadly supported, adopted, and deployed, will contribute to an environment of increased competition by new and innovative, competitive suppliers, leading to a more robust domestic supply chain that is able to develop more organically.

The Committee supports 5G Open Radio Access Network (O-RAN) because it promotes competition. To this end, the Committee is extremely supportive of efforts

and collaborations helping support the development of a healthy, domestic, multi-vendor supply base of O-RAN equipment and software providers.

Therefore, the Committee directs the Under Secretary of Defense for Acquisition and Sustainment, by March 31, 2022, to provide a briefing to the Senate Committee on Armed Services and the House Committee on Armed Services on the steps the Department is taking to support 5G and O-RAN. The report shall address how the Department is supporting the development of a domestic industrial base for 5G.

Additionally, the Committee directs the Under Secretary of Defense for Acquisition and Sustainment, in coordination with the Senior Official for 5G, to provide a report to the Senate Committee on Armed Services and the House Committee on Armed Services by March 31, 2021 regarding the Department of Defense's ability to carry out 5G research, prototyping and production projects utilizing existing consortia, as well as the advisability of creating one or more additional consortia in order to address the specific needs of the 5G Wireless Networking Cross Functional Team and others.

AMENDMENT TO H.R. 4350
OFFERED BY MR. LARSEN OF WASHINGTON

At the appropriate place in title X, insert the following:

1 **SEC. 10 ____ . LIMITATION ON FUNDING FOR INFORMATION**
2 **OPERATIONS MATTERS.**

3 Of the amounts authorized to be appropriated for fis-
4 cal year 2022 by section 301 for operation and mainte-
5 nance and available for the Office of the Secretary of De-
6 fense for the travel of persons as specified in the table
7 in section 4301—

8 (1) not more than 25 percent shall be available
9 until the date on which the report required by sub-
10 section (h)(1) of section 1631 of the National De-
11 fense Authorization Act for Fiscal Year 2020 (Pub-
12 lic Law 116–92) is submitted to the Committee on
13 Armed Services of the Senate and the Committee on
14 Armed Services House of Representatives; and

15 (2) not more than 75 percent shall be available
16 until the date on which the strategy and posture re-
17 view required by subsection (g) of such section is
18 submitted to such committees.



Amendment to H.R. 4350

National Defense Authorization Act for Fiscal Year 2022

Offered by: Mrs. Houlahan

In the appropriate place in the report to accompany H.R. 4350, insert the following new Directive Report Language:

Emerging Tech Adoption Training

The committee notes the importance of Department of Defense efforts to train its active duty and civilian workforce on innovation and technology adoption. The committee recognizes that the Department is offering training programs on these topics through both program offices and private sector organizations. As emerging technologies hold the ability to have a disruptive impact on U.S. national security, the committee understands the importance of ensuring the DoD is trained and prepared to identify, acquire, and integrate innovative technologies. The committee directs the Under Secretary of Defense for Acquisition and Sustainment, in coordination with the Under Secretary of Defense for Research and Engineering, to submit a report to the House Armed Services Committee by March 31, 2022 on the current status of the Department's emerging technology adoption training programs. The report shall include:

- (1) a detailed description of the types of training programs already underway on these subjects and the professional series of the participants;
- (2) the metrics collected on workforce performance following each program (to include the rate of adoption of emerging technologies and innovative contracting methods);
- (3) a list of the Department and private sector organizations providing the training programs;
- (4) a description of any plans to expand the training programs; and
- (5) a discussion of any authorities or funding needed to support expanded trainings.

Amendment to H.R. 4350
National Defense Authorization Act for Fiscal Year 2022

Offered by: Mr. Kim of New Jersey

In the appropriate place in the report to accompany H.R. 4350, insert the following new Directive Report Language:

Directive Authority for National Security Systems

The committee recognizes the advancement of government-wide cybersecurity through directive authorities, such as those held by the Department of Homeland Security, and binding operational directives for civilian agencies, and those of the Department of Defense, through Joint Functional Headquarters-Department of Defense Information Network (JFHQ-DODIN), for the military and subordinate components. However, while these agencies are able to direct required actions to the majority of the federal government, there appear to be impediments to a comparable authority over National Security Systems (NSS).

As such, the committee directs the Director of the National Security Agency to provide a report to the House Committee on Armed Services no later than March 2, 2022, on impediments to the effective use of directive authorities by the NSA over National Security Systems. The report shall also include recommendations to maximize the impact directive authority over National Security Systems can have in mitigating risk to the federal government, as well as steps taken to date.

**Amendment to H.R. 4350
National Defense Authorization Act for Fiscal Year 2022**

Offered by: Mr. Moore of Utah

In the appropriate place in the report to accompany H.R. 4350, insert the following new Directive Report Language:

21st Century IDEA Compliance

The Assistant to the Secretary of Defense for Public Affairs recently appointed the Defense Media Activity (DMA) as the lead agency for consolidating all DoD component public website management into a central DoD Public Web Program. The Committee is supportive of this much-needed website consolidation and modernization effort that will allow DoD to fully comply with the 21st Century Integrated Digital Experience Act “21st Century IDEA” (Public Law 115-336). The committee views a modernized DoD Public Web Program as essential to ensure DoD websites are more secure, accessible, consistent in appearance, user-centered and mobile friendly to all who use them, including active duty and civilian personnel, military families and the broader defense community. The committee directs the Assistant to the Secretary of Defense for Public Affairs, in coordination with the Director of the Defense Media Activity, to brief the committee on the Public Web Program no later than April 1, 2022.

AMENDMENT TO H.R. 4350
OFFERED BY MS. ESCOBAR OF TEXAS

In subsection (b)(2) of section 2____(Log 73288),
insert “, including economically disadvantaged commu-
nities” before the period at the end.



AMENDMENT TO H.R. 4350
OFFERED BY MR. BROWN OF MARYLAND

At the appropriate place in title VIII, insert the following:

1 **SEC. 8 ____ . CADRE OF SOFTWARE DEVELOPMENT AND AC-**
2 **QUISITION EXPERTS.**

3 (a) CADRE OF SOFTWARE DEVELOPMENT AND AC-
4 QUISITION EXPERTS.—

5 (1) Not later than January 1, 2022, the Sec-
6 retary of Defense, acting through the Under Sec-
7 retary of Defense for Acquisition and Sustainment,
8 shall establish a cadre of personnel who are experts
9 in development and acquisition of software. The pur-
10 pose of the cadre is to ensure a consistent, strategic,
11 and highly knowledgeable approach to developing
12 and acquiring software by providing expert advice,
13 assistance, and resources to the acquisition work-
14 force in support of the policies established in accord-
15 ance with Department of Defense Instruction
16 5000.02, Operation of the Adaptive Acquisition
17 Framework, dated January 23, 2020.

18 (2) The Under Secretary shall establish an ap-
19 propriate leadership structure and office within

1 which the cadre shall be managed, and shall deter-
2 mine the appropriate official to whom members of
3 the cadre shall report.

4 (3) The cadre of experts shall be assigned to a
5 program office or an acquisition command within a
6 military department to advise, assist, and provide re-
7 sources to a program manager or program executive
8 officer on matters pertaining to software at various
9 stages of the life cycle of a system, including but not
10 limited to integration, testing, production, certifi-
11 cation, deployment of capabilities to the operational
12 environment, and maintenance. In performing such
13 duties, the experts shall—

14 (A) Advise and assist in integration of
15 modern software development practices such as
16 agile software development; development, secu-
17 rity, and operations (DevSecOps); and lean
18 practices.

19 (B) Advise and assist in leveraging indus-
20 try best practices for software development, de-
21 ployment, upgrades, and sustainment to include
22 contracting for software as a service, subscrip-
23 tion models, use of prime contractors to assist
24 in integration, and other methods for acquiring
25 or accessing capability.

1 (C) In conjunction with the Cadre of Intel-
2 lectual Property Experts established pursuant
3 to section 2322 of this title, develop a strategy
4 and licensing framework to enable government
5 procurement of commercial software, to include:

6 (i) in accordance with section 2377 of
7 this title, a preference for the acquisition
8 of commercial software under the license
9 customarily provided to the public, except
10 as specified in paragraphs (ii) and (iii);

11 (ii) identification of terms or condi-
12 tions that may be inconsistent with federal
13 procurement law;

14 (iii) identification of operational user
15 needs that may necessitate the negotiation
16 of customized licenses to ensure authorized
17 use in unique operational environments;
18 and

19 (iv) methods and procedures for use
20 of stand-alone software licensing in cases
21 where other contract vehicles are inappro-
22 priate or unavailable.

23 (D) Establish and lead cross-functional
24 government-industry teams that include oper-
25 ational users, data and system architects, ex-

1 perts in artificial intelligence, developmental
2 and operational testers, software developers,
3 and cybersecurity experts to deliver software
4 rapidly and iteratively to meet the highest pri-
5 ority user needs.

6 (E) Advise and assist in the development
7 of requirements, acquisition strategy, product
8 support strategy, and intellectual property
9 strategy for a system.

10 (F) Advise and assist in planning and
11 budgeting for agile software development and
12 deployment, and the sustainment of software
13 over the life-cycle of the program, to include
14 consideration of the shifting landscape of con-
15 tinual cyber threat and evolving cyber require-
16 ments.

17 (G) Conduct or assist with financial anal-
18 ysis, cost estimation, and valuation of software,
19 to include agile software development, to in-
20 clude valuation of embedded software as a
21 standalone product or as part of modular open
22 system approach.

23 (H) Assist in the drafting of a solicitation,
24 contract, or other transaction agreement.

1 (I) Interact with or assist in interactions
2 with contractors, including communications and
3 negotiations with contractors on solicitations
4 and awards.

5 (J) Foster culture change necessary to en-
6 able the Department of Defense to embrace and
7 leverage modern software practices by:

8 (i) recommending policies to ensure
9 program managers are empowered to set
10 and maintain the integrity of agile develop
11 process and priorities; and

12 (ii) educating key stakeholders in con-
13 siderations regarding the integration and
14 incorporation of agile software development
15 practices with systems acquired under the
16 major capability acquisition pathway.

17 (4)(A) In order to achieve the purpose set forth
18 in paragraph (1), the Under Secretary shall ensure
19 the cadre has the appropriate number of staff and
20 such staff possesses the necessary skills, knowledge,
21 and experience to carry out the duties under para-
22 graph (2), including in relevant areas of law, com-
23 mercial software licensing, contracting, acquisition,
24 logistics, engineering, financial analysis, cost esti-
25 mation, and valuation. The Under Secretary, in co-

1 ordination with the Defense Acquisition University
2 and in consultation with academia and industry,
3 shall develop a career path, including development
4 opportunities, exchanges, talent management pro-
5 grams, and training, for the cadre. The Under Sec-
6 retary may use existing authorities to staff the
7 cadre, including those in subparagraphs (B), (C),
8 (D), and (F).

9 (B) Civilian personnel from within the Of-
10 fice of the Secretary of Defense, Joint Staff,
11 military departments, Defense Agencies, and
12 combatant commands may be assigned to serve
13 as members of the cadre, upon request of the
14 Director.

15 (C) The Under Secretary may use the au-
16 thorities for highly qualified experts under sec-
17 tion 9903 of title 5, to hire experts as members
18 of the cadre who are skilled professionals in
19 software development and acquisition, commer-
20 cial software licensing, and related matters.

21 (D) The Under Secretary may enter into a
22 contract with a private-sector entity for special-
23 ized expertise to support the cadre. Such entity
24 may be considered a covered Government sup-

1 port contractor, as defined in section 2320 of
2 this title.

3 (E) In establishing the cadre, the Under
4 Secretary shall give preference to civilian em-
5 ployees of the Department of Defense, rather
6 than members of the armed forces, to maintain
7 continuity in the cadre.

8 (F) The Under Secretary is authorized to
9 use amounts in the Defense Acquisition Work-
10 force Development Fund for the purpose of re-
11 cruitment, training, and retention of the cadre,
12 including paying salaries of newly hired mem-
13 bers of the cadre for up to three years.

14 (G) In implementing this section, the
15 Under Secretary shall ensure compliance with
16 applicable total force management policies, re-
17 quirements, and restrictions provided in sec-
18 tions 129a, 2329, and 2461 of title 10, United
19 States Code.

20 (H) The Under Secretary shall ensure that
21 any contractor employee providing services in
22 support of, or participation in, the cadre estab-
23 lished under this section and is considered a
24 Special Government Employee as defined by
25 section 202 of title 18, United States Code, is

1 required to file a confidential financial dislo-
2 sure in accordance with the Ethics in Govern-
3 ment Act of 1978.



Amendment to H.R. 4350
National Defense Authorization Act for Fiscal Year 2022

Offered by: Mr. Carl

In the appropriate place in the report to accompany H.R. 4350, insert the following new Directive Report Language:

Interoperability and Commercial Solutions for Combined Joint All-Domain Command and Control

The Committee directs the Secretary of Defense to provide a briefing to the House Committee on Armed Services by December 31, 2021 as a part of a quarterly update on the Joint All-Domain Command and Control required under section 1076 of the William M. (Mac) Thornberry National Defense Authorization for Fiscal Year 2021 (Public Law 116-283) on the following matters:

- (1) Availability and functionality of commercially available battlefield management software systems for use as part of the Joint All-Domain Command and Control;
- (2) Interoperability among each of the military services;
- (3) Interoperability among allied communications systems;
- (4) Employment of existing program of record open-architecture solutions.

Amendment to H.R. 4350 National Defense Authorization Act for Fiscal Year 2022

Offered by: Mr. Gallego of Arizona

In the appropriate place in the report to accompany H.R. 4350, insert the following new Directive Report Language:

Establishing a National Network for Microelectronics Research and Development

The committee recognizes that semiconductors are essential components in the electronic devices that Americans use every day. The committee also recognizes that the COVID-19 pandemic has highlighted weaknesses in our nation's reliance on supply chains abroad, particularly with regard to semiconductor manufacturing. The Committee believes that the United States must commit to translating innovations that occur inside the laboratory to the marketplace – commonly referred to as “lab to fab” capability - to support American manufacturing jobs and prevent the United States from falling further behind other countries in semiconductor manufacturing. Specifically, the committee believes it is important to establish a national network for microelectronics research and development, composed of United States research universities, to increase American “lab to fab” capability; conduct microelectronics research and development; aid in workforce development; and increase supply chain resiliency for United States semiconductor production.

Therefore, the committee directs the Secretary of Defense to provide a report to the House Committee on Armed Services by March 31, 2022, on efforts to establish a national network for microelectronics research and development composed of United States research universities. The report shall include:

- (1) opportunities to explore new cost-effective materials, devices, and architectures, and prototyping in facilities at United States research universities to safeguard domestic intellectual property;
- (2) opportunities to accelerate the transition of new technologies to domestic microelectronics manufacturers;
- (3) an assessment of United States research universities that can join the network through a competitive process; and
- (4) how the Department can ensure that research and development participants in the network represent the geographic diversity of the United States.

AMENDMENT TO H.R. 4350
OFFERED BY MR. GALLEGO OF ARIZONA

At the appropriate place in title LX, add the following new section:

1 **SEC. 60 ____ . REQUIREMENT TO ESTABLISH A NATIONAL**
2 **NETWORK FOR MICROELECTRONICS RE-**
3 **SEARCH AND DEVELOPMENT.**

4 Section 9903(b)(1) of the William M. (Mac) Thorn-
5 berry National Defense Authorization Act for Fiscal Year
6 2021 (Public Law 116-283) is amended in the matter pre-
7 ceding subparagraph (A) by striking “may” and inserting
8 “shall”.



AMENDMENT TO H.R. 4350
OFFERED BY MR. C. SCOTT FRANKLIN OF
FLORIDA

At the appropriate place in title XV, insert the following:

1 **SEC. 15** _____ **PROTECTIVE DOMAIN NAME SYSTEM**
2 **WITHIN THE DEPARTMENT OF DEFENSE.**

3 (a) **IN GENERAL.**—Not later than 120 days after the
4 date of the enactment of this Act, the Secretary shall en-
5 sure each component of the Department of Defense uses
6 a Protective Domain Name System (PDNS) instantiation
7 offered by the Department.

8 (b) **EXEMPTIONS.**—The Secretary of Defense may ex-
9 empt a component of the Department from using a PDNS
10 instantiation for any reason except for cost or technical
11 application.

12 (c) **REPORT TO CONGRESS.**—Not later than 150 days
13 after the date of the enactment of this Act, the Secretary
14 of Defense shall submit to the congressional defense com-
15 mittees a report that includes information relating to—

16 (1) each component of the Department that
17 uses a PDNS instantiation offered by the Depart-
18 ment;

1 (2) each component exempt from using a
2 PDNS instantiation pursuant to subsection (b); and
3 (3) efforts to ensure that the PDNS
4 instantiation offered by the Department connect and
5 share relevant and timely data.



**Amendment to H.R. 4350
National Defense Authorization Act for Fiscal Year 2022**

Offered by: Mr. Crow

In the appropriate place in the report to accompany H.R. 4350, insert the following new Directive Report Language:

University Consortium for Space Technology Development

The Committee recognizes the need to accelerate the transition of fundamental research and early-stage technology development into integrated systems capable of aiding the national security space enterprise. Specifically, the Committee recognizes and values the critical role universities play in spurring transformational research and technology development within the space domain. Given the diverse and highly technical needs of the Space Force, the Committee supports the development of a university-led consortium that addresses and facilitates the advancement of capabilities related to space domain awareness; position, navigation, and timing; autonomy; data analytics; communications; space-based power generation; and space applications for cybersecurity. The Committee directs the Chief of Space Operations, in coordination with the Chief Scientist of the Space Force, to establish a university consortium for space technology development that will support the Space Force's research, development and demonstration needs in these areas and others as needed. This university consortium should also promote the education and training for students in order to support the nation's future national security space workforce.

Amendment to H.R. 4350
National Defense Authorization Act for Fiscal Year 2022

Offered by: Mr. Morelle of New York

In the appropriate place in the report to accompany H.R. 4350, insert the following new Directive Report Language:

Africa Data Science Center

The committee recognizes and commends the work of the Africa Data Science Center within the U.S. Army Intelligence and Security Command's 207th Military Intelligence Brigade-Theater. With support from U.S. Army Africa and U.S. Africa Command (USAFRICOM), this pilot program serves as a model for the innovation needed to meet Department of Defense modernization priorities. With a small staff and limited funds, the team has been able to leverage best practices from across the intelligence community, applying leading-edge data science tradecraft to fulfill operational intelligence requirements. Their work has been invaluable in helping USAFRICOM better understand near-peer adversary activities across Africa. The committee believes the Africa Data Science Center is an exemplar of operationalizing innovative technological solutions in an Area of Responsibility with limited resources aligned against it. In understanding how the lessons of the Africa Data Science Center can be applied to other national security and regional challenges, the committee directs the Chief of Staff of the Army to provide a briefing to the committee no later than May 1st, 2022 on how other regionally-aligned Army elements can incorporate best practices of the Africa Data Science Center to the maximum extent practicable.

AMENDMENT TO H.R. 4350
OFFERED BY MR. LANGEVIN OF RHODE ISLAND

Add at the appropriate place in title XV the following new section:

1 **SEC. 15 ____ . PROHIBITION ON CHIEF INFORMATION OFFI-**
2 **CER OF THE DEPARTMENT OF DEFENSE**
3 **SERVING AS PRINCIPAL CYBER ADVISOR OF**
4 **THE DEPARTMENT.**

5 Section 932(c)(1) of the National Defense Authoriza-
6 tion Act for Fiscal Year 2014 (Public Law 113–66; 10
7 U.S.C. 2224 note) is amended by inserting after “civilian
8 officials of the Department of Defense” the following:
9 “(other than the Chief Information Officer of the Depart-
10 ment)”.



**Amendment to H.R. 4350
National Defense Authorization Act for Fiscal Year 2022**

Offered by: Mr. Langevin of Rhode Island

In the appropriate place in the report to accompany H.R. 4350, insert the following new Directive Report Language:

Enhancing Department of Defense Innovation Efforts Focused on Policy Analytics and Insights

There are multiple innovation initiatives being developed organically within the Department of Defense and the committee believes it is critical to ensure these efforts can be scaled, including by transitioning them to programs of record. Initiatives generated by the internal Department innovation ecosystem to solve systemic problems, however, often lack a single proponent and rarely become programs of record.

The committee is aware that through the GAMECHANGER program build on the ADVANA platform, the Department is developing the ability to use artificial intelligence to map and analyze the vast and evolving landscape of Department policy, regulations, and strategies to provide decision makers the ability to quickly search millions of pages of documents to identify a comprehensive catalogue of information to make more efficient policy decisions. This type of analytic capability has the ability to significantly advance how the Department and its workforce makes decisions.

To this end, the committee directs the Director of the Joint Artificial Intelligence Center in consultation with the Chief Data Officer and the Comptroller to provide a briefing to the House Committee on Armed Services no later than February 1, 2022 on GAMECHANGER, its current usage inside the Department, the potential need to transition it to a program of record, and efforts to identify and encourage similar programs across the defense enterprise.

Amendment to H.R. 4350 National Defense Authorization Act for Fiscal Year 2022

Offered by: Mr. Langevin of Rhode Island

In the appropriate place in the report to accompany H.R. 4350, insert the following new Directive Report Language:

Comptroller General Report on STEM and AI Workforce Development

The National Security Commission on Artificial Intelligence's (AI) final report highlighted that the Department of Defense and the Intelligence Community both face an alarming talent deficit in their digital and AI workforce and that America is not prepared to defend or compete in the AI era—a reality that demands comprehensive, whole-of-nation action. China's ambition to surpass the United States as the world's AI leader within a decade should be taken seriously. To address this daunting challenge, the Commission emphasized that the government must expand science, technology, engineering, and mathematics (STEM), to include AI, talent pipelines from universities to government service, to include streamlining the hiring process and building new training infrastructure such as a digital service academy. In 2018 the Comptroller General evaluated federal investment in STEM education fields and found that government efforts to assess the performance of STEM programs are limited and hinder efforts to identify effective programs. The United States government, and particularly the Department, cannot afford to fall behind in the development of a robust STEM workforce when AI and other emerging technology tools will be vital in future conflicts.

Therefore, the committee directs the Comptroller General to provide a briefing to the House Committee on Armed Services not later than March 31, 2022, with a report to follow on the Department's—including the defense intelligence components'—progress in developing a robust STEM, to include AI, workforce. The review shall assess the Department's:

(1) current organization and workforce planning process for their STEM, to include AI, workforce needs, including the identification of STEM skills and the resources currently dedicated to the hiring, training, and retention of their STEM workforces;

(2) plans and efforts to expand hiring in their STEM workforce, including collaboration with industry and academia, the broadening of recruiting pipelines, and mechanisms to attract the best AI talent;

(3) efforts to grow the training infrastructure for their STEM workforce, such as special schools or online training programs, and continuing professional education; and

(4) efforts to improve the retention and visibility of their STEM workforce, including the availability of non-financial benefits, the implementation of flexible career paths, and the development of management structures to enhance the workforce.

Amendment to H.R. 4350 National Defense Authorization Act for Fiscal Year 2022

Offered by: Mr. Langevin of Rhode Island

In the appropriate place in the report to accompany H.R. 4350, insert the following new Directive Report Language:

Additional Software Acquisition Contracting Mechanism

The committee appreciates the Defense Innovation Board (DIB) and its May 2019 software acquisition report. The report called for a new acquisition pathway for software that would prioritize continuous integration and delivery of working software in a secure manner, with continuous oversight from automated analytics. The report also included a recommendation for an accompanying rapid contracting mechanism to support the software pathway. This committee created the software pathway in Section 800 of the Fiscal Year 2020 National Defense Authorization Act (Public Law 116-333), and the Department of Defense issued its formal policy on the pathway on October 2, 2020. The committee is aware that the rapid contracting mechanism was never authorized nor implemented. Therefore, the committee directs the Secretary of Defense to provide a report to the House Committee on Armed Services no later than October 1, 2022 analyzing whether a new contracting mechanism would accelerate the delivery of critical software to warfighters and users and support the software acquisition pathway developed pursuant to section 800 of the FY2020 NDAA, and outlined in Department of Defense 5000.02 and 5000.87 policy. If the Secretary assesses that a new contracting mechanism would be beneficial, the Secretary shall include in the report a plan to develop and establish an agile contracting mechanism that would enable the Department to acquire software more rapidly than existing contracting mechanisms currently allow.

In the report, the Secretary shall consider whether and how a new agile mechanism could have the potential to—

- (1) streamline the processes for selection of software development contractors;
- (2) make use of contracts that ensure key software development personnel are used effectively;
- (3) allow the user community to provide input in a timelier manner than available under existing contracting mechanisms;

(4) use cost estimates that reflects the anticipated size and complexity of the effort and leverage agile cost estimation best practices;

(5) use performance metrics to measure deployment frequency, lead time, change fail rate, mean time to restore, and the speed of recovery from cybersecurity-related outages;

(6) incorporate value assessments conducted by the user community to provide direct feedback regarding the usefulness, accessibility, and user experience of the software; and

(7) improve the Department's overall ability to deliver effective and modern software to users and warfighters.

AMENDMENT TO H.R. 4350
OFFERED BY MR. LANGEVIN OF RHODE ISLAND

At the appropriate place in title LII, insert the following:

1 **SEC. 52 ____ . DEPARTMENT OF DEFENSE PLAN TO COMPETE**
2 **IN THE GLOBAL INFORMATION ENVIRON-**
3 **MENT.**

4 (a) **IN GENERAL.**—Not later than 270 days after the
5 date of the enactment of this Act, the Secretary of Defense
6 shall submit to Congress a report containing the plan of
7 the Secretary for the Department of Defense to compete
8 and win in the global information environment. Such plan
9 shall address the global information environment as an
10 arena of competition that is vital to the national security
11 and defense of the United States.

12 (b) **ISSUES TO BE ADDRESSED.**—The report required
13 by subsection (a) shall address each of the following:

14 (1) How the Department will prioritize the
15 global information environment as an arena for
16 international competition, including a plan for how
17 the will support the larger whole-of-government ef-
18 forts.

1 (2) How adversarial foreign countries and non-
2 state actors are attempting to define and control the
3 global information environment to shape global opin-
4 ion and achieve strategic advantage.

5 (3) The critical role of artificial intelligence-en-
6 abled malign information in the efforts of adver-
7 sarial foreign countries and non-state actors to
8 shape global opinion and achieve strategic advan-
9 tage.

10 (4) Actions to defend, counter, and compete
11 against malign information operations as a national
12 security threat while proactively influencing and de-
13 terring adversaries in the global information environ-
14 ment, including a prioritization of such actions.

15 (5) If the Secretary determines necessary, crit-
16 ical weapon systems and infrastructure designations
17 to update sector-specific plans to reflect emerging
18 technologies.

19 (6) An evaluation of the sufficiency of Depart-
20 ment of Defense organizational structures and re-
21 sources to counter and compete against threats and
22 challenges in the global information environment.



AMENDMENT TO H.R. 4350

OFFERED BY MR. LANGEVIN OF RHODE ISLAND

At the appropriate place in title LII insert the following:

1 **SEC. 52 ____. RESOURCING PLAN FOR DIGITAL ECOSYSTEM.**

2 (a) PLAN REQUIRED.—Not later than one year after
3 the date of the enactment of this Act, the Secretary of
4 Defense shall develop a plan detailing the requisite invest-
5 ments required to develop and implement Department of
6 Defense strategy and guidance documents for a modern,
7 robust digital ecosystem.

8 (b) DOCUMENTS FOR IMPLEMENTATION.—The plan
9 required under subsection (a) shall include a description
10 of the aggregated and consolidated financial and personnel
11 requirements necessary to implement each of the following
12 Department of Defense documents:

13 (1) The Department of Defense Digital Mod-
14 ernization Strategy.

15 (2) The Department of Defense Data Strategy.

16 (3) The Department of Defense Cloud Strategy.

17 (4) The Department of Defense Software Mod-
18 ernization Strategy.

1 (5) The Department-wide software science and
2 technology strategy required under section 255 of
3 the National Defense Authorization Act for Fiscal
4 Year 2020.

5 (6) The Department of Defense Artificial Intel-
6 ligence Data Initiative.

7 (7) The Joint All-Domain Command and Con-
8 trol Strategy.

9 (8) Such other documents as the Secretary de-
10 termines appropriate.

11 (c) CONTENTS OF PLAN.—The plan required under
12 subsection (a) shall include each of the following:

13 (1) A description of the resources, personnel,
14 processes, reforms, and other requisite components
15 to enable development, testing, fielding, and contin-
16 uous update of artificial intelligence-powered appli-
17 cations at speed and scale from headquarters to the
18 tactical edge.

19 (2) An evolving reference design and guidance
20 for needed technical investments in the proposed
21 digital ecosystem that addresses issues, including
22 common interfaces, authentication, applications,
23 platforms, software, hardware, and data infrastruc-
24 ture.

1 (3) A governance structure, together with asso-
2 ciated policies and guidance, to drive the implemen-
3 tation of the plan throughout the Department of De-
4 fense on a federated basis.

5 (d) SUBMISSION TO CONGRESS.—Not later than
6 seven days after the completion of the plan required under
7 subsection (a), the Secretary of Defense shall submit the
8 plan to the congressional defense committees.



AMENDMENT TO H.R. 4350
OFFERED BY MR. LANGEVIN OF RHODE ISLAND

At the appropriate place in title LII insert the following:

1 **SEC. 5 ____ . SHORT COURSE ON EMERGING TECHNOLOGIES**
2 **FOR SENIOR CIVILIAN LEADERS.**

3 (a) IN GENERAL.—Not later than one year after the
4 date of the enactment of this Act, the Secretary of Defense
5 shall establish a short course on emerging technologies for
6 senior executive-level civilian leaders. The short course
7 shall be taught on an iterative, two-year cycle and shall
8 address the most recent, most relevant technologies and
9 how these technologies may be applied to military and
10 business outcomes in the Department of Defense.

11 (b) THROUGHPUT OBJECTIVES.—In assessing par-
12 ticipation in the short course authorized by subsection (a),
13 the Secretary of Defense shall ensure that—

14 (1) in the first year that the course is offered,
15 no fewer than twenty percent of senior executive-
16 level civilian leaders are certified as having passed
17 the short course required by subsection (a); and

18 (2) in each subsequent year, an additional ten
19 percent of senior executive-level civilian leaders are

2

1 certified as having passed such course, until such
2 time as eighty percent of such leaders are so cer-
3 tified.

