

118TH CONGRESS
2D SESSION

S. 4105

To direct the Secretary of Defense to accelerate the implementation of quantum information science technologies within the Department of Defense, and for other purposes.

IN THE SENATE OF THE UNITED STATES

APRIL 10, 2024

Mrs. BLACKBURN introduced the following bill; which was read twice and referred to the Committee on Armed Services

A BILL

To direct the Secretary of Defense to accelerate the implementation of quantum information science technologies within the Department of Defense, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Defense Quantum Ac-
5 celeration Act of 2024”.

1 **SEC. 2. JOINT QUANTUM INFORMATION SCIENCE DEFENSE**
2 **TRANSITION ACTIVITIES.**

3 (a) IN GENERAL.—Chapter 301 of title 10, United
4 States Code, is amended by inserting after section 4001
5 the following new section:

6 **“§ 4002. Joint quantum information science defense**
7 **transition activities**

8 “(a) ACTIVITIES REQUIRED.—

9 “(1) IN GENERAL.—The Secretary of Defense
10 shall establish a set of activities to accelerate the
11 adoption and implementation quantum information
12 science technology within the Department of De-
13 fense.

14 “(2) ELEMENTS.—Pursuant to the activities es-
15 tablished under paragraph (1), the Secretary, acting
16 through the Principal Quantum Advisor designated
17 under subsection (b), shall—

18 “(A) explore and identify quantum infor-
19 mation science technologies and use cases
20 that—

21 “(i) have demonstrated value in ad-
22 vancing the priorities and missions of the
23 Department; and

24 “(ii) may be applied to address oper-
25 ational problems;

1 “(B) develop plans to transition such
2 quantum information science technologies from
3 the research and development phase to oper-
4 ational use within the Department, including
5 within each of the Armed Forces; and

6 “(C) carry out such transition plans.

7 “(b) DESIGNATION OF PRINCIPAL QUANTUM ADVI-
8 SOR.—

9 “(1) IN GENERAL.—Not later than 180 days
10 after the date of the enactment of the Defense
11 Quantum Acceleration Act of 2024, the Secretary of
12 Defense shall designate a senior official of the De-
13 partment of Defense to serve as the Principal Quan-
14 tum Advisor for the Department.

15 “(2) RESPONSIBILITIES.—The Principal Quan-
16 tum Advisor shall serve as the official within the De-
17 partment of Defense with principal responsibility
18 for—

19 “(A) coordinating activities relating to the
20 accelerated demonstration and transition of
21 quantum information science technologies for
22 applications specific to operational challenges
23 faced by the Department;

“(B) coordinating, overseeing, and managing the set of activities established under subsection (a);

“(C) carrying out the activities described in paragraphs (3) through (6); and

“(D) carrying out such other duties relating to the development and implementation of quantum information science technologies as the Secretary may direct.

“(3) DEFINING AND CODIFYING DEFENSE
QUANTUM INFORMATION SCIENCE USE CASES.—

“(A) IN GENERAL.—The Principal Quantum Advisor shall—

“(i) identify operational challenges faced by the Department of Defense that have the potential to be addressed through the use of quantum information science-technology based solutions, including solutions based on the quantum information science technology areas described subparagraph (C);

“(ii) for each such challenge, determine if the implementation of a quantum information science technology-based solution has the potential to be significantly

1 more effective at addressing such challenge
 2 compared to a non-quantum information
 3 science technology-based solution, taking
 4 into account the technology and manufac-
 5 turing readiness level of the quantum in-
 6 formation science technology-based solu-
 7 tion;

8 “(iii) for each potential quantum in-
 9 formation science technology-based solution
 10 identified under clause (ii), evaluate and
 11 determine the technology and manufac-
 12 turing readiness level of the solution taking
 13 into account the current readiness level of
 14 such solution—

15 “(I) within the Department;

16 “(II) among other departments
 17 and agencies of the Federal Govern-
 18 ment;

19 “(III) among Five Eyes coun-
 20 tries; and

21 “(IV) within academia and indus-
 22 try.

23 “(iv) for each quantum information
 24 science technology-based solution deter-
 25 mined under clause (iii) to have a tech-

nology and manufacturing readiness level of 5 or higher, begin prototyping and evaluation activities of such solution at scale in operationally relevant environments by not later than the end of fiscal year 2025; and

“(v) for each quantum information science technology-based solution determined under clause (iii) to have a technology and manufacturing readiness level of 4 or lower, submit to Congress a plan for funding such solution over the period of five fiscal years following the date of the report using research, development, test, and evaluation funds designated as budget activity 1 (basic research), budget activity 2 (applied research), budget activity 3 (advanced technology development), or budget activity 4 (advanced component development and prototypes) as those budget activity classifications are set forth in volume 2B, chapter 5 of the Department of Defense Financial Management Regulation (DOD 7000.14–R), or successor regulation.

1 “(B) COORDINATION.—In carrying out this
2 paragraph, the Principal Quantum Advisor
3 shall coordinate with and seek input from the
4 Armed Forces and unified combatant com-
5 mands—

6 “(i) to identify and better understand
7 the operational requirements of such
8 Armed Forces and commands; and

9 “(ii) to ensure that the timeline for
10 transitioning any quantum information
11 science technology-based capability to oper-
12 ational use within the Armed Forces and
13 combatant commands aligns with—

14 “(I) the plans of such Forces and
15 commands across the period covered
16 by the future-years defense program;
17 and

18 “(II) the program objective
19 memorandum processes for such
20 Forces and commands.

21 “(C) QUANTUM INFORMATION SCIENCE
22 TECHNOLOGY AREAS DESCRIBED.—The quan-
23 tum information science technology areas de-
24 scribed in this subparagraph are the following:

25 “(i) Quantum sensing, including—

1 “(I) alternative precision naviga-
2 tion and timing;

3 “(II) undersea or underground
4 detection;

5 “(III) advanced intelligence, sur-
6 veillance, and reconnaissance quantum
7 imaging techniques; and

8 “(IV) biomedical and health care.

9 “(ii) Quantum computing, including—

10 “(I) annealing;

11 “(II) quantum-enabled machine
12 learning;

13 “(III) simulation and optimiza-
14 tion; and

15 “(IV) integrating quantum com-
16 puting with high-performance super-
17 computing.

18 “(iii) Quantum annealing.

19 “(iv) Quantum communications, net-
20 working, and networked quantum com-
21 puters.

22 “(v) Quantum-enabled modeling and
23 simulation.

1 “(vi) Hybrid quantum computing and
2 the integration of quantum and classical
3 computing components.

4 “(vii) Such other quantum-enabled
5 technologies as the Principal Quantum Ad-
6 visor considers appropriate.

7 “(4) ACCELERATION OF DEVELOPMENT AND
8 FIELDING OF QUANTUM INFORMATION SCIENCE
9 TECHNOLOGIES.—The Principal Quantum Advisor
10 shall—

11 “(A) use the flexibility of regulations, per-
12 sonnel, acquisition, partnerships with industry
13 and academia, or other relevant policies of the
14 Department to accelerate the transition and
15 fielding of quantum information science tech-
16 nologies;

17 “(B) ensure engagement with combatant
18 commands, defense and private industries, re-
19 search universities, and unaffiliated, nonprofit
20 research institutions on matters relating such
21 quantum information science technologies; and

22 “(C) provide technical advice and support
23 organizations and elements of the Department
24 of Defense, including the Armed Forces, to op-

1 timize the use of quantum information science
2 technologies to meet mission requirements.

3 “(5) INDUSTRY AND ACADEMIA ENGAGE-
4 MENT.—

5 “(A) INCLUSION IN CONSORTIUM.—The
6 Secretary, in coordination with the Director of
7 the National Institute of Standards and Tech-
8 nology, shall ensure that the Principal Quan-
9 tum Advisor is included in the activities of the
10 consortium established pursuant to section
11 201(b) of the National Quantum Initiative Act
12 (15 U.S.C. 8831(b)).

13 “(B) OUTREACH ACTIVITIES.—Not less
14 frequently than once each quarter, the Principal
15 Quantum Advisor shall conduct outreach and
16 engagement with industry and academic lead-
17 ers—

18 “(i) to educate organizations in the
19 quantum information science industrial
20 base on national security quantum infor-
21 mation science use cases and operational
22 challenges faced by the Department that
23 have the potential to be addressed through
24 the use of quantum information science

1 technology-based solutions as described in
2 paragraph (3);

3 “(ii) to the extent determined appro-
4 priate by the Principal Quantum Advisor,
5 provide industry with the opportunity to
6 identify quantum information science tech-
7 nology-based solutions to operational chal-
8 lenges faced by the Department;

9 “(iii) to educate organizations in the
10 Defense industrial base on near-term and
11 commercially available quantum informa-
12 tion science technology-based solutions that
13 provide operationally relevant warfighting
14 capabilities;

15 “(iv) to advance relevant quantum in-
16 formation science supply chains and manu-
17 facturing capabilities within the United
18 States and among allies and partners of
19 the United States; and

20 “(v) to facilitate the commercializa-
21 tion of quantum information science tech-
22 nology-based solutions developed by the re-
23 search and engineering organizations of
24 the Department of Defense.

25 “(6) ALLIED QUANTUM ENHANCEMENT.—

1 “(A) ALIGNMENT WITH AUKUS EF-
2 FORTS.—Based on the quantum information
3 science use cases identified under paragraph
4 (3)(A)(ii), the Principal Quantum Advisor
5 shall—

6 “(i) identify areas in which the United
7 Kingdom and Australia, pursuant to Pillar
8 II the partnership among Australia, the
9 United Kingdom, and the United States
10 (commonly known as ‘AUKUS’) are pur-
11 suing technology aligned with such use
12 cases; and

13 “(ii) align Department research and
14 development and procurement funding in
15 relation to quantum information science
16 technologies on accelerating opportunities
17 where Australia and the United Kingdom
18 are pursuing such technologies.

19 “(B) MULTILATERAL AUKUS AND NATO
20 MEETINGS.—The Principal Quantum Advisor
21 shall organize—

22 “(i) a recurring multilateral meeting
23 of quantum technology experts from the
24 United States, the United Kingdom, and
25 Australia to facilitate information-sharing

1 and planning relevant to quantum informa-
2 tion science technology and defense-specific
3 use cases for such technology; and

4 “(ii) a recurring multilateral meeting
5 of quantum technology experts from mem-
6 ber nations of the North Atlantic Treaty
7 Organization to facilitate such information-
8 sharing and planning.

9 “(c) STRATEGIC PLAN.—

10 “(1) PLAN REQUIRED.—The Secretary shall de-
11 velop strategic plan to guide the development, as-
12 sessment, procurement, and implementation of quan-
13 tum information science technologies within the De-
14 partment over the period of five years following the
15 date of the plan.

16 “(2) ELEMENTS.—The plan required under
17 paragraph (1) shall include the following:

18 “(A) Plans for the continuous evaluation,
19 development, and implementation of quantum
20 information science technology solutions within
21 the Department.

22 “(B) Plans for the development, review,
23 performance evaluation, and adoption of a
24 fault-tolerant, utility-scale quantum computer
25 and the transition of that capability to appro-

1 appropriate organizations and elements of the De-
2 partment, including the Armed Forces, and
3 such other departments and agencies of the
4 Federal Government as the Secretary deter-
5 mines appropriate.

6 “(C) Plans for allocating the resources of
7 the Department to ensure such resources are
8 focused on quantum information science tech-
9 nologies with the potential to solve operational
10 challenges.

11 “(D) Identification of quantum informa-
12 tion science technologies that—

13 “(i) have critical defense-specific ap-
14 plications;

15 “(ii) cannot be adapted from commer-
16 cially available quantum information
17 science technology; and

18 “(iii) are unlikely to be pursued or ac-
19 celerated by industry because of limited
20 commercial value.

21 “(E) Plans for supporting the development
22 of capabilities identified under subparagraph
23 (D).

24 “(F) Plans to help strengthen the quantum
25 information science supply chain domestically

1 and among trusted allies and against untrusted
2 adversaries, including through an assessment
3 of—

4 “(i) any associated strengths, weak-
5 nesses, opportunities and threats; and

6 “(ii) critical components, suppliers,
7 and single points of failure.

8 “(3) REPORT TO CONGRESS.—Not later than
9 one year after the date of the enactment of the De-
10 fense Quantum Acceleration Act of 2024, the Sec-
11 retary shall submit to Congress a report that in-
12 cludes the plan developed under paragraph (1).

13 “(d) COMMERCIAL SECURITY STRATEGY.—The Sec-
14 retary shall adopt a comprehensive security strategy for
15 commercially developed capabilities based on the guide uti-
16 lized in the Underexplored Systems for Utility-Scale
17 Quantum Computing program of the Defense Advanced
18 Research Projects Agency.

19 “(e) NATIONAL SECURITY QUANTUM INFORMATION
20 SCIENCE ADOPTION ACCELERATION TESTBED.—

21 “(1) ESTABLISHMENT.—The Secretary of De-
22 fense, in consultation with the Secretary of Com-
23 merce and the Secretary of Energy, shall establish
24 a national defense quantum information science joint

1 center of excellence (referred to in this subsection as
2 the ‘Center’).

3 “(2) ORGANIZATION.—The Center shall be op-
4 erated by the Secretary and shall include participa-
5 tion from at least the following organizations:

6 “(A) One or more research laboratories of
7 the Armed Forces.

8 “(B) A National Laboratory (as defined in
9 section 2 of the Energy Policy Act of 2005 (42
10 U.S.C. 15801)).

11 “(C) A federally funded research and de-
12 velopment center or a university-affiliated re-
13 search center.

14 “(D) Quantum information science compa-
15 nies.

16 “(3) LOCATION.—The Secretary of Defense
17 shall establish the Center at a location in the United
18 States that is reasonably accessible to each organiza-
19 tion described in paragraph (2).

20 “(4) ACTIVITIES.—The Center shall carry out
21 the following activities:

22 “(A) Facilitate quantum information
23 science technology transition and workforce de-
24 velopment activities.

1 “(B) Conduct outreach to enhance indus-
2 try and academia’s understanding of and con-
3 tribution to national security quantum informa-
4 tion science technology use cases and current
5 operational challenges faced by the Department.

6 “(C) Prototype quantum information
7 science technologies, with priority given to the
8 prototyping and transition of quantum informa-
9 tion science-enabled position, navigation, and
10 timing efforts and quantum sensors at tech-
11 nology readiness level six or higher.

12 “(D) Integrate the prototyping activities
13 under subparagraph (C) with the needs of the
14 unified combatant commands.

15 “(E) Accelerate the transition of advanced
16 quantum information science technology from
17 the research and development phase into oper-
18 ational use.

19 “(F) Expand the quantum information
20 science workforce of the United States and the
21 quantum information science workforces of na-
22 tions that are allies and partners of the United
23 States.

24 “(5) CONTRACT AUTHORITY.—The Secretary
25 may award grants and enter into contracts and

1 other agreements, on a competitive basis, to support
 2 the activities of the Center.

3 “(6) AUTHORIZATION OF APPROPRIATIONS.—

4 There is authorized to be appropriated to carry out
 5 this subsection \$20,000,000 for each of fiscal years
 6 2025 through 2029.

7 “(f) RESEARCH OPPORTUNITIES AND WORKFORCE
 8 PLANNING.—

9 “(1) ENHANCEMENT OF RESEARCH OPPORTU-
 10 NITIES.—Not later than one year after the date of
 11 the enactment of Defense Quantum Acceleration Act
 12 of 2024, the Secretary shall seek to increase oppor-
 13 tunities for the study of quantum information
 14 science within—

15 “(A) the military service academies.

16 “(B) the Reserve Officers’ Training Corps;
 17 and

18 “(C) other institutions and programs of
 19 the Department and the Armed Forces that
 20 provide postsecondary and graduate level edu-
 21 cation.

22 “(2) STANDARD OPERATING PROCEDURES.—

23 The Secretary shall direct the chief of each Armed
 24 Force, in consultation with the heads of the research

1 laboratories under the jurisdiction of such Armed
2 Force—

3 “(A) to adopt internal standard operating
4 procedures for quantum information science
5 workforce development to monitor and evaluate
6 progress toward human capital goals and
7 human capital programmatic results; and

8 “(B) to involve top management, employ-
9 ees, and other stakeholders in quantum infor-
10 mation science workforce planning by—

11 “(i) developing and implementing an
12 enterprise-wide strategic quantum work-
13 force plan; and

14 “(ii) communicating quantum work-
15 force goals, initiatives, and metrics for
16 evaluating success throughout each labora-
17 tory.

18 “(g) BUDGET REVIEW.—

19 “(1) IN GENERAL.—The Secretary shall, acting
20 through the Under Secretary of Defense (Comp-
21 troller), require the Secretaries of the military de-
22 partments and the heads of the Defense Agencies
23 with responsibilities associated with any quantum in-
24 formation science activity to transmit the proposed
25 budget for such activities for a fiscal year and for

1 the period covered by the future-years defense pro-
2 gram submitted to Congress under section 221 of
3 this title for that fiscal year to the Principal Quan-
4 tum Advisor for review before submitting the pro-
5 posed budget to the Under Secretary of Defense
6 (Comptroller).

7 “(2) REPORT TO SECRETARY.—The Principal
8 Quantum Advisor shall review each proposed budget
9 transmitted, and, not later than January 31 of the
10 year preceding the fiscal year for which the budget
11 is proposed, shall submit to the Secretary a report
12 containing the comments of the Principal Quantum
13 Advisor with respect to all such proposed budgets,
14 together with the certification of the Principal Quan-
15 tum Advisor regarding whether each proposed budg-
16 et is adequate.

17 “(3) REPORT TO CONGRESS.—Not later than
18 March 31 of each year, the Secretary of Defense
19 shall submit to Congress a report specifying each
20 proposed budget that the Principal Quantum Advi-
21 sor did not certify to be adequate. The report of the
22 Secretary shall include the following matters:

23 “(A) A discussion of the actions that the
24 Secretary proposes to take, together with any
25 recommended legislation that the Secretary con-

1 siders appropriate, to address the inadequacy of
2 the proposed budgets specified in the report.

3 “(B) Any additional comments that the
4 Secretary considers appropriate regarding the
5 inadequacy of the proposed budgets.

6 “(h) DEFINITIONS.—In this section;

7 “(1) The term ‘Five Eyes countries’ means the
8 following:

9 “(A) Australia.

10 “(B) Canada.

11 “(C) New Zealand.

12 “(D) The United Kingdom.

13 “(E) The United States.

14 “(2) The term ‘quantum information science’
15 means the use of the laws of quantum physics for
16 the storage, transmission, manipulation, computing,
17 or measurement of information.”.

18 (b) CLERICAL AMENDMENT.—The table of sections
19 at the beginning of chapter 301 of such title is amended
20 by inserting after the item relating to section 4001 the
21 following new item:

“4002. Joint quantum information science defense transition activities.”.

