

117TH CONGRESS
2D SESSION

S. 4814

To establish a demonstration program for the active remediation of orbital debris and to require the development of uniform orbital debris standard practices in order to support a safe and sustainable orbital environment, and for other purposes.

IN THE SENATE OF THE UNITED STATES

SEPTEMBER 12, 2022

Mr. HICKENLOOPER (for himself, Ms. LUMMIS, Ms. CANTWELL, and Mr. WICKER) introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

A BILL

To establish a demonstration program for the active remediation of orbital debris and to require the development of uniform orbital debris standard practices in order to support a safe and sustainable orbital environment, 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 “Orbital Sustainability
5 Act of 2022” or the “ORBITS Act of 2022”.

1 **SEC. 2. FINDINGS; SENSE OF CONGRESS.**

2 (a) FINDINGS.—Congress makes the following find-
3 ings:

4 (1) The safety and sustainability of operations
5 in low-Earth orbit and nearby orbits in outer space
6 have become increasingly endangered by a growing
7 amount of orbital debris.

8 (2) Exploration and scientific research missions
9 and commercial space services of critical importance
10 to the United States rely on continued and secure
11 access to outer space.

12 (3) Efforts by nongovernmental space entities
13 to apply lessons learned through standards and best
14 practices will benefit from government support for
15 implementation both domestically and internation-
16 ally.

17 (b) SENSE OF CONGRESS.—It is the sense of Con-
18 gress that to preserve the sustainability of operations in
19 space, the United States Government should—

20 (1) to the extent practicable, develop and carry
21 out programs, establish or update regulations, and
22 commence initiatives to minimize orbital debris, in-
23 cluding initiatives to demonstrate active debris reme-
24 diation of orbital debris generated by the United
25 States Government;

1 (2) lead international efforts to encourage other
2 spacefaring countries to mitigate and remediate or-
3 bital debris under their jurisdiction and control; and

4 (3) encourage space system operators to con-
5 tinue implementing best practices for space safety
6 when deploying satellites and constellations of sat-
7 ellites, such as transparent data sharing and design-
8 ing for system reliability, so as to limit the genera-
9 tion of future orbital debris.

10 **SEC. 3. DEFINITIONS.**

11 In this Act:

12 (1) **ACTIVE DEBRIS REMEDIATION.**—The term
13 “active debris remediation”—

14 (A) means the deliberate process of facili-
15 tating the de-orbit, repurposing, or other dis-
16 posal of orbital debris using an object or tech-
17 nique that is external or internal to the orbital
18 debris; and

19 (B) does not include de-orbit, repurposing,
20 or other disposal of orbital debris by passive
21 means.

22 (2) **ADMINISTRATOR.**—The term “Adminis-
23 trator” means the Administrator of the National
24 Aeronautics and Space Administration.

1 (3) APPROPRIATE COMMITTEES OF CON-
2 GRESS.—The term “appropriate committees of Con-
3 gress” means—

4 (A) the Committee on Appropriations and
5 the Committee on Commerce, Science, and
6 Transportation of the Senate; and

7 (B) the Committee on Appropriations and
8 the Committee on Science, Space, and Tech-
9 nology of the House of Representatives.

10 (4) DEMONSTRATION PROGRAM.—The term
11 “demonstration program” means the active orbital
12 debris remediation demonstration program carried
13 out under section 4(b).

14 (5) ELIGIBLE ENTITY.—The term “eligible enti-
15 ty” means—

16 (A) a United States-based—

17 (i) non-Federal, commercial entity;

18 (ii) institution of higher education (as
19 defined in section 101(a) of the Higher
20 Education Act of 1965 (20 U.S.C.
21 1001(a))); or

22 (iii) nonprofit organization;

23 (B) any other United States-based entity
24 the Administrator considers appropriate; and

1 (C) a partnership of entities described in
2 subparagraphs (A) and (B).

3 (6) ORBITAL DEBRIS.—The term “orbital de-
4bris” means any human-made space object orbiting
5 Earth that—

6 (A) no longer serves any useful purpose;
7 and

8 (B)(i) has reached the end of its mission;
9 or

10 (ii) is incapable of maneuver or operation.

11 (7) SECRETARY.—The term “Secretary” means
12 the Secretary of Commerce.

13 (8) SPACE TRAFFIC COORDINATION.—The term
14 “space traffic coordination” means the planning, co-
15 ordination, and on-orbit synchronization of activities
16 to enhance the safety and sustainability of oper-
17 ations in the space environment.

18 **SEC. 4. ACTIVE DEBRIS REMEDIATION.**

19 (a) PRIORITIZATION OF ORBITAL DEBRIS.—

20 (1) LIST.—Not later than 90 days after the
21 date of the enactment of this Act, the Administrator,
22 in consultation with the Secretary, the Secretary of
23 Defense, the National Space Council, and represent-
24 atives of the commercial space industry, academia,
25 and nonprofit organizations, shall publish a list of

1 identified orbital debris that pose the greatest imme-
2 diate risk to the safety and sustainability of orbiting
3 satellites and on-orbit activities.

4 (2) CONTENTS.—The list required under para-
5 graph (1)—

6 (A) shall be developed using appropriate
7 sources of data and information derived from
8 governmental and nongovernmental sources, in-
9 cluding space situational awareness data ob-
10 tained by the Office of Space Commerce, to the
11 extent practicable;

12 (B) shall include, to the extent prac-
13 ticable—

14 (i) a description of the approximate
15 age, location in orbit, size, tumbling state,
16 post-mission passivation actions taken, and
17 national jurisdiction of each orbital debris
18 identified; and

19 (ii) a ranking of each orbital debris
20 identified in terms of potential risk and
21 feasibility for safe remediation; and

22 (C) may include orbital debris that poses a
23 significant risk to terrestrial people and assets,
24 including risk resulting from potential environ-

1 mental impacts from the uncontrolled reentry of
2 the orbital debris identified.

3 (3) FORM; PUBLIC AVAILABILITY.—The list re-
4 quired under paragraph (1) shall be—

5 (A) published in unclassified form;

6 (B) made available to the public on the
7 internet website of the National Aeronautics
8 and Space Administration; and

9 (C) updated periodically.

10 (4) RESEARCH AND DEVELOPMENT.—With re-
11 spect to orbital debris identified under paragraph
12 (1) that is determined by the Administrator, in con-
13 sultation with the National Space Council and the
14 National Science and Technology Council, to be in-
15 eligible for remediation due to characteristics, size,
16 or location in orbit that makes safe remediation in-
17 feasible, the Administrator shall, to the extent prac-
18 ticable, carry out the additional research and devel-
19 opment activities necessary, in consultation with the
20 commercial space industry, to mature technologies
21 and enable potential future remediation missions for
22 such orbital debris.

23 (b) ACTIVE ORBITAL DEBRIS REMEDIATION DEM-
24 ONSTRATION PROGRAM.—

1 (1) ESTABLISHMENT.—Subject to the avail-
2 ability of appropriations, not later than 180 days
3 after the date of the enactment of this Act, the Ad-
4 ministrator, in consultation with the head of each
5 relevant Federal department or agency, shall estab-
6 lish a demonstration program to make competitive
7 awards for the remediation of orbital debris identi-
8 fied under subsection (a)(1).

9 (2) PURPOSE.—The purpose of the demonstra-
10 tion program shall be to enable eligible entities to
11 pursue the phased development and demonstration
12 of technologies and processes required for active de-
13 bris remediation.

14 (3) PROCEDURES AND CRITERIA.—In estab-
15 lishing the demonstration program, the Adminis-
16 trator shall—

17 (A) establish—

18 (i) eligibility criteria for participation;

19 (ii) a process for soliciting proposals
20 from eligible entities;

21 (iii) criteria for the contents of such
22 proposals;

23 (iv) program compliance and evalua-
24 tion metrics; and

25 (v) program phases and milestones;

1 (B) identify government-furnished data or
2 equipment; and

3 (C) develop a plan for National Aero-
4 nautics and Space Administration participation
5 in technology development, as appropriate, and
6 intellectual property rights.

7 (4) PROPOSAL EVALUATION.—In evaluating
8 proposals for the demonstration program, the Ad-
9 ministrator shall—

10 (A) consider the safety, feasibility, cost,
11 benefit, and maturity of the proposed tech-
12 nology;

13 (B) consider the potential for the proposed
14 demonstration to successfully remediate orbital
15 debris and to advance the commercial state of
16 the art with respect to active debris remedi-
17 ation;

18 (C) carry out a risk analysis of the pro-
19 posed technology that takes into consideration
20 the potential casualty risk to humans in space
21 or on the Earth's surface;

22 (D) in an appropriate setting, conduct
23 thorough testing and evaluation of the proposed
24 technology and each component of such tech-
25 nology or system of technologies; and

1 (E) consider the technical and financial
2 feasibility of using the proposed technology to
3 conduct multiple remediation missions.

4 (5) DEMONSTRATION MISSION.—

5 (A) IN GENERAL.—The Administrator
6 shall consult with the head of each relevant
7 Federal department or agency in advance of
8 each demonstration mission.

9 (B) ACTIVE DEBRIS REMEDIATION DEM-
10 ONSTRATION MISSION.—It is the sense of Con-
11 gress that the Administrator should consider
12 not proceeding with an active debris remedi-
13 ation demonstration mission until multiple
14 award recipients have demonstrated readiness
15 to proceed.

16 (C) SPECTRUM CONSIDERATIONS.—The
17 Administrator shall convey any potential spec-
18 trum allocations and licensing needs for active
19 debris remediation demonstration missions to
20 the Federal Communications Commission
21 through the National Telecommunications and
22 Information Administration.

23 (6) REPORTS.—

24 (A) RECOMMENDATIONS.—Not later than
25 1 year after the date of the enactment of this

1 Act, the Administrator, in consultation with the
2 head of each relevant Federal department or
3 agency, shall submit to Congress a report that
4 provides legislative, regulatory, and policy rec-
5 ommendations to improve the demonstration
6 program and active debris remediation mis-
7 sions, as applicable.

8 (B) TECHNICAL ANALYSIS.—

9 (i) IN GENERAL.—To inform decisions
10 regarding the acquisition of active debris
11 remediation services by the Federal Gov-
12 ernment, not later than 180 days after the
13 completion of the demonstration program,
14 the Administrator shall submit to Congress
15 a report that—

16 (I) summarizes a technical anal-
17 ysis of technologies developed under
18 the demonstration program;

19 (II) identifies any technology
20 gaps addressed by the demonstration
21 program and any remaining tech-
22 nology gaps; and

23 (III) provides, as applicable, any
24 further legislative, regulatory, and

1 policy recommendations to enable ac-
2 tive debris remediation missions.

3 (ii) AVAILABILITY.—The Administra-
4 tion shall make the report submitted under
5 clause (i) available to the Secretary, the
6 Secretary of Defense, and other relevant
7 Federal departments and agencies, as de-
8 termined by the Administrator.

9 (7) INTERNATIONAL COOPERATION.—

10 (A) IN GENERAL.—In carrying out the
11 demonstration program, the Administrator, in
12 consultation with the National Space Council
13 and in collaboration with the Secretary of
14 State, may pursue a cooperative relationship
15 with one or more partner countries to enable
16 the remediation of orbital debris identified
17 under subsection (a)(1) that is under the juris-
18 diction of such partner countries.

19 (B) ARRANGEMENT OR AGREEMENT WITH
20 PARTNER COUNTRY.—Any arrangement or
21 agreement entered into with a partner country
22 under subparagraph (A) shall be—

23 (i) concluded—

24 (I) in the interests of the United
25 States Government; and

1 (II) without prejudice to any con-
2 tractual arrangement among commer-
3 cial parties that may be required to
4 complete the active debris remediation
5 mission concerned; and

6 (ii) consistent with the international
7 obligations of the United States under the
8 international legal framework governing
9 outer space activities.

10 (c) AUTHORIZATION OF APPROPRIATIONS.—There is
11 authorized to be appropriated to the Administrator to
12 carry out this section \$150,000,000 for fiscal years 2023
13 through 2027.

14 **SEC. 5. ACTIVE DEBRIS REMEDIATION SERVICES.**

15 (a) IN GENERAL.—To foster the competitive develop-
16 ment, operation, improvement, and commercial availability
17 of active debris remediation services, and in consideration
18 of the economic analysis required by subsection (b) and
19 the reports under section 4(b)(6), the Administrator and
20 the head of each relevant Federal department or agency
21 may acquire services for the remediation of orbital debris,
22 whenever practicable, through fair and open competition
23 for contracts that are well-defined, milestone-based, and
24 in accordance with the Federal Acquisition Regulation.

1 (b) ECONOMIC ANALYSIS.—Based on the results of
2 the demonstration program, the Secretary, acting through
3 the Office of Space Commerce, shall publish an assess-
4 ment of the estimated Federal Government and private
5 sector demand for orbital debris remediation services for
6 the 10-year period beginning in 2024.

7 **SEC. 6. UNIFORM ORBITAL DEBRIS STANDARD PRACTICES**
8 **FOR UNITED STATES SPACE ACTIVITIES.**

9 (a) IN GENERAL.—Not later than 90 days after the
10 date of the enactment of this Act, the National Space
11 Council, in coordination with the Secretary, the Adminis-
12 trator of the Federal Aviation Administration, the Sec-
13 retary of Defense, the Federal Communications Commis-
14 sion, and the Administrator, shall initiate an update to
15 the Orbital Debris Mitigation Standard Practices that—

16 (1) considers planned space systems, including
17 satellite constellations; and

18 (2) addresses—

19 (A) collision risk;

20 (B) casualty probability;

21 (C) post-mission disposal of space systems;

22 (D) time to disposal or de-orbit;

23 (E) spacecraft collision avoidance and
24 automated identification capability; and

1 (F) the ability to track orbital debris of de-
2 creasing size.

3 (b) CONSULTATION.—In developing the update under
4 subsection (a), the National Space Council shall seek ad-
5 vice and input on commercial standards and best practices
6 from representatives of the commercial space industry,
7 academia, and nonprofit organizations.

8 (c) PUBLICATION.—Not later than 1 year after the
9 date of the enactment of this Act, such update shall be
10 published in the Federal Register and posted to the rel-
11 evant Federal Government websites.

12 (d) REGULATIONS.—To promote uniformity and
13 avoid duplication in the regulation of space activity, in-
14 cluding licensing by the Federal Aviation Administration,
15 the National Oceanic and Atmospheric Administration,
16 and the Federal Communications Commission, such up-
17 date, after publication, shall be used to inform the further
18 development and promulgation of Federal regulations re-
19 lating to orbital debris.

20 (e) INTERNATIONAL PROMOTION.—To encourage ef-
21 fective and nondiscriminatory standards, best practices,
22 rules, and regulations implemented by other countries,
23 such update shall inform bilateral and multilateral discus-
24 sions focused on the authorization and continuing super-
25 vision of nongovernmental space activities.

1 (f) REVIEW.—Not later than 5 years after the com-
2 pletion of such update, and every 5 years thereafter, the
3 Secretary, in consultation with representatives of the com-
4 mercial space industry, academia, and nonprofit organiza-
5 tions, shall—

6 (1) conduct a review of the Orbital Debris Miti-
7 gation Standard Practices applicable to space sys-
8 tems; and

9 (2) submit to the National Space Council rec-
10 ommendations for modifications to such standard
11 practices.

12 **SEC. 7. STANDARD PRACTICES FOR SPACE TRAFFIC CO-**
13 **ORDINATION.**

14 (a) IN GENERAL.—The Secretary, in coordination
15 with members of the National Space Council and the Fed-
16 eral Communications Commission, shall facilitate the de-
17 velopment of standard practices for on-orbit space traffic
18 coordination based on guidelines and best practices used
19 by Government and commercial space industry operators.

20 (b) CONSULTATION.—In facilitating the development
21 of standard practices under subsection (a), the Secretary,
22 through the Office of Space Commerce, shall engage in
23 frequent and routine consultation with representatives of
24 the commercial space industry, academia, and nonprofit
25 organizations.

1 (c) PROMOTION OF STANDARD PRACTICES.—On
2 completion of such standard practices, the Secretary, the
3 Secretary of State, the Secretary of Transportation, the
4 Administrator, and the Secretary of Defense shall promote
5 the adoption and use of the standard practices for domes-
6 tic and international space missions.

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