

116TH CONGRESS
1ST SESSION

S. 2800

To authorize programs of the National Aeronautics and Space Administration,
and for other purposes.

IN THE SENATE OF THE UNITED STATES

NOVEMBER 6, 2019

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

A BILL

To authorize programs of the National Aeronautics and
Space Administration, 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; TABLE OF CONTENTS.**

4 (a) SHORT TITLE.—This Act may be cited as the
5 “National Aeronautics and Space Administration Author-
6 ization Act of 2019”.

7 (b) TABLE OF CONTENTS.—The table of contents of
8 this Act is as follows:

Sec. 1. Short title; table of contents.
Sec. 2. Definitions.

TITLE I—AUTHORIZATION OF APPROPRIATIONS

Sec. 101. Authorization of appropriations.

TITLE II—HUMAN SPACEFLIGHT AND EXPLORATION

- Sec. 201. Advanced cislunar and lunar surface capabilities.
- Sec. 202. Space launch system configurations.
- Sec. 203. Advanced spacesuits.
- Sec. 204. Life science and physical science research.
- Sec. 205. Acquisition of domestic space transportation and logistics resupply services.
- Sec. 206. Rocket engine test infrastructure.
- Sec. 207. Indian River Bridge.
- Sec. 208. Value of International Space Station and capabilities in low-Earth orbit.
- Sec. 209. Extension and modification relating to International Space Station.
- Sec. 210. Department of Defense activities on International Space Station.
- Sec. 211. Low-Earth orbit commercialization.
- Sec. 212. Maintaining a national laboratory in space.
- Sec. 213. International Space Station national laboratory; property rights in inventions.
- Sec. 214. Data first produced during non-NASA scientific use of the ISS national laboratory.
- Sec. 215. Royalties and other payments received for designated activities.
- Sec. 216. Steppingstone approach to exploration.
- Sec. 217. Technical amendments relating to Artemis missions.

TITLE III—SCIENCE

- Sec. 301. Science priorities.
- Sec. 302. Lunar discovery program.
- Sec. 303. Search for life.
- Sec. 304. James Webb Space Telescope.
- Sec. 305. Wide-Field Infrared Survey Telescope.
- Sec. 306. Satellite servicing for science missions.
- Sec. 307. Earth science missions and programs.
- Sec. 308. Science missions to Mars.
- Sec. 309. Planetary Defense Coordination Office.
- Sec. 310. Suborbital science flights.
- Sec. 311. Sense of Congress on small satellite science.

TITLE IV—AERONAUTICS

- Sec. 401. Short title.
- Sec. 402. Definitions.
- Sec. 403. Experimental aircraft projects.
- Sec. 404. Unmanned aircraft systems.
- Sec. 405. 21st Century Aeronautics Capabilities Initiative.
- Sec. 406. Sense of Congress on on-demand air transportation.
- Sec. 407. Sense of Congress on hypersonic technology research.

TITLE V—SPACE TECHNOLOGY

- Sec. 501. Space Technology Mission Directorate.
- Sec. 502. Flight opportunities program.
- Sec. 503. Small Spacecraft Technology Program.
- Sec. 504. Nuclear propulsion technology.
- Sec. 505. Mars-forward technologies.

TITLE VI—STEM ENGAGEMENT

- Sec. 601. Sense of Congress.
- Sec. 602. STEM education engagement activities.
- Sec. 603. Skilled technical education outreach program.

TITLE VII—WORKFORCE AND INDUSTRIAL BASE

- Sec. 701. Appointment and compensation pilot program.
- Sec. 702. Establishment of multi-institution consortia and university-affiliated research centers.
- Sec. 703. Expedited access to technical talent and expertise.
- Sec. 704. Report on industrial base for civil space missions and operations.
- Sec. 705. Separations and retirement incentives.
- Sec. 706. Confidentiality of medical quality assurance records.

TITLE VIII—MISCELLANEOUS PROVISIONS

- Sec. 801. Contracting authority.
- Sec. 802. Authority for transaction prototype projects and follow-on production contracts.
- Sec. 803. Protection of data and information from public disclosure.
- Sec. 804. Physical security modernization.
- Sec. 805. Lease of non-excess property.
- Sec. 806. Cybersecurity.
- Sec. 807. Limitation on cooperation with the People’s Republic of China.
- Sec. 808. Small satellite launch services program.
- Sec. 809. 21st century space launch infrastructure.
- Sec. 810. Missions of national need.
- Sec. 811. Exemption from the Iran, North Korea, and Syria Nonproliferation Act.
- Sec. 812. Drinking water well replacement for Chincoteague, Virginia.
- Sec. 813. Passenger carrier use.
- Sec. 814. SBIR phase flexibility for the National Aeronautics and Space Administration.

1 **SEC. 2. DEFINITIONS.**

2 In this Act:

3 (1) ADMINISTRATION.—The term “Administra-
 4 tion” means the National Aeronautics and Space
 5 Administration.

6 (2) ADMINISTRATOR.—The term “Adminis-
 7 trator” means the Administrator of the National
 8 Aeronautics and Space Administration.

9 (3) APPROPRIATE COMMITTEES OF CON-
 10 GRESS.—Except as otherwise expressly provided, the

1 term “appropriate committees of Congress”
2 means—

3 (A) the Committee on Commerce, Science,
4 and Transportation of the Senate; and

5 (B) the Committee on Science, Space, and
6 Technology of the House of Representatives.

7 (4) CISLUNAR SPACE.—The term “cislunar
8 space” means the region of space beyond low-Earth
9 orbit out to and including the region around the sur-
10 face of the Moon.

11 (5) DEEP SPACE.—The term “deep space”
12 means the region of space beyond low-Earth orbit,
13 including cislunar space.

14 (6) DEVELOPMENT COST.—The term “develop-
15 ment cost” has the meaning given the term in sec-
16 tion 30104 of title 51, United States Code.

17 (7) ISS.—The term “ISS” means the Inter-
18 national Space Station.

19 (8) ISS MANAGEMENT ENTITY.—The term
20 “ISS management entity” means the organization
21 with which the Administrator has entered into a co-
22 operative agreement under section 504(a) of the Na-
23 tional Aeronautics and Space Administration Au-
24 thorization Act of 2010 (42 U.S.C. 18354(a)).

1 (9) NASA.—The term “NASA” means the Na-
2 tional Aeronautics and Space Administration.

3 (10) ORION.—The term “Orion” means the
4 multipurpose crew vehicle described in section 303 of
5 the National Aeronautics and Space Administration
6 Authorization Act of 2010 (42 U.S.C. 18323).

7 (11) OSTP.—The term “OSTP” means the Of-
8 fice of Science and Technology Policy.

9 (12) SPACE LAUNCH SYSTEM.—The term
10 “Space Launch System” means the Space Launch
11 System authorized under section 302 of the National
12 Aeronautics and Space Administration Act of 2010
13 (42 U.S.C. 18322).

14 **TITLE I—AUTHORIZATION OF** 15 **APPROPRIATIONS**

16 **SEC. 101. AUTHORIZATION OF APPROPRIATIONS.**

17 There are authorized to be appropriated to the Ad-
18 ministration for fiscal year 2020 \$22,750,000,000 as fol-
19 lows:

- 20 (1) For Exploration, \$6,222,600,000.
- 21 (2) For Space Operations, \$4,150,200,000.
- 22 (3) For Science, \$6,905,700,000.
- 23 (4) For Aeronautics, \$783,900,000.
- 24 (5) For Space Technology, \$1,076,400,000.

1 (6) For Science, Technology, Engineering, and
2 Mathematics Engagement, \$112,000,000.

3 (7) For Safety, Security, and Mission Services,
4 \$2,934,800,000.

5 (8) For Construction and Environmental Com-
6 pliance and Restoration, \$524,400,000.

7 (9) For Inspector General, \$40,000,000.

8 **TITLE II—HUMAN SPACEFLIGHT**
9 **AND EXPLORATION**

10 **SEC. 201. ADVANCED CISLUNAR AND LUNAR SURFACE CA-**
11 **PABILITIES.**

12 (a) SENSE OF CONGRESS.—It is the sense of Con-
13 gress that—

14 (1) commercial entities in the United States
15 have made significant investment and progress to-
16 ward the development of human-class lunar landers;

17 (2) NASA developed the Artemis program—

18 (A) to fulfil the goal of landing United
19 States astronauts, include the first woman and
20 the next man, on the Moon; and

21 (B) to collaborate with commercial and
22 international partners to establish sustainable
23 lunar exploration by 2028; and

24 (3) in carrying out the Artemis program, the
25 Administration should ensure that the entire

1 Artemis program is inclusive and representative of
2 all people of the United States, including women and
3 minorities.

4 (b) LANDER PROGRAM.—The Administrator shall
5 foster the development of not more than 2 human-class
6 lunar lander designs through public-private partnerships.

7 (c) REQUIREMENTS.—In carrying out the program
8 under subsection (b), the Administrator shall—

9 (1) enter into industry-led partnerships using a
10 fixed-price, milestone-based approach;

11 (2) to the maximum extent practicable, encour-
12 age reusability and sustainability of systems devel-
13 oped;

14 (3) ensure availability of 1 or more lunar polar
15 science payloads for a demonstration mission; and

16 (4) to the maximum extent practicable, offer ex-
17 isting capabilities and assets of NASA centers to
18 support these partnerships.

19 **SEC. 202. SPACE LAUNCH SYSTEM CONFIGURATIONS.**

20 (a) MOBILE LAUNCH PLATFORM.—The Adminis-
21 trator is authorized to maintain 2 operational mobile
22 launch platforms to enable the launch of multiple configu-
23 rations of the Space Launch System.

24 (b) EXPLORATION UPPER STAGE.—To meet the ca-
25 pability requirements under section 302(c)(2) of the Na-

1 tional Aeronautics and Space Administration Authoriza-
2 tion Act of 2010 (42 U.S.C. 18322(c)(2)), the Adminis-
3 trator shall continue development of the Exploration
4 Upper Stage for the Space Launch System with a sched-
5 uled availability sufficient for use on the third launch of
6 the Space Launch System.

7 (c) BRIEFING.—Not later than 90 days after the date
8 of the enactment of this Act, the Administrator shall brief
9 the appropriate committees of Congress on the develop-
10 ment and scheduled availability of the Exploration Upper
11 Stage for the third launch of the Space Launch System.

12 (d) MAIN PROPULSION TEST ARTICLE.—To meet the
13 requirements under section 302(c)(3) of the National Aer-
14 onautics and Space Administration Authorization Act of
15 2010 (42 U.S.C. 18322(c)(3)), the Administrator shall—

16 (1) immediately on completion of the first full-
17 duration integrated core stage test of the Space
18 Launch System, initiate development of a main pro-
19 pulsion test article for the integrated core stage pro-
20 pulsion elements of the Space Launch System;

21 (2) not later than 180 days after the date of
22 the enactment of this Act, submit to the appropriate
23 committees of Congress a detailed plan for the devel-
24 opment and operation of such main propulsion test
25 article; and

1 (3) use existing capabilities of NASA centers
2 for the design, manufacture, and operation of the
3 main propulsion test article.

4 **SEC. 203. ADVANCED SPACESUITS.**

5 (a) SENSE OF CONGRESS.—It is the sense of Con-
6 gress that next-generation advanced spacesuits are a crit-
7 ical technology for human space exploration and use of
8 low-Earth orbit, cislunar space, the surface of the Moon,
9 and Mars.

10 (b) DEVELOPMENT PLAN.—The Administrator shall
11 establish a detailed plan for the development and manu-
12 facture of advanced spacesuits, consistent with the deep
13 space exploration goals and timetables of NASA.

14 (c) DIVERSE ASTRONAUT CORPS.—The Adminis-
15 trator shall ensure that spacesuits developed and manufac-
16 tured after the date of the enactment of this Act are capa-
17 ble of accommodating a wide range of sizes of astronauts
18 so as to meet the needs of the diverse NASA astronaut
19 corps.

20 (d) ISS USE.—Throughout the operational life of the
21 ISS, the Administrator should fully use the ISS for testing
22 advanced spacesuits.

23 (e) PRIOR INVESTMENTS.—

24 (1) IN GENERAL.—In developing an advanced
25 spacesuit, the Administrator shall, to the maximum

1 extent practicable, leverage prior and existing invest-
 2 ments in advanced spacesuit technologies to maxi-
 3 mize the benefits of such investments and tech-
 4 nologies.

5 (2) AGREEMENTS WITH PRIVATE ENTITIES.—In
 6 carrying out this subsection, the Administrator may
 7 enter into 1 or more agreements with 1 or more pri-
 8 vate entities for the manufacture of advanced
 9 spacesuits, as the Administrator considers appro-
 10 priate.

11 (f) BRIEFING.—Not later than 180 days after the
 12 date of the enactment of this Act, and semiannually there-
 13 after until NASA procures advanced spacesuits under this
 14 section, the Administrator shall brief the appropriate com-
 15 mittees of Congress on the development plan in subsection
 16 (b).

17 **SEC. 204. LIFE SCIENCE AND PHYSICAL SCIENCE RE-**
 18 **SEARCH.**

19 (a) SENSE OF CONGRESS.—It is the sense of Con-
 20 gress that—

21 (1) the 2011 decadal survey on biological and
 22 physical sciences in space identifies—

23 (A) many areas in which fundamental sci-
 24 entific research is needed to efficiently advance
 25 the range of human activities in space, from the

1 first stages of exploration to eventual economic
2 development; and

3 (B) many areas of basic and applied sci-
4 entific research that could use the microgravity,
5 radiation, and other aspects of the spaceflight
6 environment to answer fundamental scientific
7 questions; and

8 (2) given the central role of life science and
9 physical science research in developing the future of
10 space exploration, NASA should continue to invest
11 strategically in such research to maintain United
12 States leadership in space exploration; and

13 (3) such research remains important to the ob-
14 jectives of NASA with respect to long-duration deep
15 space human exploration to the Moon and Mars.

16 (b) PROGRAM CONTINUATION.—

17 (1) IN GENERAL.—In support of the goals de-
18 scribed in section 20302 of title 51, United States
19 Code, the Administrator shall continue to implement
20 a collaborative, multidisciplinary life science and
21 physical science fundamental research program—

22 (A) to build a scientific foundation for the
23 exploration and development of space;

24 (B) to investigate the mechanisms of
25 changes to biological systems and physical sys-

1 tems, and the environments of those systems in
2 space, including the effects of long-duration ex-
3 posure to deep space-related environmental fac-
4 tors on those systems;

5 (C) to understand the effects of combined
6 deep space radiation and altered gravity levels
7 on biological systems so as to inform the devel-
8 opment and testing of potential counter-
9 measures;

10 (D) to understand physical phenomena in
11 reduced gravity that affect design and perform-
12 ance of enabling technologies necessary for the
13 space exploration program;

14 (E) to provide scientific opportunities to
15 educate, train, and develop the next generation
16 of researchers and engineers; and

17 (F) to provide state-of-the-art data reposi-
18 tories and curation of large multi-data sets to
19 enable comparative research analyses.

20 (2) ELEMENTS.—The program under para-
21 graph (1) shall—

22 (A) include fundamental research relating
23 to life science, space bioscience, and physical
24 science; and

1 (B) maximize intra-agency and interagency
 2 partnerships to advance space exploration, sci-
 3 entific knowledge, and benefits to Earth.

4 (3) USE OF FACILITIES.—In carrying out the
 5 program under paragraph (1), the Administrator
 6 may use ground-based, air-based, and space-based
 7 facilities in low-Earth orbit and beyond low-Earth
 8 orbit.

9 **SEC. 205. ACQUISITION OF DOMESTIC SPACE TRANSPOR-**
 10 **TATION AND LOGISTICS RESUPPLY SERV-**
 11 **ICES.**

12 (a) IN GENERAL.—Except as provided in subsection
 13 (b), the Administrator shall not enter into any contract
 14 with a person or entity that proposes to use, or will use,
 15 a foreign launch provider for a commercial service to pro-
 16 vide space transportation or logistics resupply for—

17 (1) the ISS; or

18 (2) any Government-owned or Government-
 19 funded platform in Earth orbit or cislunar space, on
 20 the lunar surface, or elsewhere in space.

21 (b) EXCEPTION.—The Administrator may enter into
 22 a contract with a person or entity that proposes to use,
 23 or will use, a foreign launch provider for a commercial
 24 service to carry out an activity described in subsection (a)
 25 if a domestic vehicle or service is unavailable.

1 (c) RULE OF CONSTRUCTION.—Nothing in this sec-
2 tion shall be construed to prohibit the Administrator from
3 entering into 1 or more no-exchange-of-funds collaborative
4 agreements with an international partner in support of the
5 deep space exploration plan of NASA.

6 **SEC. 206. ROCKET ENGINE TEST INFRASTRUCTURE.**

7 (a) IN GENERAL.—The Administrator shall carry out
8 a program to modernize rocket propulsion test infrastruc-
9 ture at NASA facilities—

- 10 (1) to increase capabilities;
- 11 (2) to enhance safety;
- 12 (3) to support propulsion development and test-
- 13 ing; and
- 14 (4) to foster the improvement of Government
- 15 and commercial space transportation and explo-
- 16 ration.

17 (b) PROJECTS.—Projects funded under the program
18 under subsection (a) may include—

- 19 (1) infrastructure and other facilities and sys-
- 20 tems relating to rocket propulsion test stands and
- 21 rocket propulsion testing;
- 22 (2) enhancements to test facility capacity and
- 23 flexibility; and

1 (3) such other projects as the Administrator
2 considers appropriate to meet the goals described in
3 subsection (a).

4 (c) REQUIREMENTS.—In carrying out the program
5 under subsection (a), the Administrator shall—

6 (1) prioritize investments in projects that en-
7 hance test and flight certification capabilities for
8 large thrust-level atmospheric and altitude engines
9 and engine systems, and multi-engine integrated test
10 capabilities; and

11 (2) ensure that no project carried out under
12 this program shall adversely impact, delay, or defer
13 testing or other activities associated with facilities
14 used for Government programs, including—

15 (A) the Space Launch System and the Ex-
16 ploration Upper Stage of the Space Launch
17 System;

18 (B) in-space propulsion to support explo-
19 ration missions; or

20 (C) nuclear propulsion testing.

21 (d) SAVINGS CLAUSE.—Nothing in this section shall
22 preclude a NASA program, including the Space Launch
23 System and the Exploration Upper Stage of the Space
24 Launch System, from using the modernized test infra-
25 structure developed under this section.

1 **SEC. 207. INDIAN RIVER BRIDGE.**

2 The Administrator, in coordination with the heads of
3 other Federal agencies that use the Indian River Bridge
4 on the NASA Causeway, shall develop a plan to ensure
5 that a bridge over the Indian River at such location pro-
6 vides access to the Eastern Range for national security,
7 civil, and commercial space operations.

8 **SEC. 208. VALUE OF INTERNATIONAL SPACE STATION AND**
9 **CAPABILITIES IN LOW-EARTH ORBIT.**

10 (a) SENSE OF CONGRESS.—It is the sense of Con-
11 gress that—

12 (1) it is in the national and economic security
13 interests of the United States to maintain a contin-
14 uous human presence in low-Earth orbit;

15 (2) low-Earth orbit should be used as a test bed
16 to advance human space exploration and scientific
17 discoveries; and

18 (3) the ISS is a critical component of economic,
19 commercial, and industrial development in low-Earth
20 orbit.

21 (b) HUMAN PRESENCE REQUIREMENT.—The United
22 States shall continuously maintain the capability for a
23 continuous human presence in low-Earth orbit through
24 and beyond the useful life of the ISS.

1 **SEC. 209. EXTENSION AND MODIFICATION RELATING TO**
2 **INTERNATIONAL SPACE STATION.**

3 (a) **POLICY.**—Section 501(a) of the National Aero-
4 nautics and Space Administration Authorization Act of
5 2010 (42 U.S.C. 18351(a)) is amended by striking
6 “2024” and inserting “2030”.

7 (b) **MAINTENANCE OF UNITED STATES SEGMENT**
8 **AND ASSURANCE OF CONTINUED OPERATIONS.**—Section
9 503(a) of the National Aeronautics and Space Administra-
10 tion Authorization Act of 2010 (42 U.S.C. 18353(a)) is
11 amended by striking “September 30, 2024” and inserting
12 “September 30, 2030”.

13 (c) **RESEARCH CAPACITY ALLOCATION AND INTE-**
14 **GRATION OF RESEARCH PAYLOADS.**—Section 504(d) of
15 the National Aeronautics and Space Administration Au-
16 thorization Act of 2010 (42 U.S.C. 18354(d)) is amend-
17 ed—

18 (1) in paragraph (1), in the first sentence—

19 (A) by striking “As soon as practicable”
20 and all that follows through “2011,” and in-
21 serting “The”; and

22 (B) by striking “September 30, 2024” and
23 inserting “September 30, 2030”; and

24 (2) in paragraph (2), in the third sentence, by
25 striking “September 30, 2024” and inserting “Sep-
26 tember 30, 2030”.

1 (d) MAINTENANCE OF USE.—

2 (1) IN GENERAL.—Section 70907 of title 51,
3 United States Code, is amended—

4 (A) in the section heading, by striking
5 “**2024**” and inserting “**2030**”;

6 (B) in subsection (a), by striking “Sep-
7 tember 30, 2024” and inserting “September 30,
8 2030”; and

9 (C) in subsection (b)(3), by striking “Sep-
10 tember 30, 2024” and inserting “September 30,
11 2030”.

12 (e) TRANSITION PLAN REPORTS.—Section
13 50111(c)(2) of title 51, United States Code is amended—

14 (1) in the matter preceding subparagraph (A),
15 by striking “2023” and inserting “2028”; and

16 (2) in subparagraph (J), by striking “2028”
17 and inserting “2030”.

18 (f) ELIMINATION OF INTERNATIONAL SPACE STA-
19 TION NATIONAL LABORATORY ADVISORY COMMITTEE.—
20 Section 70906 of title 51, United States Code, is repealed.

21 (g) CONFORMING AMENDMENTS.—Chapter 709 of
22 title 51, United States Code, is amended—

23 (1) by redesignating section 70907 as section
24 70906; and

1 (2) in the table of sections for the chapter, by
 2 striking the items relating to sections 70906 and
 3 70907 and inserting the following:

“Sec. 70906. Maintaining use through at least 2030.”.

4 **SEC. 210. DEPARTMENT OF DEFENSE ACTIVITIES ON**
 5 **INTERNATIONAL SPACE STATION.**

6 (a) IN GENERAL.—Not later than March 1, 2020, the
 7 Secretary of Defense shall—

8 (1) identify and review each activity, program,
 9 and project of the Department of Defense com-
 10 pleted, being carried out, or planned to be carried
 11 out on the ISS as of the date of the review; and

12 (2) provide to the appropriate committees of
 13 Congress a briefing that describes the results of the
 14 review.

15 (b) APPROPRIATE COMMITTEES OF CONGRESS DE-
 16 FINED.—In this section, the term “appropriate commit-
 17 tees of Congress” means—

18 (1) the Committee on Armed Services and the
 19 Committee on Commerce, Science, and Transpor-
 20 tation of the Senate; and

21 (2) the Committee on Armed Services and the
 22 Committee on Science, Space, and Technology of the
 23 House of Representatives.

1 **SEC. 211. LOW-EARTH ORBIT COMMERCIALIZATION.**

2 (a) STATEMENT OF POLICY.—It is the policy of the
3 United States to encourage the development of a thriving
4 and robust United States commercial sector in low-Earth
5 orbit.

6 (b) PREFERENCE FOR UNITED STATES COMMERCIAL
7 PRODUCTS AND SERVICES.—The Administrator shall con-
8 tinue to increase the use of assets, products, and services
9 of private entities in the United States to fulfill the low-
10 Earth orbit requirements of the Administration.

11 (c) NONCOMPETITION.—

12 (1) IN GENERAL.—Except as provided in para-
13 graph (2), the Administrator may not offer to a for-
14 eign person or a foreign government a spaceflight
15 product or service relating to the ISS, if a com-
16 parable spaceflight product or service, as applicable,
17 is offered by a private entity in the United States.

18 (2) EXCEPTION.—The Administrator may offer
19 a space-flight product or service relating to the ISS
20 to the government of a country that is a signatory
21 to the Agreement Among the Government of Can-
22 ada, Governments of Member States of the Euro-
23 pean Space Agency, the Government of Japan, the
24 Government of the Russian Federation, and the
25 Government of the United States of America Con-
26 cerning Cooperation on the Civil International Space

1 Station, signed at Washington January 29, 1998,
2 and entered into force on March 27, 2001 (TIAS
3 12927).

4 (d) SHORT-DURATION COMMERCIAL MISSIONS.—To
5 provide opportunities for additional transport of astro-
6 nauts to the ISS and help establish a commercial market
7 in low-Earth orbit, the Administrator may permit short-
8 duration missions to the ISS for commercial passengers.

9 (e) PROGRAM AUTHORIZATION.—

10 (1) ESTABLISHMENT.—The Administrator shall
11 establish a low-Earth orbit commercialization pro-
12 gram to encourage the fullest commercial use and
13 development of space by private entities in the
14 United States.

15 (2) ELEMENTS.—The program established
16 under paragraph (1) shall, to the maximum extent
17 practicable, include activities—

18 (A) to stimulate demand for—

19 (i) space-based commercial research,
20 development, and manufacturing;

21 (ii) spaceflight products and services;

22 and

23 (iii) human spaceflight products and
24 services in low-Earth orbit;

1 (B) to improve the capability of the ISS to
2 accommodate commercial users; and

3 (C) subject to paragraph (3), to foster the
4 development of commercial space stations and
5 habitats.

6 (3) COMMERCIAL SPACE STATIONS AND HABI-
7 TATS.—

8 (A) PRIORITY.—With respect to an activity
9 to develop a commercial space station or habi-
10 tat, the Administrator shall give priority to an
11 activity for which a private entity provides a
12 share of the cost to develop and operate the ac-
13 tivity.

14 (B) LIMITATION.—The Administrator may
15 not provide funding for the development of a
16 commercial space station or habitat until after
17 the date on which the Administrator awards a
18 contract for the use of a docking port on the
19 ISS.

20 (C) REPORT.—Not later than 30 days
21 after the date that an award or agreement is
22 made to carry out an activity to develop a com-
23 mercial space station or habitat, the Adminis-
24 trator shall submit to the appropriate commit-
25 tees of Congress a report on the development of

1 the commercial space station or habitat, as ap-
2 plicable, that includes—

3 (i) a business plan that describes the
4 manner in which the project will—

5 (I) meet the future requirements
6 of NASA for low-Earth orbit human
7 space-flight services; and

8 (II) fulfill the cost-share funding
9 prioritization under subparagraph (A);
10 and

11 (ii) a review of the viability of the
12 operational business case, including—

13 (I) the level of expected Govern-
14 ment participation;

15 (II) a list of anticipated non-
16 governmental and international cus-
17 tomers and associated contributions;
18 and

19 (III) an assessment of long-term
20 sustainability for the nongovernmental
21 customers, including an independent
22 assessment of the viability of the mar-
23 ket for such commercial services or
24 products.

1 **SEC. 212. MAINTAINING A NATIONAL LABORATORY IN**
2 **SPACE.**

3 (a) SENSE OF CONGRESS.—It is the sense of Con-
4 gress that—

5 (1) the United States segment of the Inter-
6 national Space Station (as defined in section 70905
7 of title 51, United States Code), which is designated
8 as a national laboratory under section 70905(b) of
9 title 51, United States Code—

10 (A) benefits the scientific community and
11 promotes commerce in space;

12 (B) fosters stronger relationships among
13 NASA and other Federal agencies, the private
14 sector, and research groups and universities;

15 (C) advances science, technology, engineer-
16 ing, and mathematics education through use of
17 the unique microgravity environment; and

18 (D) advances human knowledge and inter-
19 national cooperation;

20 (2) after the ISS is decommissioned, the United
21 States should maintain a national microgravity lab-
22 oratory in space;

23 (3) in maintaining a national microgravity lab-
24 oratory in space, the United States should make ap-
25 propriate accommodations for different types of own-

1 ership and operation arrangements for the ISS and
2 future space stations;

3 (4) to the maximum extent practicable, a na-
4 tional microgravity laboratory in space should be
5 maintained in cooperation with international space
6 partners; and

7 (5) NASA should continue to support funda-
8 mental science research on future platforms in low-
9 Earth orbit and cislunar space, orbital and sub-
10 orbital flights, drop towers, and other microgravity
11 testing environments.

12 (b) REPORT.—The Administrator, in coordination
13 with the National Space Council and other Federal agen-
14 cies as the Administrator considers appropriate, shall
15 issue a report detailing the feasibility of establishing a
16 microgravity national laboratory federally funded research
17 and development center to carry out activities relating to
18 the study and use of in-space conditions.

19 **SEC. 213. INTERNATIONAL SPACE STATION NATIONAL LAB-**
20 **ORATORY; PROPERTY RIGHTS IN INVEN-**
21 **TIONS.**

22 (a) IN GENERAL.—Subchapter III of chapter 201 of
23 title 51, United States Code, is amended by adding at the
24 end the following:

1 **“§ 20150. Property rights in designated inventions**

2 “(a) EXCLUSIVE PROPERTY RIGHTS.—Notwith-
3 standing section 3710a of title 15, chapter 18 of title 35,
4 section 20135, or any other provision of law, a designated
5 invention shall be the exclusive property of a user, and
6 shall not be subject to a Government-purpose license, if—

7 “(1) the Administration is reimbursed under
8 the terms of the contract for the full cost of a con-
9 tribution by the Federal Government of the use of
10 Federal facilities, equipment, materials, proprietary
11 information of the Federal Government, or services
12 of a Federal employee during working hours, includ-
13 ing the cost for the Administration to carry out its
14 responsibilities under paragraphs (1) and (4) of sec-
15 tion 504(d) of the National Aeronautics and Space
16 Administration Authorization Act of 2010 (42
17 U.S.C. 18354(d));

18 “(2) Federal funds are not transferred to the
19 user under the contract; and

20 “(3) the invention was made (as defined in sec-
21 tion 20135(a))—

22 “(A) solely by the user; or

23 “(B)(i) by the user with the services of a
24 Federal employee under the terms of the con-
25 tract; and

1 “(ii) the Administration is reimbursed for
2 such services under paragraph (1).

3 “(b) RULE OF CONSTRUCTION.—Nothing in this sec-
4 tion may be construed to affect the rights of the Federal
5 Government, including property rights in inventions,
6 under any contract, except in the case of a written con-
7 tract with the Administration or the ISS management en-
8 tity for the performance of a designated activity.

9 “(c) DEFINITIONS.—In this section—

10 “(1) CONTRACT.—The term ‘contract’ has the
11 meaning giving the term in section 20135(a).

12 “(2) DESIGNATED ACTIVITY.—The term ‘des-
13 ignated activity’ means any non-NASA scientific use
14 of the ISS national laboratory as described in sec-
15 tion 504 of the National Aeronautics and Space Ad-
16 ministration Authorization Act of 2010 (42 U.S.C.
17 18354).

18 “(3) DESIGNATED INVENTION.—The term ‘des-
19 ignated invention’ means any invention conceived or
20 first reduced to practice by any person in the per-
21 formance of a designated activity under a written
22 contract with the Administration or the ISS man-
23 agement entity.

24 “(4) GOVERNMENT-PURPOSE LICENSE.—The
25 term ‘Government-purpose license’ means the res-

1 ervation by the Federal Government of an irrev-
 2 ocable, nonexclusive, nontransferable, royalty-free li-
 3 cense for the use of an invention throughout the
 4 world by or on behalf of the United States or any
 5 foreign government pursuant to a treaty or agree-
 6 ment with the United States.

7 “(5) ISS MANAGEMENT ENTITY.—The term
 8 ‘ISS management entity’ means the organization
 9 with which the Administrator enters into a coopera-
 10 tive agreement under section 504(a) of the National
 11 Aeronautics and Space Administration Authorization
 12 Act of 2010 (42 U.S.C. 18354(a)).

13 “(6) USER.—The term ‘user’ means a person,
 14 including a nonprofit organization or small business
 15 firm (as such terms are defined in section 201 of
 16 title 35), or class of persons that enters into a writ-
 17 ten contract with the Administration or the ISS
 18 management entity for the performance of des-
 19 ignated activities.”.

20 (b) CONFORMING.—The table of sections for chapter
 21 201 of title 51, United States Code, is amended by insert-
 22 ing after the item relating to section 20149 the following:

“20150. Property rights in designated inventions.”.

1 **SEC. 214. DATA FIRST PRODUCED DURING NON-NASA SCI-**
 2 **ENTIFIC USE OF THE ISS NATIONAL LABORA-**
 3 **TORY.**

4 (a) DATA RIGHTS.—Subchapter III of chapter 201
 5 of title 51, United States Code, as amended by section
 6 213, is further amended by adding at the end the fol-
 7 lowing:

8 **“§ 20151. Data rights**

9 “(a) NON-NASA SCIENTIFIC USE OF THE ISS NA-
 10 TIONAL LABORATORY.—The Federal Government may not
 11 use or reproduce, or disclose outside of the Government,
 12 any data first produced in the performance of a designated
 13 activity under a written contract with the Administration
 14 or the ISS management entity, unless—

15 “(1) otherwise agreed under the terms of the
 16 contract with the Administration or the ISS man-
 17 agement entity, as applicable;

18 “(2) the designated activity is carried out with
 19 Federal funds;

20 “(3) disclosure is required by law;

21 “(4) the Federal Government has rights in the
 22 data under another Federal contract, grant, coopera-
 23 tive agreement, or other transaction; or

24 “(5) the data is—

1 “(A) otherwise lawfully acquired or inde-
2 pendently developed by the Federal Govern-
3 ment;

4 “(B) related to the health and safety of
5 personnel on the ISS; or

6 “(C) essential to the performance of work
7 by the ISS management entity or NASA per-
8 sonnel.

9 “(b) DEFINITIONS.—In this section:

10 “(1) CONTRACT.—The term ‘contract’ has the
11 meaning given the term under section 20135(a).

12 “(2) DATA.—

13 “(A) IN GENERAL.—The term ‘data’
14 means recorded information, regardless of form
15 or the media on which it may be recorded.

16 “(B) INCLUSIONS.—The term ‘data’ in-
17 cludes technical data and computer software.

18 “(C) EXCLUSIONS.—The term ‘data’ does
19 not include information incidental to contract
20 administration, such as financial, administra-
21 tive, cost or pricing, or management informa-
22 tion.

23 “(3) DESIGNATED ACTIVITY.—The term ‘des-
24 ignated activity’ has the meaning given the term in
25 section 20150.

1 “(4) ISS MANAGEMENT ENTITY.—The term
 2 ‘ISS management entity’ has the meaning given the
 3 term in section 20150.”.

4 (b) SPECIAL HANDLING OF TRADE SECRETS OR
 5 CONFIDENTIAL INFORMATION.—Section 20131(b)(2) of
 6 title 51, United States Code, is amended to read as fol-
 7 lows:

8 “(2) INFORMATION DESCRIBED.—

9 “(A) ACTIVITIES UNDER AGREEMENT.—
 10 Information referred to in paragraph (1) is in-
 11 formation that—

12 “(i) results from activities conducted
 13 under an agreement entered into under
 14 subsections (e) and (f) of section 20113;
 15 and

16 “(ii) would be a trade secret or com-
 17 mercial or financial information that is
 18 privileged or confidential within the mean-
 19 ing of section 552(b)(4) of title 5 if the in-
 20 formation had been obtained from a non-
 21 Federal party participating in such an
 22 agreement.

23 “(B) CERTAIN DATA.—Information re-
 24 ferred to in paragraph (1) includes data (as de-
 25 fined in section 20151) that—

1 “(i) was first produced by the Admin-
 2 istration in the performance of any des-
 3 igned activity (as defined in section
 4 20150); and

5 “(ii) would be a trade secret or com-
 6 mercial or financial information that is
 7 privileged or confidential within the mean-
 8 ing of section 552(b)(4) of title 5 if the
 9 data had been obtained from a non-Fed-
 10 eral party.”.

11 (c) CONFORMING AMENDMENT.—The table of sec-
 12 tions for chapter 201 of title 51, United States Code, as
 13 amended by section 213, is further amended by inserting
 14 after the item relating to section 20150 the following:

“20151. Data rights.”.

15 **SEC. 215. ROYALTIES AND OTHER PAYMENTS RECEIVED**
 16 **FOR DESIGNATED ACTIVITIES.**

17 (a) SENSE OF CONGRESS.—It is the sense of Con-
 18 gress that the Administrator should determine a threshold
 19 for which it may be appropriate for NASA to recoup the
 20 costs of supporting the creation of invention aboard the
 21 ISS, through the negotiation of royalties, similar to agree-
 22 ments made by other Federal agencies that support pri-
 23 vate sector innovation.

24 (b) IN GENERAL.—Subchapter III of chapter 201 of
 25 title 51, United States Code, as amended by sections 213

1 and 214, is further amended by adding at the end the
2 following:

3 **“§ 20152. Royalties and other payments received for**
4 **designated activities**

5 “(a) DESIGNATED INVENTIONS MADE WITH FED-
6 ERAL ASSISTANCE.—Notwithstanding any other provision
7 of law, if the Administration, under the terms of a written
8 contract for the performance of a designated activity,
9 agrees to provide, unreimbursed, the total cost of a con-
10 tribution by the Federal Government of the use of Federal
11 facilities, equipment, materials, proprietary information of
12 the Federal Government, or services of a Federal employee
13 during working hours, including the cost for the Adminis-
14 tration to carry out its responsibilities under paragraphs
15 (1) and (4) of section 504(d) of the National Aeronautics
16 and Space Administration Authorization Act of 2010 (42
17 U.S.C. 18354(d)), the Administrator shall negotiate an
18 agreement on the terms and rates of royalty payments
19 with respect to an invention or class of inventions con-
20 ceived or first reduced to practice by any person or class
21 of persons in the performance of such designated activi-
22 ties.

23 “(b) LICENSING AND ASSIGNMENT OF INVEN-
24 TIONS.—Notwithstanding sections 3710a and 3710c of
25 title 15 and any other provision of law, after payment in

1 accordance with subsection (A)(i) of such section
 2 3710c(a)(1)(A)(i) to the inventors who have directly as-
 3 signed to the Federal Government their interests in an in-
 4 vention under a written contract with the Administration
 5 or the ISS management entity for the performance of a
 6 designated activity, the balance of any royalty or other
 7 payment received by the Administrator or the ISS man-
 8 agement entity from licensing and assignment of such in-
 9 vention shall be paid by the Administrator or the ISS
 10 management entity, as applicable, to the Space Explo-
 11 ration Fund.

12 “(c) SPACE EXPLORATION FUND.—

13 “(1) ESTABLISHMENT.—There is established in
 14 the Treasury of the United States a fund, to be
 15 known as the ‘Space Exploration Fund’ (referred to
 16 in this subsection as the ‘Fund’), to be administered
 17 by the Administrator.

18 “(2) USE OF FUND.—The Fund shall be avail-
 19 able without fiscal year limitation and without fur-
 20 ther appropriation to carry out space exploration ac-
 21 tivities under section 20302.

22 “(3) DEPOSITS.—There shall be deposited in
 23 the Fund—

24 “(A) amounts appropriated to the Fund;

1 “(B) fees and royalties collected by the Ad-
 2 ministrator or the ISS management entity
 3 under subsections (a) and (b); and

4 “(C) donations or contributions designated
 5 to support authorized activities.

6 “(4) RULE OF CONSTRUCTION.—Amounts avail-
 7 able to the Administrator under this subsection shall
 8 be in addition to amounts otherwise made available
 9 for the purpose described in paragraph (2).

10 “(d) DEFINITIONS.—The terms used in this section
 11 have the meanings given the terms in section 20150.”.

12 (c) CONFORMING AMENDMENT.—The table of sec-
 13 tions for chapter 201 of title 51, United States Code, as
 14 amended by sections 213 and 214, is further amended by
 15 inserting after the item relating to section 20151 the fol-
 16 lowing:

“20152. Royalties and other payments received for designated activities.”.

17 **SEC. 216. STEPPINGSTONE APPROACH TO EXPLORATION.**

18 (a) IN GENERAL.—Section 70504 of title 51, United
 19 States Code, is amended to read as follows:

20 **“§ 70504. Steppingstone approach to exploration**

21 “(a) IN GENERAL.—The Administrator, in sustain-
 22 able steps, may conduct missions to intermediate destina-
 23 tions, such as the Moon, in accordance with section
 24 20302(b), and on a timetable determined by the avail-
 25 ability of funding, in order to achieve the objective of

1 human exploration of Mars specified in section 202(b)(5)
2 of the National Aeronautics and Space Administration Au-
3 thorization Act of 2010 (42 U.S.C. 18312(b)(5)), if the
4 Administrator—

5 “(1) determines that each such mission dem-
6 onstrates or advances a technology or operational
7 concept that will enable human missions to Mars;
8 and

9 “(2) incorporates each such mission into the
10 human exploration roadmap under section 432 of
11 the National Aeronautics and Space Administration
12 Transition Authorization Act of 2017 (Public Law
13 115–10; 51 U.S.C. 20302 note).

14 “(b) CISLUNAR SPACE EXPLORATION ACTIVITIES.—
15 In conducting a mission under subsection (a), the Admin-
16 istrator shall—

17 “(1) use a combination of launches of the Space
18 Launch System and space transportation services
19 from United States commercial providers, as appro-
20 priate, for the mission;

21 “(2) plan for not fewer than 1 Space Launch
22 System launch annually beginning after the first
23 successful crewed launch of Orion on the Space
24 Launch System; and

1 “(3) establish an outpost in orbit around the
2 Moon that—

3 “(A) demonstrates technologies, systems,
4 and operational concepts directly applicable to
5 the space vehicle that will be used to transport
6 humans to Mars;

7 “(B) has the capability for periodic human
8 habitation; and

9 “(C) can function as a point of departure,
10 return, or staging for Administration or non-
11 governmental or international partner missions
12 to multiple locations on the lunar surface or
13 other destinations.

14 “(c) COST-EFFECTIVENESS.—To maximize the cost-
15 effectiveness of the long-term space exploration and utili-
16 zation activities of the United States, the Administrator
17 shall take all necessary steps, including engaging non-
18 governmental and international partners, to ensure that
19 activities in the Administration’s human space exploration
20 program are balanced in order to help meet the require-
21 ments of future exploration and utilization activities lead-
22 ing to human habitation on the surface of Mars.

23 “(d) COMPLETION.—Within budgetary consider-
24 ations, once an exploration-related project enters its devel-
25 opment phase, the Administrator shall seek, to the max-

1 imum extent practicable, to complete that project without
2 undue delay.

3 “(e) INTERNATIONAL PARTICIPATION.—To achieve
4 the goal of successfully conducting a crewed mission to
5 the surface of Mars, the Administrator shall invite the
6 partners in the ISS program and other nations, as appro-
7 priate, to participate in an international initiative under
8 the leadership of the United States.”.

9 (b) DEFINITION OF CISLUNAR SPACE.—Section
10 10101 of title 51, United States Code, is amended by add-
11 ing at the end the following:

12 “(3) CISLUNAR SPACE.—The term ‘cislunar
13 space’ means the region of space beyond low-Earth
14 orbit out to and including the region around the sur-
15 face of the Moon.”.

16 (c) TECHNICAL AND CONFORMING AMENDMENTS.—
17 Section 3 of the National Aeronautics and Space Adminis-
18 tration Authorization Act of 2010 (42 U.S.C. 18302) is
19 amended by striking paragraphs (2) and (3) and inserting
20 the following:

21 “(2) APPROPRIATE COMMITTEES OF CON-
22 GRESS.—The term ‘appropriate committees of Con-
23 gress’ means—

24 “(A) the Committee on Commerce,
25 Science, and Transportation of the Senate; and

1 “(B) the Committee on Science, Space,
2 and Technology of the House of Representa-
3 tives.

4 “(3) CISLUNAR SPACE.—The term ‘cislunar
5 space’ means the region of space beyond low-Earth
6 orbit out to and including the region around the sur-
7 face of the Moon.”.

8 **SEC. 217. TECHNICAL AMENDMENTS RELATING TO**
9 **ARTEMIS MISSIONS.**

10 (1) Section 421 of the National Aeronautics
11 and Space Administration Authorization Act of 2017
12 (Public Law 115–10; 51 U.S.C. 20301 note) is
13 amended—

14 (A) in subsection (c)(3)—

15 (i) by striking “EM–1” and inserting
16 “Artemis 1”;

17 (ii) by striking “EM–2” and inserting
18 “Artemis 2”; and

19 (iii) by striking “EM–3” and inserting
20 “Artemis 3”; and

21 (B) in subsection (f)(3), by striking “EM–
22 3” and inserting “Artemis 3”.

23 (2) Section 432(b) of the National Aeronautics
24 and Space Administration Authorization Act of 2017

1 (Public Law 115–10; 51 U.S.C. 20302 note) is
 2 amended—

3 (A) in paragraph (3)(D)—

4 (i) by striking “EM–1” and inserting
 5 “Artemis 1”; and

6 (ii) by striking “EM–2” and inserting
 7 “Artemis 2”; and

8 (B) in paragraph (4)(C), by striking “EM–
 9 3” and inserting “Artemis 3”.

10 **TITLE III—SCIENCE**

11 **SEC. 301. SCIENCE PRIORITIES.**

12 (a) SENSE OF CONGRESS ON SCIENCE PORTFOLIO.—
 13 Congress reaffirms the sense of Congress that—

14 (1) a balanced and adequately funded set of ac-
 15 tivities, consisting of research and analysis grant
 16 programs, technology development, suborbital re-
 17 search activities, and small, medium, and large space
 18 missions, contributes to a robust and productive
 19 science program and serves as a catalyst for innova-
 20 tion and discovery; and

21 (2) the Administrator should set science prior-
 22 ities by following the guidance provided by the sci-
 23 entific community through the decadal surveys of
 24 the National Academies of Sciences, Engineering,
 25 and Medicine.

1 (b) NATIONAL ACADEMIES DECADAL SURVEYS.—
 2 Section 20305(c) of title 51, United States Code, is
 3 amended—

4 (1) by striking “The Administrator shall” and
 5 inserting the following:

6 “(1) REEXAMINATION OF PRIORITIES BY NA-
 7 TIONAL ACADEMIES.—The Administrator shall”; and

8 (2) by adding at the end the following:

9 “(2) REEXAMINATION OF PRIORITIES BY AD-
 10 MINISTRATOR.—If the Administrator decides to reex-
 11 amine the applicability of the priorities of the
 12 decadal surveys to the missions and activities of the
 13 Administration due to scientific discoveries or exter-
 14 nal factors, the Administrator shall, to the maximum
 15 extent practicable, consult with the relevant commit-
 16 tees of the National Academies.”.

17 **SEC. 302. LUNAR DISCOVERY PROGRAM.**

18 (a) IN GENERAL.—The Administrator may carry out
 19 a program to conduct lunar science research, including
 20 missions to the surface of the Moon, that materially con-
 21 tributes to the objective described in section 20102(d)(1)
 22 of title 51, United States Code.

23 (b) COMMERCIAL LANDERS.—In carrying out a pro-
 24 gram under subsection (a), the Administrator shall pro-
 25 cure the services of commercial landers developed pri-

1 marily by United States industry to land science payloads
2 of all classes on the lunar surface.

3 (c) LUNAR SCIENCE RESEARCH.—The Administrator
4 shall ensure that lunar science research carried out under
5 subsection (a) is consistent with recommendations made
6 by the National Academies of Sciences, Engineering, and
7 Medicine.

8 (d) LUNAR POLAR VOLATILES.—In carrying out a
9 program under subsection (a), the Administrator shall, at
10 the earliest opportunity, consider mission proposals to
11 evaluate the potential of lunar polar volatiles to contribute
12 to sustainable lunar exploration.

13 **SEC. 303. SEARCH FOR LIFE.**

14 (a) SENSE OF CONGRESS.—It is the sense of Con-
15 gress that—

16 (1) the report entitled “An Astrobiology Strat-
17 egy for the Search for Life in the Universe” pub-
18 lished by the National Academies of Sciences, Engi-
19 neering, and Medicine outlines the key scientific
20 questions and methods for fulfilling the objective of
21 NASA to search for the origin, evolution, distribu-
22 tion, and future of life in the universe; and

23 (2) the interaction of lifeforms with their envi-
24 ronment, a central focus of astrobiology research, is

1 a topic of broad significance to life sciences research
2 in space and on Earth.

3 (b) PROGRAM CONTINUATION.—

4 (1) IN GENERAL.—The Administrator shall con-
5 tinue to implement a collaborative, multidisciplinary
6 science and technology development program to
7 search for proof of the existence or historical exist-
8 ence of life beyond Earth in support of the objective
9 described in section 20102(d)(10) of title 51, United
10 States Code.

11 (2) ELEMENT.—The program under paragraph
12 (1) shall include activities relating to astronomy, bi-
13 ology, geology, and planetary science.

14 (3) COORDINATION WITH LIFE SCIENCES PRO-
15 GRAM.—In carrying out the program under para-
16 graph (1), the Administrator shall coordinate efforts
17 with the life sciences program of the Administration.

18 (4) TECHNOSIGNATURES.—In carrying out the
19 program under paragraph (1), the Administrator
20 shall support activities to search for and analyze
21 technosignatures.

22 (5) INSTRUMENTATION AND SENSOR TECH-
23 NOLOGY.—In carrying out the program under para-
24 graph (1), the Administrator may strategically invest

1 in the development of new instrumentation and sen-
2 sor technology.

3 **SEC. 304. JAMES WEBB SPACE TELESCOPE.**

4 (a) SENSE OF CONGRESS.—It is the sense of Con-
5 gress that—

6 (1) the James Webb Space Telescope will be
7 the next premier observatory in space and has great
8 potential to further scientific study and assist sci-
9 entists in making new discoveries in the field of as-
10 tronomy;

11 (2) the James Webb Space Telescope was devel-
12 oped as an ambitious project with a scope that was
13 not fully defined at inception and with risk that was
14 not fully known or understood;

15 (3) despite the major technology development
16 and innovation that was needed to construct the
17 James Webb Space Telescope, major negative im-
18 pacts to the cost and schedule of the James Webb
19 Space Telescope resulted from poor program man-
20 agement and poor contractor performance;

21 (4) the Administrator should take into account
22 the lessons learned from the cost and schedule issues
23 relating to the development of the James Webb
24 Space Telescope in making decisions regarding the

1 scope of and the technologies needed for future sci-
2 entific missions;

3 (5) in selecting future scientific missions, the
4 Administrator should take into account the impact
5 that large programs that overrun cost and schedule
6 estimates may have on other NASA programs in
7 earlier phases of development; and

8 (6) the Administrator should continue to de-
9 velop the James Webb Space Telescope with a devel-
10 opment cost of not more than \$9,000,000,000, as
11 estimated by the James Webb Space Telescope Inde-
12 pendent Review Board Report released in May 2018.

13 (b) PROJECT CONTINUATION.—

14 (1) IN GENERAL.—The Administrator shall con-
15 tinue—

16 (A) to closely track the cost and schedule
17 performance of the James Webb Space Tele-
18 scope project; and

19 (B) to improve the reliability of cost esti-
20 mates and contractor performance data
21 throughout the remaining development of the
22 James Webb Space Telescope.

23 (2) KEY PROGRAM OBJECTIVE.—The Adminis-
24 trator shall continue to develop the James Webb
25 Space Telescope on a schedule to meet the objective

1 of safely launching the James Webb Space Telescope
2 not later than March 31, 2021.

3 **SEC. 305. WIDE-FIELD INFRARED SURVEY TELESCOPE.**

4 (a) SENSE OF CONGRESS.—It is the sense of Con-
5 gress that—

6 (1) major growth in the cost of astrophysics
7 flagship-class missions has impacted the overall port-
8 folio balance of the Science Mission Directorate; and
9 (2) the Administrator should continue to de-
10 velop the Wide-Field Infrared Survey Telescope with
11 a development cost of not more than
12 \$3,200,000,000.

13 (b) PROJECT CONTINUATION.—The Administrator
14 shall continue to develop the Wide-Field Infrared Survey
15 Telescope to meet the objectives outlined in the 2010
16 decadal survey on astronomy and astrophysics of the Na-
17 tional Academies of Sciences, Engineering, and Medicine
18 in a manner that maximizes scientific productivity based
19 on the resources invested.

20 **SEC. 306. SATELLITE SERVICING FOR SCIENCE MISSIONS.**

21 (a) STUDY.—

22 (1) IN GENERAL.—The Administrator shall con-
23 duct a study on the feasibility of using in-space
24 robotic refueling, repair, or refurbishment capabili-
25 ties to extend the useful life of telescopes and other

1 science missions that are operational or in develop-
2 ment as of the date of the enactment of this Act.

3 (2) ELEMENTS.—The study conducted under
4 paragraph (1) shall include the following:

5 (A) An identification of the technologies
6 and in-space testing required to demonstrate
7 the in-space robotic refueling, repair, or refur-
8 bishment capabilities described in paragraph
9 (1).

10 (B) The projected cost of using such capa-
11 bilities, including the cost of extended oper-
12 ations for science missions described in that
13 paragraph.

14 (b) BRIEFING.—Not later than 1 year after the date
15 of the enactment of this Act, the Administrator shall pro-
16 vide to the appropriate committees of Congress and the
17 Space Studies Board of the National Academies of
18 Sciences, Engineering, and Medicine a briefing on the re-
19 sults of the study conducted under subsection (a)(1).

20 **SEC. 307. EARTH SCIENCE MISSIONS AND PROGRAMS.**

21 (a) SENSE OF CONGRESS.—It is the sense of Con-
22 gress that the Earth Science Division of NASA plays an
23 important role in national efforts—

24 (1) to collect and use Earth observations in
25 service to society; and

1 (2) to understand global change.

2 (b) EARTH SCIENCE MISSIONS AND PROGRAMS.—

3 With respect to the missions and programs of the Earth
4 Science Division, the Administrator shall, to the maximum
5 extent practicable, follow the recommendations and guid-
6 ance provided by the scientific community through the
7 decadal survey for Earth science and applications from
8 space of the National Academies of Sciences, Engineering,
9 and Medicine, including—

10 (1) the science priorities described in such sur-
11 vey;

12 (2) the execution of the series of existing or
13 previously planned observations (commonly known as
14 the “program of record”); and

15 (3) the development of a range of missions of
16 all classes, including opportunities for principal in-
17 vestigator-led, competitively selected missions.

18 **SEC. 308. SCIENCE MISSIONS TO MARS.**

19 (a) IN GENERAL.—The Administrator shall conduct
20 1 or more science missions to Mars to enable the selection
21 of 1 or more sites for human landing.

22 (b) SAMPLE PROGRAM.—The Administrator may
23 carry out a program—

24 (1) to collect samples from the surface of Mars;
25 and

1 (2) to return such samples to Earth for sci-
2 entific analysis.

3 (c) USE OF EXISTING CAPABILITIES AND ASSETS.—

4 In carrying out this section, the Administrator shall, to
5 the maximum extent practicable, use existing capabilities
6 and assets of NASA centers.

7 **SEC. 309. PLANETARY DEFENSE COORDINATION OFFICE.**

8 (a) FINDINGS.—Congress makes the following find-
9 ings:

10 (1) Near-Earth objects remain a threat to the
11 United States.

12 (2) Section 321(d)(1) of the National Aero-
13 nautics and Space Administration Authorization Act
14 of 2005 (Public Law 109–155; 119 Stat. 2922; 51
15 U.S.C. 71101 note prec.) established a requirement
16 that the Administrator plan, develop, and implement
17 a Near-Earth Object Survey program to detect,
18 track, catalogue, and characterize the physical char-
19 acteristics of near-Earth objects equal to or greater
20 than 140 meters in diameter in order to assess the
21 threat of such near-Earth objects to the Earth, with
22 the goal of 90-percent completion of the catalogue of
23 such near-Earth objects by December 30, 2020.

24 (3) The current planetary defense strategy of
25 NASA acknowledges that such goal will not be met.

(4) The report of the National Academies of Sciences, Engineering, and Medicine entitled “Finding Hazardous Asteroids Using Infrared and Visible Wavelength Telescopes” issued in 2019 states that—

(A) NASA cannot accomplish such goal with currently available assets;

(B) NASA should develop and launch a dedicated space-based infrared survey telescope to meet the requirements of section 321(d)(1) of the National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109–155; 119 Stat. 2922; 51 U.S.C. 71101 note prec.); and

(C) the early detection of potentially hazardous near-Earth objects enabled by a space-based infrared survey telescope is important to enable deflection of a dangerous asteroid.

(b) ESTABLISHMENT OF PLANETARY DEFENSE COORDINATION OFFICE.—

(1) IN GENERAL.—Not later than 90 days after the date of the enactment of this Act, the Administrator shall establish an office within the Planetary Science Division of the Science Mission Directorate, to be known as the “Planetary Defense Coordination

1 Office”, to plan, develop, and implement a program
2 to survey threats posed by near-Earth objects equal
3 to or greater than 140 meters in diameter, as re-
4 quired by section 321(d)(1) of the National Aero-
5 nautics and Space Administration Authorization Act
6 of 2005 (Public Law 109–155; 119 Stat. 2922; 51
7 U.S.C. 71101 note prec.).

8 (2) ACTIVITIES.—The Administrator shall—

9 (A) develop and, not later than September
10 30, 2025, launch a space-based infrared survey
11 telescope that is capable of detecting near-
12 Earth objects equal to or greater than 140 me-
13 ters in diameter, with preference given to plan-
14 etary missions selected by the Administrator as
15 of the date of the enactment of this Act to pur-
16 sue concept design studies relating to the devel-
17 opment of a space-based infrared survey tele-
18 scope;

19 (B) identify, track, and characterize poten-
20 tially hazardous near-Earth objects and issue
21 warnings of the effects of potential impacts of
22 such objects; and

23 (C) assist in coordinating Government
24 planning for response to a potential impact of
25 a near-Earth object.

1 (c) ANNUAL REPORT.—Section 321(f) of the Na-
2 tional Aeronautics and Space Administration Authoriza-
3 tion Act of 2005 (Public Law 109–155; 119 Stat. 2922;
4 51 U.S.C. 71101 note prec.) is amended to read as fol-
5 lows:

6 “(f) ANNUAL REPORT.—Not later than September
7 30, 2020, and annually thereafter through 90-percent
8 completion of the catalogue required by subsection (d)(1),
9 the Administrator shall submit to the Committee on Com-
10 merce, Science, and Transportation of the Senate and the
11 Committee on Science, Space, and Technology of the
12 House of Representatives a report that includes the fol-
13 lowing:

14 “(1) A summary of all activities carried out by
15 the Planetary Defense Coordination Office estab-
16 lished under section 309(b)(1) of the National Aero-
17 nautics and Space Administration Authorization Act
18 of 2019 since the date of enactment of that Act.

19 “(2) A description of the progress with respect
20 to the design, development, and launch of the space-
21 based infrared survey telescope required by section
22 309(b)(2)(A) of the National Aeronautics and Space
23 Administration Authorization Act of 2019.

24 “(3) An assessment of the progress toward
25 meeting the requirements of subsection (d)(1).

1 “(4) A description of the status of efforts to co-
2 ordinate planetary defense activities in response to a
3 threat posed by a near-Earth object with other Fed-
4 eral agencies since the date of enactment of the Na-
5 tional Aeronautics and Space Administration Au-
6 thorization Act of 2019.

7 “(5) A description of the status of efforts to co-
8 ordinate and cooperate with other countries to dis-
9 cover hazardous asteroids and comets, plan a mitiga-
10 tion strategy, and implement that strategy in the
11 event of the discovery of an object on a likely colli-
12 sion course with Earth.

13 “(6) A summary of expenditures for all activi-
14 ties carried out by the Planetary Defense Coordina-
15 tion Office since the date of enactment of the Na-
16 tional Aeronautics and Space Administration Au-
17 thorization Act of 2019.”.

18 (d) LIMITATION ON USE OF FUNDS.—Of the
19 amounts authorized to be appropriated by this Act, not
20 more than 80 percent of amounts authorized to be appro-
21 priated for the Office of the Administrator for a fiscal year
22 may be obligated or expended until the date on which the
23 Administrator submits the report for such fiscal year re-
24 quired by section 321(f) of the National Aeronautics and
25 Space Administration Authorization Act of 2005 (Public

1 Law 109–155; 119 Stat. 2922; 51 U.S.C. 71101 note
2 prec.).

3 (e) NEAR-EARTH OBJECT DEFINED.—In this sec-
4 tion, the term “near-Earth object” means an asteroid or
5 comet with a perihelion distance of less than 1.3 Astro-
6 nomical Units from the Sun.

7 **SEC. 310. SUBORBITAL SCIENCE FLIGHTS.**

8 (a) SENSE OF CONGRESS.—It is the sense of Con-
9 gress that commercially available suborbital flight plat-
10 forms enable low-cost access to a microgravity environ-
11 ment to advance science and train scientists and engineers
12 under the Suborbital Research Program established under
13 section 802(c) of the National Aeronautics and Space Ad-
14 ministration Authorization Act of 2010 (42 U.S.C.
15 18382(c)).

16 (b) REPORT.—

17 (1) IN GENERAL.—Not later than 270 days
18 after the date of the enactment of this Act, the Ad-
19 ministrator shall submit to the appropriate commit-
20 tees of Congress a report evaluating the manner in
21 which suborbital flight platforms can contribute to
22 meeting the science objectives of NASA for the
23 Science Mission Directorate and the Human Explo-
24 ration and Operations Mission Directorate.

(2) CONTENTS.—The report required by paragraph (1) shall include the following:

(A) An assessment of the advantages of suborbital flight platforms to meet science objectives.

(B) An evaluation of the challenges to greater use of commercial suborbital flight platforms for science purposes.

(C) An analysis of whether commercial suborbital flight platforms can provide low-cost flight opportunities to test lunar and Mars science payloads.

SEC. 311. SENSE OF CONGRESS ON SMALL SATELLITE SCIENCE.

It is the sense of Congress that—

(1) small satellites—

(A) are increasingly robust, effective, and affordable platforms for carrying out space science missions;

(B) can work in tandem with or augment larger NASA spacecraft to support high-priority science missions of NASA; and

(C) are cost effective solutions that may allow NASA to continue collecting legacy obser-

1 vations while developing next generation science
2 missions; and

3 (2) NASA should continue to support small sat-
4 ellite research, development, technologies, and pro-
5 grams, including technologies for compact and light-
6 weight instrumentation for small satellites.

7 **TITLE IV—AERONAUTICS**

8 **SEC. 401. SHORT TITLE.**

9 This title may be cited as the “Aeronautics Innova-
10 tion Act”.

11 **SEC. 402. DEFINITIONS.**

12 In this title:

13 (1) AERONAUTICS STRATEGIC IMPLEMENTA-
14 TION PLAN.—The term “Aeronautics Strategic Im-
15 plementation Plan” means the Aeronautics Strategic
16 Implementation Plan issued by the Aeronautics Re-
17 search Mission Directorate.

18 (2) UNMANNED AIRCRAFT; UNMANNED AIR-
19 CRAFT SYSTEM.—The terms “unmanned aircraft”
20 and “unmanned aircraft system” have the meanings
21 given those terms in section 44801 of title 49,
22 United States Code.

23 (3) X-PLANE.—The term “X-plane” means an
24 experimental aircraft that is—

1 (A) used to test and evaluate a new tech-
2 nology or aerodynamic concept; and

3 (B) operated by NASA or the Department
4 of Defense.

5 **SEC. 403. EXPERIMENTAL AIRCRAFT PROJECTS.**

6 (a) SENSE OF CONGRESS.—It is the sense of Con-
7 gress that—

8 (1) developing high-risk, precompetitive aero-
9 space technologies for which there is not yet a profit
10 rationale is a fundamental role of NASA;

11 (2) large-scale piloted flight test experimen-
12 tation and validation are necessary for—

13 (A) transitioning new technologies and ma-
14 terials, including associated manufacturing
15 processes, for general aviation, commercial avia-
16 tion, and military aeronautics use; and

17 (B) capturing the full extent of benefits
18 from investments made by the Aeronautics Re-
19 search Mission Directorate in priority programs
20 called for in—

21 (i) the National Aeronautics Research
22 and Development Plan issued by the Na-
23 tional Science and Technology Council in
24 February 2010;

25 (ii) the NASA 2014 Strategic Plan;

1 (iii) the Aeronautics Strategic Imple-
2 mentation Plan; and

3 (iv) any updates to the programs
4 called for in the plans described in clauses
5 (i) through (iii); and

6 (3) a level of funding that adequately supports
7 large-scale piloted flight test experimentation and
8 validation, including related infrastructure, should
9 be ensured over a sustained period of time to restore
10 the capacity of NASA—

11 (A) to see legacy priority programs
12 through to completion; and

13 (B) to achieve national economic and secu-
14 rity objectives.

15 (b) STATEMENT OF POLICY.—It is the policy of the
16 United States—

17 (1) to maintain world leadership in—

18 (A) military and civilian aeronautical
19 science and technology;

20 (B) global air power projection; and

21 (C) industrialization; and

22 (2) to maintain as a fundamental objective of
23 NASA aeronautics research the steady progression
24 and expansion of flight research and capabilities, in-

cluding the science and technology of critical underlying disciplines and competencies, such as—

(A) computational-based analytical and predictive tools and methodologies;

(B) aerothermodynamics;

(C) propulsion;

(D) advanced materials and manufacturing processes;

(E) high-temperature structures and materials; and

(F) guidance, navigation, and flight controls.

(c) ESTABLISHMENT AND CONTINUATION OF X-PLANE PROJECTS.—

(1) IN GENERAL.—The Administrator shall establish or continue to implement, in a manner that is consistent with the roadmap for supersonic aeronautics research and development required by section 604(b) of the National Aeronautics and Space Administration Transition Authorization Act of 2017 (Public Law 115–10; 131 Stat. 55), the following projects:

(A) A low-boom supersonic aircraft project to demonstrate supersonic aircraft designs and technologies that—

1 (i) reduce sonic boom noise; and
2 (ii) assist the Administrator of the
3 Federal Aviation Administration in ena-
4 bling—

5 (I) the safe commercial deploy-
6 ment of civil supersonic aircraft tech-
7 nology; and

8 (II) the safe and efficient oper-
9 ation of civil supersonic aircraft.

10 (B) A subsonic flight demonstrator aircraft
11 project to advance aircraft designs and tech-
12 nologies that enable significant increases in en-
13 ergy efficiency and reduced life-cycle emissions
14 in the aviation system while reducing noise and
15 emissions.

16 (C) A series of large-scale X-plane dem-
17 onstrators that are—

18 (i) developed sequentially or in par-
19 allel; and

20 (ii) each based on a set of new con-
21 figuration concepts or technologies deter-
22 mined by the Administrator to dem-
23 onstrate—

24 (I) aircraft and propulsion con-
25 cepts and technologies and related ad-

1 vances in alternative propulsion and
2 energy; and

3 (II) flight propulsion concepts
4 and technologies.

5 (2) ELEMENTS.—For each project under para-
6 graph (1), the Administrator shall—

7 (A) include the development of X-planes
8 and all necessary supporting flight test assets;

9 (B) pursue a robust technology maturation
10 and flight test validation effort;

11 (C) improve necessary facilities, flight test-
12 ing capabilities, and computational tools to sup-
13 port the project;

14 (D) award any primary contracts for de-
15 sign, procurement, and manufacturing to
16 United States persons, consistent with inter-
17 national obligations and commitments;

18 (E) coordinate research and flight test
19 demonstration activities with other Federal
20 agencies and the United States aviation com-
21 munity, as the Administrator considers appro-
22 priate; and

23 (F) ensure that the project is aligned with
24 the Aeronautics Strategic Implementation Plan

1 and any updates to the Aeronautics Strategic
2 Implementation Plan.

3 (3) UNITED STATES PERSON DEFINED.—In this
4 subsection, the term “United States person”
5 means—

6 (A) a United States citizen or an alien law-
7 fully admitted for permanent residence to the
8 United States; or

9 (B) an entity organized under the laws of
10 the United States or of any jurisdiction within
11 the United States, including a foreign branch of
12 such an entity.

13 (d) ADVANCED MATERIALS AND MANUFACTURING
14 TECHNOLOGY PROGRAM.—

15 (1) IN GENERAL.—The Administrator may es-
16 tablish an advanced materials and manufacturing
17 technology program—

18 (A) to develop—

19 (i) new materials, including composite
20 and high-temperature materials, from base
21 material formulation through full-scale
22 structural validation and manufacture;

23 (ii) advanced materials and manufac-
24 turing processes, including additive manu-
25 facturing, to reduce the cost of manufac-

turing scale-up and certification for use in
 general aviation, commercial aviation, and
 military aeronautics; and

(iii) noninvasive or nondestructive
 techniques for testing or evaluating avia-
 tion and aeronautics structures, including
 for materials and manufacturing processes;

(B) to reduce the time it takes to design,
 industrialize, and certify advanced materials
 and manufacturing processes;

(C) to provide education and training op-
 portunities for the aerospace workforce; and

(D) to address global cost and human cap-
 ital competitiveness for United States aero-
 nautical industries and technological leadership
 in advanced materials and manufacturing tech-
 nology.

(2) ELEMENTS.—In carrying out a program
 under paragraph (1), the Administrator shall—

(A) build on work that was carried out by
 the Advanced Composites Project of NASA;

(B) partner with the private and academic
 sectors, such as members of the Advanced Com-
 posites Consortium of NASA, the Joint Ad-
 vanced Materials and Structures Center of Ex-

1 cellence of the Federal Aviation Administration,
 2 and national laboratories, as the Administrator
 3 considers appropriate;

4 (C) provide a structure for managing intel-
 5 lectual property generated by the program
 6 based on or consistent with the structure estab-
 7 lished for the Advanced Composites Consortium
 8 of NASA;

9 (D) ensure adequate Federal cost share for
 10 applicable research; and

11 (E) coordinate with advanced manufac-
 12 turing and composites initiatives in other mis-
 13 sion directorates of NASA, as the Adminis-
 14 trator considers appropriate.

15 (e) RESEARCH PARTNERSHIPS.—In carrying out the
 16 projects under subsection (c) and a program under sub-
 17 section (d), the Administrator may engage in cooperative
 18 research programs with—

19 (1) academia; and

20 (2) commercial aviation and aerospace manu-
 21 facturers.

22 **SEC. 404. UNMANNED AIRCRAFT SYSTEMS.**

23 (a) UNMANNED AIRCRAFT SYSTEMS OPERATION
 24 PROGRAM.—The Administrator shall—

1 (1) research and test capabilities and concepts,
2 including unmanned aircraft systems communica-
3 tions and spectrum-related resources, for integrating
4 unmanned aircraft systems into the national air-
5 space system;

6 (2) leverage the partnership NASA has with in-
7 dustry focused on the advancement of technologies
8 for future air traffic management systems for un-
9 manned aircraft systems; and

10 (3) continue to align the research and testing
11 portfolio of NASA to inform the integration of un-
12 manned aircraft systems into the national airspace
13 system, consistent with public safety and national
14 security objectives.

15 (b) SENSE OF CONGRESS ON COORDINATION WITH
16 FEDERAL AVIATION ADMINISTRATION.—It is the sense of
17 Congress that—

18 (1) NASA should continue—

19 (A) to coordinate with the Federal Avia-
20 tion Administration on research on air traffic
21 management systems for unmanned aircraft
22 systems; and

23 (B) to assist the Federal Aviation Admin-
24 istration in the integration of air traffic man-

1 agement systems for unmanned aircraft sys-
2 tems into the national airspace system; and

3 (2) the test ranges (as defined in section 44801
4 of title 49, United States Code) should continue to
5 be leveraged for research on—

6 (A) air traffic management systems for un-
7 manned aircraft systems; and

8 (B) the integration of such systems into
9 the national airspace system.

10 **SEC. 405. 21ST CENTURY AERONAUTICS CAPABILITIES INI-**
11 **TIATIVE.**

12 (a) IN GENERAL.—The Administrator may establish
13 an initiative, to be known as the “21st Century Aero-
14 nautics Capabilities Initiative”, within the Construction
15 and Environmental Compliance and Restoration Account,
16 to ensure that NASA possesses the infrastructure and ca-
17 pabilities necessary to conduct proposed flight demonstra-
18 tion projects across the range of NASA aeronautics inter-
19 ests.

20 (b) ACTIVITIES.—In carrying out the 21st Century
21 Aeronautics Capabilities Initiative, the Administrator may
22 carry out the following activities:

23 (1) Any investments the Administrator con-
24 siders necessary to upgrade and create facilities for

1 civil and national security aeronautics research to
2 support advancements in—

3 (A) long-term foundational science and
4 technology;

5 (B) advanced aircraft systems;

6 (C) air traffic management systems;

7 (D) fuel efficiency;

8 (E) electric propulsion technologies;

9 (F) system-wide safety assurance;

10 (G) autonomous aviation; and

11 (H) supersonic and hypersonic aircraft de-
12 sign and development.

13 (2) Any measures the Administrator considers
14 necessary to support flight testing activities, includ-
15 ing—

16 (A) continuous refinement and develop-
17 ment of free-flight test techniques and meth-
18 odologies;

19 (B) upgrades and improvements to real-
20 time tracking and data acquisition; and

21 (C) such other measures relating to aero-
22 nautics research support and modernization as
23 the Administrator considers appropriate to
24 carry out the scientific study of the problems of

1 flight, with a view to practical solutions for
2 such problems.

3 **SEC. 406. SENSE OF CONGRESS ON ON-DEMAND AIR TRANS-**
4 **PORTATION.**

5 It is the sense of Congress that—

6 (1) greater use of high-speed air transportation,
7 small airports, helipads, vertical flight infrastruc-
8 ture, and other aviation-related infrastructure can
9 alleviate surface transportation congestion and sup-
10 port economic growth within cities;

11 (2) with respect to urban air mobility and re-
12 lated concepts, NASA should continue—

13 (A) to conduct research focused on con-
14 cepts, technologies, and design tools; and

15 (B) to support the evaluation of advanced
16 technologies and operational concepts that can
17 be leveraged by—

18 (i) industry to develop future vehicles
19 and systems; and

20 (ii) the Federal Aviation Administra-
21 tion to support vehicle safety and oper-
22 ational certification; and

23 (3) NASA should leverage ongoing efforts to
24 develop advanced technologies to actively support the
25 research needed for on-demand air transportation.

1 **SEC. 407. SENSE OF CONGRESS ON HYPERSONIC TECH-**
2 **NOLOGY RESEARCH.**

3 It is the sense of Congress that—

4 (1) hypersonic technology is critical to the de-
5 velopment of advanced high-speed aerospace vehicles
6 for both civilian and national security purposes;

7 (2) for hypersonic vehicles to be realized, re-
8 search is needed to overcome technical challenges,
9 including in propulsion, advanced materials, and
10 flight performance in a severe environment;

11 (3) NASA plays a critical role in supporting
12 fundamental hypersonic research focused on system
13 design, analysis and validation, and propulsion tech-
14 nologies;

15 (4) NASA research efforts in hypersonic tech-
16 nology should complement research supported by the
17 Department of Defense to the maximum extent
18 practicable, since contributions from both agencies
19 working in partnership with universities and indus-
20 try are necessary to overcome key technical chal-
21 lenges;

22 (5) previous coordinated research programs be-
23 tween NASA and the Department of Defense en-
24 abled important progress on hypersonic technology;

25 (6) the commercial sector could provide flight
26 platforms and other capabilities that are able to host

1 and support NASA hypersonic technology research
2 projects; and

3 (7) in carrying out hypersonic technology re-
4 search projects, the Administrator should—

5 (A) focus research and development efforts
6 on high-speed propulsion systems, reusable ve-
7 hicle technologies, high-temperature materials,
8 and systems analysis;

9 (B) coordinate with the Department of De-
10 fense to prevent duplication of efforts and of in-
11 vestments;

12 (C) include partnerships with universities
13 and industry to accomplish research goals; and

14 (D) maximize public-private use of com-
15 mercially available platforms for hosting re-
16 search and development flight projects.

17 **TITLE V—SPACE TECHNOLOGY**

18 **SEC. 501. SPACE TECHNOLOGY MISSION DIRECTORATE.**

19 (a) SENSE OF CONGRESS.—It is the sense of Con-
20 gress that an independent Space Technology Mission Di-
21 rectorate is critical to ensuring continued investments in
22 the development of technologies for missions across the
23 portfolio of NASA, including science, aeronautics, and
24 human exploration.

1 (b) SPACE TECHNOLOGY MISSION DIRECTORATE.—
 2 The Administrator shall maintain a Space Technology
 3 Mission Directorate consistent with section 702 of the Na-
 4 tional Aeronautics and Space Administration Transition
 5 Authorization Act of 2017 (51 U.S.C. 20301 note).

6 **SEC. 502. FLIGHT OPPORTUNITIES PROGRAM.**

7 (a) SENSE OF CONGRESS.—It is the sense of Con-
 8 gress that the Administrator should provide flight oppor-
 9 tunities for payloads to microgravity environments and
 10 suborbital altitudes as required by section 907(c) of the
 11 National Aeronautics and Space Administration Author-
 12 ization Act of 2010 (42 U.S.C. 18405(c)), as amended by
 13 subsection (b).

14 (b) ESTABLISHMENT.—Section 907(c) of the Na-
 15 tional Aeronautics and Space Administration Authoriza-
 16 tion Act of 2010 (42 U.S.C. 18405(c)) is amended to read
 17 as follows:

18 “(c) ESTABLISHMENT.—

19 “(1) IN GENERAL.—The Administrator shall es-
 20 tablish a Commercial Reusable Suborbital Research
 21 Program within the Space Technology Mission Di-
 22 rectorate to fund—

23 “(A) the development of payloads for sci-
 24 entific research, technology development, and
 25 education;

1 “(B) flight opportunities for those pay-
2 loads to microgravity environments and sub-
3 orbital altitudes; and

4 “(C) transition of those payloads to orbital
5 opportunities.

6 “(2) COMMERCIAL REUSABLE VEHICLE
7 FLIGHTS.—In carrying out the Commercial Reusable
8 Suborbital Research Program, the Administrator
9 may fund engineering and integration demonstra-
10 tions, proofs of concept, and educational experiments
11 for flights of commercial reusable vehicles.

12 “(3) COMMERCIAL SUBORBITAL LAUNCH VEHI-
13 CLES.—In carrying out the Commercial Reusable
14 Suborbital Research Program, the Administrator
15 may not fund the development of commercial sub-
16 orbital launch vehicles.

17 “(4) WORKING WITH MISSION DIREC-
18 TORATES.—In carrying out the Commercial Reus-
19 able Suborbital Research Program, the Adminis-
20 trator shall work with the mission directorates of
21 NASA to achieve the research, technology, and edu-
22 cation goals of NASA.”.

23 (c) CONFORMING AMENDMENT.—Section 907(b) of
24 the National Aeronautics and Space Administration Au-
25 thorization Act of 2010 (42 U.S.C. 18405(b)) is amended,

1 in the first sentence, by striking “Commercial Reusable
 2 Suborbital Research Program in” and inserting “Commer-
 3 cial Reusable Suborbital Research Program established
 4 under subsection (c)(1) within”.

5 **SEC. 503. SMALL SPACECRAFT TECHNOLOGY PROGRAM.**

6 (a) SENSE OF CONGRESS.—It is the sense of Con-
 7 gress that the Small Spacecraft Technology Program is
 8 important for conducting science and technology valida-
 9 tion for—

10 (1) short- and long-duration missions in low-
 11 Earth orbit; and

12 (2) deep space missions.

13 (b) ACCOMMODATION OF CERTAIN PAYLOADS.—In
 14 carrying out the Small Spacecraft Technology Program,
 15 the Administrator shall, as the mission risk posture and
 16 technology development objectives allow, accommodate
 17 science payloads that further the goal of long-term human
 18 exploration to the Moon and Mars.

19 **SEC. 504. NUCLEAR PROPULSION TECHNOLOGY.**

20 (a) SENSE OF CONGRESS.—It is the sense of Con-
 21 gress that nuclear propulsion is critical to the development
 22 of advanced spacecraft for civilian and national defense
 23 purposes.

1 (b) DEVELOPMENT; STUDIES.—The Administrator
 2 shall, in coordination with the Secretary of Energy and
 3 the Secretary of Defense—

4 (1) continue to develop the fuel element design
 5 for NASA nuclear propulsion technology;

6 (2) finalize the systems feasibility studies for
 7 such technology; and

8 (3) partner with members of commercial indus-
 9 try to conduct mission concept studies on such tech-
 10 nology.

11 (c) NUCLEAR PROPULSION TECHNOLOGY DEM-
 12 ONSTRATION.—

13 (1) DETERMINATION; REPORT.—Not later than
 14 December 31, 2021, the Administrator shall—

15 (A) determine the correct approach for
 16 conducting a flight demonstration of nuclear
 17 propulsion technology; and

18 (B) submit to Congress a report on a plan
 19 for such a demonstration.

20 (2) DEMONSTRATION.—Not later than Decem-
 21 ber 31, 2024, the Administrator shall conduct the
 22 flight demonstration described in paragraph (1).

23 **SEC. 505. MARS-FORWARD TECHNOLOGIES.**

24 (a) SENSE OF CONGRESS.—It is the sense of Con-
 25 gress that the Administrator should pursue multiple tech-

1 nical paths for entry, descent, and landing for Mars, in-
 2 cluding competitively selected technology demonstration
 3 missions.

4 (b) PRIORITIZATION OF LONG-LEAD TECHNOLOGIES
 5 AND SYSTEMS.—The Administrator shall prioritize, within
 6 the Space Technology Mission Directorate, research, test-
 7 ing, and development of long-lead technologies and sys-
 8 tems for Mars, including technologies and systems relating
 9 to—

10 (1) entry, descent, and landing; and

11 (2) in-space propulsion, including nuclear pro-
 12 pulsion, cryogenic fluid management, and electric
 13 propulsion options.

14 **TITLE VI—STEM ENGAGEMENT**

15 **SEC. 601. SENSE OF CONGRESS.**

16 It is the sense of Congress that—

17 (1) NASA serves as a source of inspiration to
 18 the people of the United States; and

19 (2) NASA is uniquely positioned to help in-
 20 crease student interest in science, technology, engi-
 21 neering, and math;

22 (3) engaging students, and providing hands-on
 23 experience at an early age, in science, technology,
 24 engineering, and math are important aspects of en-

1 suring and promoting United States leadership in
2 innovation; and

3 (4) NASA should strive to leverage its unique
4 position—

5 (A) to increase kindergarten through grade
6 12 involvement in NASA projects;

7 (B) to enhance higher education in STEM
8 fields in the United States;

9 (C) to support individuals who are under-
10 represented in science, technology, engineering,
11 and math fields, such as women, minorities,
12 and individuals in rural areas; and

13 (D) to provide flight opportunities for stu-
14 dent experiments and investigations.

15 **SEC. 602. STEM EDUCATION ENGAGEMENT ACTIVITIES.**

16 (a) IN GENERAL.—The Administrator shall continue
17 to provide opportunities for formal and informal STEM
18 education engagement activities within the Office of
19 NASA STEM Engagement and other NASA directorates,
20 including—

21 (1) the Established Program to Stimulate Com-
22 petitive Research;

23 (2) the Minority University Research and Edu-
24 cation Project; and

1 (3) the National Space Grant College and Fel-
2 lowship Program.

3 (b) LEVERAGING NASA NATIONAL PROGRAMS TO
4 PROMOTE STEM EDUCATION.—The Administrator, in
5 partnership with museums, nonprofit organizations, and
6 commercial entities, shall, to the maximum extent prac-
7 ticable, leverage human spaceflight missions, Deep Space
8 Exploration Systems (including the Space Launch System,
9 Orion, and Exploration Ground Systems), and NASA
10 science programs to engage students at the kindergarten
11 through grade 12 and higher education levels to pursue
12 learning and career opportunities in STEM fields.

13 (c) BRIEFING.—Not later than 1 year after the date
14 of the enactment of this Act, the Administrator shall brief
15 the appropriate committees of Congress on—

16 (1) the status of the programs described in sub-
17 section (a); and

18 (2) the manner by which each NASA STEM
19 education engagement activity is organized and
20 funded.

21 (d) STEM EDUCATION DEFINED.—In this section,
22 the term “STEM education” has the meaning given the
23 term in section 2 of the STEM Education Act of 2015
24 (Public Law 114–59; 42 U.S.C. 6621 note).

1 **SEC. 603. SKILLED TECHNICAL EDUCATION OUTREACH**
2 **PROGRAM.**

3 (a) ESTABLISHMENT.—The Administrator shall es-
4 tablish a program to conduct outreach to secondary school
5 students—

6 (1) to expose students to careers that require
7 career and technical education; and

8 (2) to encourage students to pursue careers
9 that require career and technical education.

10 (b) OUTREACH PLAN.—Not later than 180 days after
11 the date of the enactment of this Act, the Administrator
12 shall submit to the appropriate committees of Congress
13 a report on the outreach program under subsection (a)
14 that includes—

15 (1) an implementation plan;

16 (2) a description of the resources needed to
17 carry out the program; and

18 (3) any recommendations on expanding out-
19 reach to secondary school students interested in
20 skilled technical occupations.

21 (c) SYSTEMS OBSERVATION.—

22 (1) IN GENERAL.—The Administrator shall de-
23 velop a program and associated policies to allow stu-
24 dents from accredited educational institutions to
25 view the manufacturing, assembly, and testing of

1 NASA-funded space and aeronautical systems, as
 2 the Administrator considers appropriate.

3 (2) CONSIDERATIONS.—In developing the pro-
 4 gram and policies under paragraph (1), the Adminis-
 5 trator shall take into consideration factors such as
 6 workplace safety, mission needs, and the protection
 7 of sensitive and proprietary technologies.

8 **TITLE VII—WORKFORCE AND** 9 **INDUSTRIAL BASE**

10 **SEC. 701. APPOINTMENT AND COMPENSATION PILOT PRO-** 11 **GRAM.**

12 (a) DEFINITION OF COVERED PROVISIONS.—In this
 13 section the term “covered provisions” means the provi-
 14 sions of title 5, United States Code, other than—

15 (1) section 2301 of that title;

16 (2) section 2302 of that title;

17 (3) chapter 71 of that title;

18 (4) section 7204 of that title; and

19 (5) chapter 73 of that title.

20 (b) ESTABLISHMENT.—There is established a 3-year
 21 pilot program under which, notwithstanding section 20113
 22 of title 51, United States Code, the Administrator may,
 23 with respect to not more than 5,000 designated per-
 24 sonnel—

1 (1) appoint and manage such designated per-
2 sonnel of the Administration, without regard to the
3 covered provisions; and

4 (2) fix the compensation of such designated
5 personnel of the Administration, without regard to
6 chapter 51 and subchapter III of chapter 53 of title
7 5, United States Code, at a rate that does not ex-
8 ceed the per annum rate of salary of the Vice Presi-
9 dent of the United States under section 104 of title
10 3, United States Code.

11 (c) ADMINISTRATOR RESPONSIBILITIES.—In car-
12 rying out the pilot program established under subsection
13 (b), the Administrator shall ensure that the pilot pro-
14 gram—

15 (1) uses—

16 (A) state-of-the-art recruitment techniques;

17 (B) simplified classification methods with
18 respect to personnel of the Administration; and

19 (C) broad banding; and

20 (2) offers—

21 (A) competitive compensation; and

22 (B) the opportunity for career mobility.

1 **SEC. 702. ESTABLISHMENT OF MULTI-INSTITUTION CON-**
2 **SORTIA AND UNIVERSITY-AFFILIATED RE-**
3 **SEARCH CENTERS.**

4 (a) IN GENERAL.—The Administrator, pursuant to
5 section 2304(c)(3)(B) of title 10, United States Code,
6 may—

7 (1) establish one or more multi-institution con-
8 sortia or university-affiliated research centers to fa-
9 cilitate access to essential engineering, research, and
10 development capabilities in support of NASA mis-
11 sions;

12 (2) use such a consortium or research center to
13 fund technical analyses and other engineering sup-
14 port to address the acquisition, technical, and oper-
15 ational needs of NASA centers; and

16 (3) ensure such a consortium or research cen-
17 ter—

18 (A) is held accountable for the technical
19 quality of the work product developed under
20 this section; and

21 (B) convenes disparate groups to facilitate
22 public-private partnerships.

23 (b) POLICIES AND PROCEDURES.—The Adminis-
24 trator shall develop and implement policies and procedures
25 to govern, with respect to the establishment of a consor-
26 tium or research center under subsection (a)—

1 (1) the selection of participants;

2 (2) the award of cooperative agreements or
3 other contracts;

4 (3) the appropriate use of competitive awards
5 and sole source awards; and

6 (4) technical capabilities required.

7 (c) ELIGIBILITY.—The following entities shall be eli-
8 gible to participate in a consortium or research center es-
9 tablished under subsection (a)—

10 (1) an institution of higher education (as de-
11 fined in section 102 of the Higher Education Act of
12 1965 (20 U.S.C. 1002));

13 (2) an operator of a federally funded research
14 and development center;

15 (3) a nonprofit or not-for-profit research insti-
16 tution; and

17 (4) a consortium composed of—

18 (A) an entity described in paragraph (1),

19 (2), or (3); and

20 (B) one or more for-profit entities.

21 **SEC. 703. EXPEDITED ACCESS TO TECHNICAL TALENT AND**
22 **EXPERTISE.**

23 (a) IN GENERAL.—The Administrator may—

24 (1) establish one or more multi-institution task
25 order contracts, consortia, cooperative agreements,

1 or other arrangements to facilitate expedited access
2 to eligible entities in support of NASA missions; and

3 (2) use such a multi-institution task order con-
4 tract, consortium, cooperative agreement, or other
5 arrangement to fund technical analyses and other
6 engineering support to address the acquisition, tech-
7 nical, and operational needs of NASA centers.

8 (b) CONSULTATION WITH OTHER NASA-AFFILI-
9 ATED ENTITIES.—To ensure access to technical expertise
10 and reduce costs and duplicative efforts, a multi-institu-
11 tion task order contract, consortium, cooperative agree-
12 ment, or any other arrangement established under sub-
13 section (a)(1) shall, to the maximum extent practicable,
14 be carried out in consultation with other NASA-affiliated
15 entities, including federally funded research and develop-
16 ment centers, university-affiliated research centers, and
17 NASA laboratories and test centers.

18 (c) POLICIES AND PROCEDURES.—The Adminis-
19 trator shall develop and implement policies and procedures
20 to govern, with respect to the establishment of a multi-
21 institution task order contract, consortium, cooperative
22 agreement, or any other arrangement under subsection
23 (a)(1)—

24 (1) the selection of participants;

25 (2) the award of task orders;

1 (3) the maximum award size for a task;

2 (4) the appropriate use of competitive awards

3 and sole source awards; and

4 (5) technical capabilities required.

5 (d) ELIGIBLE ENTITY DEFINED.—In this section,

6 the term “eligible entity” means—

7 (1) an institution of higher education (as de-

8 fined in section 102 of the Higher Education Act of

9 1965 (20 U.S.C. 1002));

10 (2) an operator of a federally funded research

11 and development center;

12 (3) a nonprofit or not-for-profit research insti-

13 tution; and

14 (4) a consortium composed of—

15 (A) an entity described in paragraph (1),

16 (2), or (3); and

17 (B) one or more for-profit entities.

18 **SEC. 704. REPORT ON INDUSTRIAL BASE FOR CIVIL SPACE**

19 **MISSIONS AND OPERATIONS.**

20 (a) IN GENERAL.—Not later than 1 year after the

21 date of the enactment of this Act, the Administrator shall

22 submit to the appropriate committees of Congress a report

23 on the United States industrial base for NASA civil space

24 missions and operations.

1 (b) ELEMENTS.—The report required by subsection
2 (a) shall include the following:

3 (1) A comprehensive description of the current
4 status of the United States industrial base for
5 NASA civil space missions and operations.

6 (2) A description and assessment of the weak-
7 nesses in the supply chain, skills, manufacturing ca-
8 pacity, raw materials, key components, and other
9 areas of the United States industrial base for NASA
10 civil space missions and operations that could ad-
11 versely impact such missions and operations if un-
12 available.

13 (3) A description and assessment of various
14 mechanisms to address and mitigate the weaknesses
15 described pursuant to paragraph (2).

16 (4) Such other matters relating to the United
17 States industrial base for NASA civil space missions
18 and operations as the Administrator considers ap-
19 propriate.

20 **SEC. 705. SEPARATIONS AND RETIREMENT INCENTIVES.**

21 Section 20113 of title 51, United States Code, is
22 amended by adding at the end the following:

23 “(o) PROVISIONS RELATED TO SEPARATION AND RE-
24 TIREMENT INCENTIVES.—

1 “(1) DEFINITION.—In this subsection, the term
2 ‘employee’—

3 “(A) means an employee of the Adminis-
4 tration serving under an appointment without
5 time limitation; and

6 “(B) does not include—

7 “(i) a reemployed annuitant under
8 subchapter III of chapter 83 or chapter 84
9 of title 5 or any other retirement system
10 for employees of the Federal Government;

11 “(ii) an employee having a disability
12 on the basis of which such employee is or
13 would be eligible for disability retirement
14 under any of the retirement systems re-
15 ferred to in clause (i); or

16 “(iii) for purposes of eligibility for
17 separation incentives under this subsection,
18 an employee who is in receipt of a decision
19 notice of involuntary separation for mis-
20 conduct or unacceptable performance.

21 “(2) AUTHORITY.—The Administrator may es-
22 tablish a program under which employees may be el-
23 igible for early retirement, offered separation incen-
24 tive pay to separate from service voluntarily, or
25 both. This authority may be used to reduce the

1 number of personnel employed or to restructure the
2 workforce to meet mission objectives without reduc-
3 ing the overall number of personnel. This authority
4 is in addition to, and notwithstanding, any other au-
5 thorities established by law or regulation for such
6 programs.

7 “(3) EARLY RETIREMENT.—An employee who
8 is at least 50 years of age and has completed 20
9 years of service, or has at least 25 years of service,
10 may, pursuant to regulations promulgated under
11 this subsection, apply and be retired from the Ad-
12 ministration and receive benefits in accordance with
13 subchapter III of chapter 83 or 84 of title 5 if the
14 employee has been employed continuously within the
15 Administration for more than 30 days before the
16 date on which the determination to conduct a reduc-
17 tion or restructuring within 1 or more Administra-
18 tion centers is approved.

19 “(4) SEPARATION PAY.—

20 “(A) IN GENERAL.—Separation pay shall
21 be paid in a lump sum or in installments and
22 shall be equal to the lesser of—

23 “(i) an amount equal to the amount
24 the employee would be entitled to receive
25 under section 5595(c) of title 5, if the em-

1 ployee were entitled to payment under such
2 section; or

3 “(ii) \$40,000.

4 “(B) LIMITATIONS.—Separation pay shall
5 not be a basis for payment, and shall not be in-
6 cluded in the computation, of any other type of
7 Government benefit. Separation pay shall not
8 be taken into account for the purpose of deter-
9 mining the amount of any severance pay to
10 which an individual may be entitled under sec-
11 tion 5595 of title 5, based on any other separa-
12 tion.

13 “(C) INSTALLMENTS.—Separation pay, if
14 paid in installments, shall cease to be paid upon
15 the recipient’s acceptance of employment by the
16 Federal Government, or commencement of work
17 under a personal services contract as described
18 in paragraph (5).

19 “(5) LIMITATIONS ON REEMPLOYMENT.—

20 “(A) An employee who receives separation
21 pay under such program may not be reemployed
22 by the Administration for a 12-month period
23 beginning on the effective date of the employ-
24 ee’s separation, unless this prohibition is waived
25 by the Administrator on a case-by-case basis.

1 “(B) An employee who receives separation
2 pay under this section on the basis of a separa-
3 tion and accepts employment with the Govern-
4 ment of the United States, or who commences
5 work through a personal services contract with
6 the United States within 5 years after the date
7 of the separation on which payment of the sepa-
8 ration pay is based, shall be required to repay
9 the entire amount of the separation pay to the
10 Administration. If the employment is with an
11 Executive agency (as defined by section 105 of
12 title 5) other than the Administration, the Ad-
13 ministrator may, at the request of the head of
14 that agency, waive the repayment if the indi-
15 vidual involved possesses unique abilities and is
16 the only qualified applicant available for the po-
17 sition. If the employment is within the Adminis-
18 tration, the Administrator may waive the repay-
19 ment if the individual involved is the only quali-
20 fied applicant available for the position. If the
21 employment is with an entity in the legislative
22 branch, the head of the entity or the appointing
23 official may waive the repayment if the indi-
24 vidual involved possesses unique abilities and is
25 the only qualified applicant available for the po-

1 sition. If the employment is with the judicial
 2 branch, the Director of the Administrative Of-
 3 fice of the United States Courts may waive the
 4 repayment if the individual involved possesses
 5 unique abilities and is the only qualified appli-
 6 cant available for the position.

7 “(6) REGULATIONS.—Under the program es-
 8 tablished under paragraph (2), early retirement and
 9 separation pay may be offered only pursuant to reg-
 10 ulations established by the Administrator, subject to
 11 such limitations or conditions as the Administrator
 12 may require.

13 “(7) USE OF EXISTING FUNDS.—The Adminis-
 14 trator shall carry out this subsection using amounts
 15 otherwise made available to the Administrator and
 16 no additional funds are authorized to be appro-
 17 priated to carry out this subsection.”.

18 **SEC. 706. CONFIDENTIALITY OF MEDICAL QUALITY ASSUR-**
 19 **ANCE RECORDS.**

20 (a) IN GENERAL.—Chapter 313 of title 51, United
 21 States Code, is amended by adding at the end the fol-
 22 lowing:

1 **“§ 31303. Confidentiality of medical quality assurance**
2 **records**

3 “(a) IN GENERAL.—Except as provided in subsection
4 (b)(1)—

5 “(1) a medical quality assurance record, or any
6 part of a medical quality assurance record, may not
7 be subject to discovery or admitted into evidence in
8 a judicial or administrative proceeding; and

9 “(2) an individual who reviews or creates a
10 medical quality assurance record for the Administra-
11 tion, or participates in any proceeding that reviews
12 or creates a medical quality assurance record, may
13 not testify in a judicial or administrative proceeding
14 with respect to—

15 “(A) the medical quality assurance record;
16 or

17 “(B) any finding, recommendation, evalua-
18 tion, opinion, or action taken by such individual
19 or in accordance with such proceeding with re-
20 spect to the medical quality assurance record.

21 “(b) DISCLOSURE OF RECORDS.—

22 “(1) IN GENERAL.—Notwithstanding subsection
23 (a), a medical quality assurance record may be dis-
24 closed to—

25 “(A) a Federal agency or private entity, if
26 the medical quality assurance record is nec-

1 essary for the Federal agency or private entity
2 to carry out—

3 “(i) licensing or accreditation func-
4 tions relating to Administration healthcare
5 facilities; or

6 “(ii) monitoring of Administration
7 healthcare facilities required by law;

8 “(B) a Federal agency or healthcare pro-
9 vider, if the medical quality assurance record is
10 required by the Federal agency or healthcare
11 provider to enable Administration participation
12 in a healthcare program of the Federal agency
13 or healthcare provider;

14 “(C) a criminal or civil law enforcement
15 agency, or an instrumentality authorized by law
16 to protect the public health or safety, on writ-
17 ten request by a qualified representative of such
18 agency or instrumentality submitted to the Ad-
19 ministrator that includes a description of the
20 lawful purpose for which the medical quality as-
21 surance record is requested;

22 “(D) an officer, an employee, or a con-
23 tractor of the Administration who requires the
24 medical quality assurance record to carry out
25 an official duty associated with healthcare;

1 “(E) healthcare personnel, to the extent
2 necessary to address a medical emergency af-
3 fecting the health or safety of an individual;
4 and

5 “(F) any committee, panel, or board con-
6 vened by the Administration to review the
7 healthcare-related policies and practices of the
8 Administration.

9 “(2) SUBSEQUENT DISCLOSURE PROHIBITED.—
10 An individual or entity to whom a medical quality
11 assurance record has been disclosed under para-
12 graph (1) may not make a subsequent disclosure of
13 the medical quality assurance record.

14 “(c) PERSONALLY IDENTIFIABLE INFORMATION.—

15 “(1) IN GENERAL.—Except as provided in para-
16 graph (2), the personally identifiable information
17 contained in a medical quality assurance record of a
18 patient or an employee of the Administration, or any
19 other individual associated with the Administration
20 for purposes of a medical quality assurance pro-
21 gram, shall be removed before the disclosure of the
22 medical quality assurance record to an entity other
23 than the Administration.

24 “(2) EXCEPTION.—Personally identifiable infor-
25 mation described in paragraph (1) may be released

1 to an entity other than the Administration if the Ad-
2 ministrator makes a determination that the release
3 of such personally identifiable information—

4 “(A) is in the best interests of the Admin-
5 istration; and

6 “(B) does not constitute an unwarranted
7 invasion of personal privacy.

8 “(d) EXCLUSION FROM FOIA.—A medical quality
9 assurance record may not be made available to any person
10 under section 552 of title 5, United States Code (com-
11 monly referred to as the ‘Freedom of Information Act’),
12 and this section shall be considered a statute described
13 in subsection (b)(3)(B) of such section 522.

14 “(e) REGULATIONS.—Not later than one year after
15 the date of the enactment of this section, the Adminis-
16 trator shall promulgate regulations to implement this sec-
17 tion.

18 “(f) RULES OF CONSTRUCTION.—Nothing in this
19 section shall be construed—

20 “(1) to withhold a medical quality assurance
21 record from a committee of the Senate or House of
22 Representatives or a joint committee of Congress if
23 the medical quality assurance record relates to a
24 matter within the jurisdiction of such committee or
25 joint committee; or

1 “(2) to limit the use of a medical quality assur-
 2 ance record within the Administration, including the
 3 use by a contractor or consultant of the Administra-
 4 tion.

5 “(g) DEFINITIONS.—In this section:

6 “(1) MEDICAL QUALITY ASSURANCE RECORD.—
 7 The term ‘medical quality assurance record’ means
 8 any proceeding, discussion, record, finding, rec-
 9 ommendation, evaluation, opinion, minutes, report,
 10 or other document or action that results from a
 11 quality assurance committee, quality assurance pro-
 12 gram, or quality assurance program activity.

13 “(2) QUALITY ASSURANCE PROGRAM.—

14 “(A) IN GENERAL.—The term ‘quality as-
 15 surance program’ means a comprehensive pro-
 16 gram of the Administration—

17 “(i) to systematically review and im-
 18 prove the quality of medical and behavioral
 19 health services provided by the Administra-
 20 tion to ensure the safety and security of
 21 individuals receiving such health services;
 22 and

23 “(ii) to evaluate and improve the effi-
 24 ciency, effectiveness, and use of staff and

1 resources in the delivery of such health
2 services.

3 “(B) INCLUSION.—The term ‘quality as-
4 surance program’ includes any activity carried
5 out by or for the Administration to assess the
6 quality of medical care provided by the Admin-
7 istration.”.

8 (b) TECHNICAL AND CONFORMING AMENDMENT.—
9 The table of sections for chapter 313 of title 51, United
10 States Code, is amended by adding at the end the fol-
11 lowing:

“31303. Confidentiality of medical quality assurance records.”.

12 **TITLE VIII—MISCELLANEOUS** 13 **PROVISIONS**

14 **SEC. 801. CONTRACTING AUTHORITY.**

15 Section 20113 of title 51, United States Code, is
16 amended by adding at the end the following:

17 “(o) CONTRACTING AUTHORITY.—The Administra-
18 tion—

19 “(1) may enter into an agreement with a pri-
20 vate, commercial, or State government entity to pro-
21 vide the entity with supplies, support, and services
22 related to private, commercial, or State government
23 space activities carried out at a property owned or
24 operated by the Administration; and

1 “(2) upon the request of such an entity, may
2 include such supplies, support, and services in the
3 requirements of the Administration if—

4 “(A) the Administrator determines that
5 the inclusion of such supplies, support, or serv-
6 ices in such requirements—

7 “(i) is in the best interest of the Fed-
8 eral Government;

9 “(ii) does not interfere with the re-
10 quirements of the Administration; and

11 “(iii) does not compete with the com-
12 mercial space activities of other such enti-
13 ties; and

14 “(B) the Administration has full reimburs-
15 able funding from the entity that requested
16 supplies, support, and services prior to making
17 any obligation for the delivery of such supplies,
18 support, or services under an Administration
19 procurement contract or any other agreement.”.

20 **SEC. 802. AUTHORITY FOR TRANSACTION PROTOTYPE**
21 **PROJECTS AND FOLLOW-ON PRODUCTION**
22 **CONTRACTS.**

23 Section 20113 of title 51, United States Code, as
24 amended by section 801, is further amended by adding
25 at the end the following:

1 “(p) TRANSACTION PROTOTYPE PROJECTS AND FOL-
2 LOW-ON PRODUCTION CONTRACTS.—

3 “(1) IN GENERAL.—The Administration may
4 enter into a transaction (other than a contract, co-
5 operative agreement, or grant) to carry out a proto-
6 type project that is directly relevant to enhancing
7 the mission effectiveness of the Administration.

8 “(2) SUBSEQUENT AWARD OF FOLLOW-ON PRO-
9 Duction CONTRACT.—A transaction entered into
10 under this subsection for a prototype project may
11 provide for the subsequent award of a follow-on pro-
12 duction contract to participants in the transaction.

13 “(3) INCLUSION.—A transaction under this
14 subsection includes a project awarded to an indi-
15 vidual participant and to all individual projects
16 awarded to a consortium of United States industry
17 and academic institutions.

18 “(4) DETERMINATION.—The authority of this
19 section may be exercised for a transaction for a pro-
20 totype project and any follow-on production contract,
21 upon a determination by the head of the contracting
22 activity, in accordance with Administration policies,
23 that—

24 “(A) circumstances justify use of a trans-
25 action to provide an innovative business ar-

1 rangement that would not be feasible or appro-
 2 priate under a contract; and

3 “(B) the use of the authority of this sec-
 4 tion is essential to promoting the success of the
 5 prototype project.

6 “(5) COMPETITIVE PROCEDURE.—

7 “(A) IN GENERAL.—To the maximum ex-
 8 tent practicable, the Administrator shall use
 9 competitive procedures with respect to entering
 10 into a transaction to carry out a prototype
 11 project.

12 “(B) EXCEPTION.—Notwithstanding sec-
 13 tion 2304 of title 10, United States Code, a fol-
 14 low-on production contract may be awarded to
 15 the participants in the prototype transaction
 16 without the use of competitive procedures, if—

17 “(i) competitive procedures were used
 18 for the selection of parties for participation
 19 in the prototype transaction; and

20 “(ii) the participants in the trans-
 21 action successfully completed the prototype
 22 project provided for in the transaction.

23 “(6) COST SHARE.—A transaction to carry out
 24 a prototype project and a follow-on production con-
 25 tract may require that part of the total cost of the

1 transaction or contract be paid by the participant or
 2 contractor from a source other than the Federal
 3 Government.

4 “(7) PROCUREMENT ETHICS.—A transaction
 5 under this authority shall be considered an agency
 6 procurement for purposes of chapter 21 of title 41,
 7 United States Code, with regard to procurement eth-
 8 ics.”.

9 **SEC. 803. PROTECTION OF DATA AND INFORMATION FROM**
 10 **PUBLIC DISCLOSURE.**

11 (a) CERTAIN TECHNICAL DATA.—Section 20131 of
 12 title 51, United States Code, is amended—

13 (1) by redesignating subsection (c) as sub-
 14 section (d);

15 (2) in subsection (a)(3), by striking “subsection
 16 (b)” and inserting “subsection (b) or (c)”;

17 (3) by inserting after subsection (b) the fol-
 18 lowing:

19 “(c) SPECIAL HANDLING OF CERTAIN TECHNICAL
 20 DATA.—

21 “(1) IN GENERAL.—The Administrator may
 22 provide appropriate protections against the public
 23 dissemination of certain technical data, including ex-
 24 emption from subchapter II of chapter 5 of title 5.

25 “(2) DEFINITIONS.—In this subsection:

1 “(A) CERTAIN TECHNICAL DATA.—The
2 term ‘certain technical data’ means technical
3 data that may not be exported lawfully outside
4 the United States without approval, authoriza-
5 tion, or license under—

6 “(i) the Export Control Reform Act of
7 2018 (Public Law 115–232; 132 Stat.
8 2208); or

9 “(ii) the International Security Assist-
10 ance and Arms Export Control Act of
11 1976 (Public Law 94–329; 90 Stat. 729).

12 “(B) TECHNICAL DATA.—The term ‘tech-
13 nical data’ means any blueprint, drawing, pho-
14 tograph, plan, instruction, computer software,
15 or documentation, or any other technical infor-
16 mation.”;

17 (4) in subsection (d), as so redesignated, by in-
18 serting “, including any data,” after “information”;
19 and

20 (5) by adding at the end the following:

21 “(e) EXCLUSION FROM FOIA.—This section shall be
22 considered a statute described in subsection (b)(3)(B) of
23 section 552 of title 5 (commonly referred to as the ‘Free-
24 dom of Information Act’).”.

1 (b) CERTAIN VOLUNTARILY PROVIDED SAFETY-RE-
2 LATED INFORMATION.—

3 (1) IN GENERAL.—The Administrator shall pro-
4 vide appropriate safeguards against the public dis-
5 semination of safety-related information collected as
6 part of a mishap investigation carried out under the
7 NASA safety reporting system or in conjunction
8 with an organizational safety assessment, if the Ad-
9 ministrator makes a written determination, including
10 a justification of the determination, that—

11 (A)(i) disclosure of the information would
12 inhibit individuals from voluntarily providing
13 safety-related information; and

14 (ii) the ability of NASA to collect such in-
15 formation improves the safety of NASA pro-
16 grams and research relating to aeronautics and
17 space; or

18 (B) withholding such information from
19 public disclosure improves the safety of such
20 NASA programs and research.

21 (2) OTHER FEDERAL AGENCIES.—Notwith-
22 standing any other provision of law, if the Adminis-
23 trator provides to the head of another Federal agen-
24 cy safety-related information with respect to which
25 the Administrator has made a determination under

1 paragraph (1), the head of the Federal agency shall
 2 withhold the information from public disclosure.

3 (3) PUBLIC AVAILABILITY.—A determination
 4 under paragraph (1) shall be made available to the
 5 public on request, as required under section 552 of
 6 title 5, United States Code (commonly referred to as
 7 the “Freedom of Information Act”).

8 (4) EXCLUSION FROM FOIA.—This subsection
 9 shall be considered a statute described in subsection
 10 (b)(3)(B) of section 552 of title 5, United States
 11 Code.

12 **SEC. 804. PHYSICAL SECURITY MODERNIZATION.**

13 Chapter 201 of title 51, United States Code, is
 14 amended—

15 (1) in section 20133(2), by striking “property”
 16 and all that follows through “to the United States,”
 17 and inserting “Administration personnel or of prop-
 18 erty owned or leased by, or under the control of, the
 19 United States”; and

20 (2) in section 20134, in the second sentence—

21 (A) by inserting “Administration personnel
 22 or any” after “protecting”; and

23 (B) by striking “, at facilities owned or
 24 contracted to the Administration”.

1 **SEC. 805. LEASE OF NON-EXCESS PROPERTY.**

2 Section 20145 of title 51, United States Code, is
3 amended—

4 (1) in paragraph (b)(1)(B), by striking “en-
5 tered into for the purpose of developing renewable
6 energy production facilities”; and

7 (2) by striking subsection (g).

8 **SEC. 806. CYBERSECURITY.**

9 (a) IN GENERAL.—Section 20301 of title 51, United
10 States Code, is amended by adding at the end the fol-
11 lowing:

12 “(c) CYBERSECURITY.—The Administrator shall up-
13 date and improve the cybersecurity of NASA space assets
14 and supporting infrastructure.”.

15 (b) SECURITY OPERATIONS CENTER.—

16 (1) ESTABLISHMENT.—The Administrator shall
17 maintain a Security Operations Center, to identify
18 and respond to cybersecurity threats to NASA infor-
19 mation technology systems, including institutional
20 systems and mission systems.

21 (2) INSPECTOR GENERAL RECOMMENDA-
22 TIONS.—The Administrator shall implement, to the
23 maximum extent practicable, each of the rec-
24 ommendations contained in the report of the Inspec-
25 tor General of NASA entitled “Audit of NASA’s Se-
26 curity Operations Center”, issued on May 23, 2018.

1 (c) CYBER THREAT HUNT.—

2 (1) IN GENERAL.—The Administrator, in co-
3 ordination with the Secretary of Homeland Security
4 and the heads of other relevant Federal agencies,
5 may implement a cyber threat hunt capability to
6 proactively search NASA information systems for
7 advanced cyber threats that otherwise evade existing
8 security tools.

9 (2) THREAT-HUNTING PROCESS.—In carrying
10 out paragraph (1), the Administrator shall develop
11 and document a threat-hunting process, including
12 the roles and responsibilities of individuals con-
13 ducting a cyber threat hunt.

14 (d) GAO PRIORITY RECOMMENDATIONS.—The Ad-
15 ministrator shall implement, to the maximum extent prac-
16 ticable, the recommendations for NASA contained in the
17 report of the Comptroller General of the United States
18 entitled “Information Security: Agencies Need to Improve
19 Controls over Selected High-Impact Systems”, issued May
20 18, 2016, including—

21 (1) re-evaluating security control assessments;
22 and

23 (2) specifying metrics for the continuous moni-
24 toring strategy of the Administration.

1 **SEC. 807. LIMITATION ON COOPERATION WITH THE PEO-**
 2 **PLE'S REPUBLIC OF CHINA.**

3 (a) IN GENERAL.—Except as provided by subsection
 4 (b), the Administrator, the Director of the Office of
 5 Science and Technology Policy, and the Chair of the Na-
 6 tional Space Council, shall not—

7 (1) develop, design, plan, promulgate, imple-
 8 ment, or execute a bilateral policy, program, order,
 9 or contract of any kind to participate, collaborate, or
 10 coordinate bilaterally in any manner with—

11 (A) the Government of the People's Repub-
 12 lic of China; or

13 (B) any company—

14 (i) owned by the Government of the
 15 People's Republic of China; or

16 (ii) incorporated under the laws of the
 17 People's Republic of China; and

18 (2) host official visitors from the People's Re-
 19 public of China at a facility belonging to or used by
 20 NASA.

21 (b) WAIVER.—

22 (1) IN GENERAL.—The Administrator, the Di-
 23 rector, or the Chair may waive the limitation under
 24 subsection (a) with respect to an activity described
 25 in that subsection only if the Administrator, the Di-

1 rector, or the Chair, as applicable, makes a deter-
2 mination that the activity—

3 (A) does not pose a risk of a transfer of
4 technology, data, or other information with na-
5 tional security or economic security implications
6 to an entity described in paragraph (1) of such
7 subsection; and

8 (B) does not involve knowing interactions
9 with officials who have been determined by the
10 United States to have direct involvement with
11 violations of human rights.

12 (2) CERTIFICATION TO CONGRESS.—Not later
13 than 30 days after the date on which a waiver is
14 granted under paragraph (1), the Administrator, the
15 Director, or the Chair, as applicable, shall submit to
16 the Committee on Commerce, Science, and Trans-
17 portation and the Committee on Appropriations of
18 the Senate and the Committee on Science, Space,
19 and Technology and the Committee on Appropria-
20 tions of the House of Representatives a written cer-
21 tification that the activity complies with the require-
22 ments in subparagraphs (A) and (B) of that para-
23 graph.

1 **SEC. 808. SMALL SATELLITE LAUNCH SERVICES PROGRAM.**

2 (a) IN GENERAL.—The Administrator shall continue
3 to procure dedicated launch services for small satellites,
4 including CubeSats, for the purpose of conducting science
5 and technology missions that further the goals of NASA.

6 (b) REQUIREMENTS.—In carrying out the program
7 under subsection (a), the Administrator shall—

8 (1) engage with the academic community to
9 maximize awareness and use of dedicated small sat-
10 ellite launch opportunities; and

11 (2) to the maximum extent practicable, use a
12 secondary payload of procured launch services for
13 CubeSats.

14 **SEC. 809. 21ST CENTURY SPACE LAUNCH INFRASTRUC-**
15 **TURE.**

16 (a) IN GENERAL.—The Administrator shall carry out
17 a program to modernize launch infrastructure at NASA
18 facilities—

19 (1) to enhance safety; and

20 (2) to advance Government and commercial
21 space transportation and exploration.

22 (b) PROJECTS.—Projects funded under the program
23 under subsection (a) may include—

24 (1) infrastructure relating to commodities;

1 (2) standard interfaces to meet customer needs
2 for multiple payload processing and launch vehicle
3 processing;

4 (3) enhancements to range capacity and flexi-
5 bility; and

6 (4) such other projects as the Administrator
7 considers appropriate to meet the goals described in
8 subsection (a).

9 (c) REQUIREMENTS.—In carrying out the program
10 under subsection (a), the Administrator shall—

11 (1) prioritize investments in projects that can
12 be used by multiple users and launch vehicles, in-
13 cluding non-NASA users and launch vehicles; and

14 (2) limit investments to projects that would not
15 otherwise be funded by a NASA program, such as
16 an institutional or programmatic infrastructure pro-
17 gram.

18 (d) SAVINGS CLAUSE.—Nothing in this section shall
19 preclude a NASA program, including the Space Launch
20 System and Orion, from using the launch infrastructure
21 modernized under this section.

22 **SEC. 810. MISSIONS OF NATIONAL NEED.**

23 (a) SENSE OF CONGRESS.—It is the Sense of Con-
24 gress that—

1 (1) while certain space missions, such as aster-
2 oid detection or space debris mitigation missions,
3 may not provide the highest-value science, as deter-
4 mined by the National Academies of Science, Engi-
5 neering, and Medicine decadal surveys, such mis-
6 sions provide tremendous value to the United States
7 and the world; and

8 (2) the current organizational and funding
9 structure of NASA has not prioritized the funding
10 of missions of national need.

11 (b) STUDY.—

12 (1) IN GENERAL.—The Director of the Office of
13 Science and Technology Policy shall conduct a study
14 on the manner in which NASA funds missions of na-
15 tional need.

16 (2) MATTERS TO BE INCLUDED.—The study
17 conducted under paragraph (1) shall include the fol-
18 lowing:

19 (A) An identification and assessment of
20 the types of missions or technology development
21 programs that constitute missions of national
22 need.

23 (B) An assessment of the manner in which
24 such missions are currently funded and man-
25 aged by NASA.

1 (C) An analysis of the options for funding
2 missions of national need, including—

3 (i) structural changes required to
4 allow NASA to fund such missions; and

5 (ii) an assessment of the capacity of
6 other Federal agencies to make funds
7 available for such missions.

8 (c) REPORT TO CONGRESS.—Not later than 1 year
9 after the date of the enactment of this Act, the Director
10 of the Office of Science and Technology Policy shall sub-
11 mit to the appropriate committees of Congress a report
12 on the results of the study conducted under subsection (b),
13 including recommendations for funding missions of na-
14 tional need.

15 **SEC. 811. EXEMPTION FROM THE IRAN, NORTH KOREA, AND**
16 **SYRIA NONPROLIFERATION ACT.**

17 Section 7(1) of the Iran, North Korea, and Syria
18 Nonproliferation Act (Public Law 106–178; 50 U.S.C.
19 1701 note) is amended, in the undesignated matter fol-
20 lowing subparagraph (B), by striking “December 31,
21 2020” and inserting “December 31, 2030”.

22 **SEC. 812. DRINKING WATER WELL REPLACEMENT FOR**
23 **CHINCOTEAGUE, VIRGINIA.**

24 Notwithstanding any other provision of law, during
25 the 5-year period beginning on the date of the enactment

1 of this Act, the Administrator may enter into 1 or more
2 agreements with the town of Chincoteague, Virginia, to
3 reimburse the town for costs that are directly associated
4 with—

5 (1) the removal of drinking water wells located
6 on property administered by the Administration; and

7 (2) the relocation of such wells to property
8 under the administrative control, through lease, own-
9 ership, or easement, of the town.

10 **SEC. 813. PASSENGER CARRIER USE.**

11 Section 1344(a)(2) of title 31, United States Code,
12 is amended—

13 (1) in subparagraph (A), by striking “or” at
14 the end;

15 (2) in subparagraph (B), by inserting “or”
16 after the comma at the end; and

17 (3) by inserting after subparagraph (B) the fol-
18 lowing:

19 “(C) necessary for post-flight transportation of
20 United States Government astronauts subject to re-
21 imburseable arrangements returning from space for
22 the performance of medical research, monitoring, di-
23 agnosis, or treatment, or other official duties, prior
24 to receiving post-flight medical clearance to operate
25 a motor vehicle,”.

1 **SEC. 814. SBIR PHASE FLEXIBILITY FOR THE NATIONAL**
2 **AERONAUTICS AND SPACE ADMINISTRATION.**

3 Section 9(cc) of the Small Business Act (15 U.S.C.
4 638(cc)) is amended by inserting “the National Aero-
5 nautics and Space Administration,” after “through
6 2022,”.

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