

115TH CONGRESS  
1ST SESSION

# S. 442

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## AN ACT

To authorize the 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,*

1 **SECTION 1. SHORT TITLE; TABLE OF CONTENTS.**

2 (a) SHORT TITLE.—This Act may be cited as the  
 3 “National Aeronautics and Space Administration Transi-  
 4 tion Authorization Act of 2017”.

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

Sec. 1. Short title; table of contents.

Sec. 2. Definitions.

TITLE I—AUTHORIZATION OF APPROPRIATIONS

Sec. 101. Fiscal year 2017.

TITLE II—SUSTAINING NATIONAL SPACE COMMITMENTS

Sec. 201. Sense of Congress on sustaining national space commitments.

Sec. 202. Findings.

TITLE III—MAXIMIZING UTILIZATION OF THE ISS AND LOW-  
EARTH ORBIT

Sec. 301. Operation of the ISS.

Sec. 302. Transportation to ISS.

Sec. 303. ISS transition plan.

Sec. 304. Space communications.

Sec. 305. Indemnification; NASA launch services and reentry services.

TITLE IV—ADVANCING HUMAN DEEP SPACE EXPLORATION

Subtitle A—Human Space Flight and Exploration Goals and Objectives

Sec. 411. Human space flight and exploration long-term goals.

Sec. 412. Key objectives.

Sec. 413. Vision for space exploration.

Sec. 414. Stepping stone approach to exploration.

Sec. 415. Update of exploration plan and programs.

Sec. 416. Repeals.

Sec. 417. Assured access to space.

Subtitle B—Assuring Core Capabilities for Exploration

Sec. 421. Space Launch System, Orion, and Exploration Ground Systems.

Subtitle C—Journey to Mars

Sec. 431. Findings on human space exploration.

Sec. 432. Human exploration roadmap.

Sec. 433. Advanced space suit capability.

Sec. 434. Asteroid robotic redirect mission.

Sec. 435. Mars 2033 report.

Subtitle D—TREAT Astronauts Act

- Sec. 441. Short title.
- Sec. 442. Findings; sense of Congress.
- Sec. 443. Medical monitoring and research relating to human space flight.

#### TITLE V—ADVANCING SPACE SCIENCE

- Sec. 501. Maintaining a balanced space science portfolio.
- Sec. 502. Planetary science.
- Sec. 503. James Webb Space Telescope.
- Sec. 504. Wide-Field Infrared Survey Telescope.
- Sec. 505. Mars 2020 rover.
- Sec. 506. Europa.
- Sec. 507. Congressional declaration of policy and purpose.
- Sec. 508. Extrasolar planet exploration strategy.
- Sec. 509. Astrobiology strategy.
- Sec. 510. Astrobiology public-private partnerships.
- Sec. 511. Near-Earth objects.
- Sec. 512. Near-Earth objects public-private partnerships.
- Sec. 513. Assessment of science mission extensions.
- Sec. 514. Stratospheric observatory for infrared astronomy.
- Sec. 515. Radioisotope power systems.
- Sec. 516. Assessment of Mars architecture.
- Sec. 517. Collaboration.

#### TITLE VI—AERONAUTICS

- Sec. 601. Sense of Congress on aeronautics.
- Sec. 602. Transformative aeronautics research.
- Sec. 603. Hypersonic research.
- Sec. 604. Supersonic research.
- Sec. 605. Rotorcraft research.

#### TITLE VII—SPACE TECHNOLOGY

- Sec. 701. Space technology infusion.
- Sec. 702. Space technology program.

#### TITLE VIII—MAXIMIZING EFFICIENCY

##### Subtitle A—Agency Information Technology and Cybersecurity

- Sec. 811. Information technology governance.
- Sec. 812. Information technology strategic plan.
- Sec. 813. Cybersecurity.
- Sec. 814. Security management of foreign national access.
- Sec. 815. Cybersecurity of web applications.

##### Subtitle B—Collaboration Among Mission Directorates and Other Matters

- Sec. 821. Collaboration among mission directorates.
- Sec. 822. NASA launch capabilities collaboration.
- Sec. 823. Detection and avoidance of counterfeit parts.
- Sec. 824. Education and outreach.
- Sec. 825. Leveraging commercial satellite servicing capabilities across mission directorates.
- Sec. 826. Flight opportunities.
- Sec. 827. Sense of Congress on small class launch missions.
- Sec. 828. Baseline and cost controls.

- Sec. 829. Commercial technology transfer program.
- Sec. 830. Avoiding organizational conflicts of interest in major administration acquisition programs.
- Sec. 831. Protection of Apollo landing sites.
- Sec. 832. NASA lease of non-excess property.
- Sec. 833. Termination liability.
- Sec. 834. Independent reviews.
- Sec. 835. NASA Advisory Council.
- Sec. 836. Cost estimation.
- Sec. 837. Facilities and infrastructure.
- Sec. 838. Human space flight accident investigations.
- Sec. 839. Orbital debris.
- Sec. 840. Review of orbital debris removal concepts.
- Sec. 841. Space Act Agreements.

## 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.—The term “appropriate committees of Con-  
11 gress” means—

12 (A) the Committee on Commerce, Science,  
13 and Transportation of the Senate; and

14 (B) the Committee on Science, Space, and  
15 Technology of the House of Representatives.

16 (4) CIS-LUNAR SPACE.—The term “cis-lunar  
17 space” means the region of space from the Earth  
18 out to and including the region around the surface  
19 of the Moon.

1           (5) DEEP SPACE.—The term “deep space”  
2 means the region of space beyond low-Earth orbit,  
3 to include cis-lunar space.

4           (6) GOVERNMENT ASTRONAUT.—The term  
5 “government astronaut” has the meaning given the  
6 term in section 50902 of title 51, United States  
7 Code.

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

10          (8) ISS MANAGEMENT ENTITY.—The term  
11 “ISS management entity” means the organization  
12 with which the Administrator has a cooperative  
13 agreement under section 504(a) of the National Aer-  
14 onautics and Space Administration Authorization  
15 Act of 2010 (42 U.S.C. 18354(a)).

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

18          (10) ORION.—The term “Orion” means the  
19 multipurpose crew vehicle described under section  
20 303 of the National Aeronautics and Space Adminis-  
21 tration Authorization Act of 2010 (42 U.S.C.  
22 18323).

23          (11) SPACE LAUNCH SYSTEM.—The term  
24 “Space Launch System” has the meaning given the  
25 term in section 3 of the National Aeronautics and

1       Space Administration Authorization Act of 2010 (42  
2       U.S.C. 18302).

3               (12) UNITED STATES GOVERNMENT ASTRO-  
4       NAUT.—The term “United States government astro-  
5       naut” has the meaning given the term “government  
6       astronaut” in section 50902 of title 51, United  
7       States Code, except it does not include an individual  
8       who is an international partner astronaut.

## 9       **TITLE I—AUTHORIZATION OF** 10       **APPROPRIATIONS**

### 11   **SEC. 101. FISCAL YEAR 2017.**

12       There are authorized to be appropriated to NASA for  
13   fiscal year 2017, \$19,508,000,000, as follows:

14               (1) For Exploration, \$4,330,000,000.

15               (2) For Space Operations, \$5,023,000,000.

16               (3) For Science, \$5,500,000,000.

17               (4) For Aeronautics, \$640,000,000.

18               (5) For Space Technology, \$686,000,000.

19               (6) For Education, \$115,000,000.

20               (7) For Safety, Security, and Mission Services,  
21   \$2,788,600,000.

22               (8) For Construction and Environmental Com-  
23   pliance and Restoration, \$388,000,000.

24               (9) For Inspector General, \$37,400,000.

1 **TITLE II—SUSTAINING NA-**  
2 **TIONAL SPACE COMMIT-**  
3 **MENTS**

4 **SEC. 201. SENSE OF CONGRESS ON SUSTAINING NATIONAL**  
5 **SPACE COMMITMENTS.**

6 It is the sense of Congress that—

7 (1) honoring current national space commit-  
8 ments and building upon investments in space across  
9 successive Administrations demonstrates clear con-  
10 tinuity of purpose by the United States, in collabora-  
11 tion with its international, academic, and industry  
12 partners, to extend humanity's reach into deep  
13 space, including cis-lunar space, the Moon, the sur-  
14 face and moons of Mars, and beyond;

15 (2) NASA leaders can best leverage investments  
16 in the United States space program by continuing to  
17 develop a balanced portfolio for space exploration  
18 and space science, including continued development  
19 of the Space Launch System, Orion, Commercial  
20 Crew Program, space and planetary science missions  
21 such as the James Webb Space Telescope, Wide-  
22 Field Infrared Survey Telescope, and Europa mis-  
23 sion, and ongoing operations of the ISS and Com-  
24 mercial Resupply Services Program;

1           (3) a national, government-led space program  
2       that builds on current science and exploration pro-  
3       grams, advances human knowledge and capabilities,  
4       and opens the frontier beyond Earth for ourselves,  
5       commercial enterprise, and science, and with our  
6       international partners, is of critical importance to  
7       our national destiny and to a future guided by  
8       United States values and freedoms;

9           (4) continuity of purpose and effective execu-  
10      tion of core NASA programs are essential for effi-  
11      cient use of resources in pursuit of timely and tan-  
12      gible accomplishments;

13          (5) NASA could improve its efficiency and ef-  
14      fectiveness by working with industry to streamline  
15      existing programs and requirements, procurement  
16      practices, institutional footprint, and bureaucracy  
17      while preserving effective program oversight, ac-  
18      countability, and safety;

19          (6) it is imperative that the United States  
20      maintain and enhance its leadership in space explo-  
21      ration and space science, and continue to expand  
22      freedom and economic opportunities in space for all  
23      Americans that are consistent with the Constitution  
24      of the United States; and

(7) NASA should be a multi-mission space agency, and should have a balanced and robust set of core missions in space science, space technology, aeronautics, human space flight and exploration, and education.

**SEC. 202. FINDINGS.**

Congress makes the following findings:

(1) Returns on the Nation's investments in science, technology, and exploration accrue over decades-long timeframes, and a disruption of such investments could prevent returns from being fully realized.

(2) Past challenges to the continuity of such investments, particularly threats regarding the cancellation of authorized programs with bipartisan and bicameral support, have disrupted completion of major space systems thereby—

(A) impeding planning and pursuit of national objectives in space science and human space exploration;

(B) placing such investments in space science and space exploration at risk; and

(C) degrading the aerospace industrial base.

(3) The National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109–155; 119 Stat. 2895), National Aeronautics and Space Administration Authorization Act of 2008 (Public Law 110–422; 122 Stat. 4779), and National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18301 et seq.) reflect a broad, bipartisan agreement on the path forward for NASA’s core missions in science, space technology, aeronautics, human space flight and exploration, and education, that serves as the foundation for the policy updates by this Act.

(4) Sufficient investment and maximum utilization of the ISS and ISS National Laboratory with our international and industry partners is—

(A) consistent with the goals and objectives of the United States space program; and

(B) imperative to continuing United States global leadership in human space exploration, science, research, technology development, and education opportunities that contribute to development of the next generation of American scientists, engineers, and leaders, and to creating the opportunity for economic development of low-Earth orbit.

(5) NASA has made measurable progress in the development and testing of the Space Launch System and Orion exploration systems with the near-term objectives of the initial integrated test flight and launch in 2018, a human mission in 2021, and continued missions with an annual cadence in cislunar space and eventually to the surface of Mars.

(6) The Commercial Crew Program has made measurable progress toward reestablishing the capability to launch United States government astronauts from United States soil into low-Earth orbit by the end of 2018.

(7) The Aerospace Safety Advisory Panel, in its 2015 Annual Report, urged continuity of purpose noting concerns over the potential for cost overruns and schedule slips that could accompany significant changes to core NASA programs.

## **TITLE III—MAXIMIZING UTILIZATION OF THE ISS AND LOW-EARTH ORBIT**

### **SEC. 301. OPERATION OF THE ISS.**

(a) SENSE OF CONGRESS.—It is the sense of Congress that—

1           (1) after 15 years of continuous human pres-  
2       ence in low-Earth orbit, the ISS continues to over-  
3       come challenges and operate safely;

4           (2) the ISS is a unique testbed for future space  
5       exploration systems development, including long-du-  
6       ration space travel;

7           (3) the expansion of partnerships, scientific re-  
8       search, and commercial applications of the ISS is es-  
9       sential to ensuring the greatest return on invest-  
10      ments made by the United States and its inter-  
11      national space partners in the development, assem-  
12      bly, and operations of that unique facility;

13          (4) utilization of the ISS will sustain United  
14      States leadership and progress in human space ex-  
15      ploration by—

16           (A) facilitating the commercialization and  
17      economic development of low-Earth orbit;

18           (B) serving as a testbed for technologies  
19      and a platform for scientific research and devel-  
20      opment; and

21           (C) serving as an orbital facility enabling  
22      research upon—

23           (i) the health, well-being, and per-  
24      formance of humans in space; and

1 (ii) the development of in-space sys-  
2 tems enabling human space exploration be-  
3 yond low-Earth orbit; and

4 (5) the ISS provides a platform for funda-  
5 mental, microgravity, discovery-based space life and  
6 physical sciences research that is critical for ena-  
7 bling space exploration, protecting humans in space,  
8 increasing pathways for commercial space develop-  
9 ment that depend on advances in basic research, and  
10 contributes to advancing science, technology, engi-  
11 neering, and mathematics research.

12 (b) OBJECTIVES.—The primary objectives of the ISS  
13 program shall be—

14 (1) to achieve the long term goal and objectives  
15 under section 202 of the National Aeronautics and  
16 Space Administration Authorization Act of 2010 (42  
17 U.S.C. 18312); and

18 (2) to pursue a research program that advances  
19 knowledge and provides other benefits to the Nation.

20 (c) CONTINUATION OF THE ISS.—Section 501 of the  
21 National Aeronautics and Space Administration Author-  
22 ization Act of 2010 (42 U.S.C. 18351) is amended to read  
23 as follows:

1 **“SEC. 501. CONTINUATION OF THE INTERNATIONAL SPACE**  
2 **STATION.**

3 “(a) **POLICY OF THE UNITED STATES.**—It shall be  
4 the policy of the United States, in consultation with its  
5 international partners in the ISS program, to support full  
6 and complete utilization of the ISS through at least 2024.

7 “(b) **NASA ACTION.**—In furtherance of the policy set  
8 forth in subsection (a), NASA shall—

9 “(1) pursue international, commercial, and  
10 intragovernmental means to maximize ISS logistics  
11 supply, maintenance, and operational capabilities,  
12 reduce risks to ISS systems sustainability, and offset  
13 and minimize United States operations costs relating  
14 to the ISS;

15 “(2) utilize, to the extent practicable, the ISS  
16 for the development of capabilities and technologies  
17 needed for the future of human space exploration  
18 beyond low-Earth orbit; and

19 “(3) utilize, if practical and cost effective, the  
20 ISS for Science Mission Directorate missions in low-  
21 Earth orbit.”.

22 **SEC. 302. TRANSPORTATION TO ISS.**

23 (a) **FINDINGS.**—Congress finds that reliance on for-  
24 eign carriers for United States crew transfer is unaccept-  
25 able, and the Nation’s human space flight program must  
26 acquire the capability to launch United States government

1 astronauts on vehicles using United States rockets from  
2 United States soil as soon as is safe, reliable, and afford-  
3 able to do so.

4 (b) SENSE OF CONGRESS ON COMMERCIAL CREW  
5 PROGRAM AND COMMERCIAL RESUPPLY SERVICES PRO-  
6 GRAM.—It is the sense of Congress that—

7 (1) once developed and certified to meet the Ad-  
8 ministration’s safety and reliability requirements,  
9 United States commercially provided crew transpor-  
10 tation systems can serve as the primary means of  
11 transporting United States government astronauts  
12 and international partner astronauts to and from  
13 the ISS and serving as ISS crew rescue vehicles;

14 (2) previous budgetary assumptions used by the  
15 Administration in its planning for the Commercial  
16 Crew Program assumed significantly higher funding  
17 levels than were authorized and appropriated by  
18 Congress;

19 (3) credibility in the Administration’s budgetary  
20 estimates for the Commercial Crew Program can be  
21 enhanced by an independently developed cost esti-  
22 mate;

23 (4) such credibility in budgetary estimates is an  
24 important factor in understanding program risk;

1           (5) United States access to low-Earth orbit is  
2     paramount to the continued success of the ISS and  
3     ISS National Laboratory;

4           (6) a stable and successful Commercial Resup-  
5     ply Services Program and Commercial Crew Pro-  
6     gram are critical to ensuring timely provisioning of  
7     the ISS and to reestablishing the capability to  
8     launch United States government astronauts from  
9     United States soil into orbit, ending reliance upon  
10    Russian transport of United States government as-  
11    tronauts to the ISS which has not been possible  
12    since the retirement of the Space Shuttle program in  
13    2011;

14          (7) NASA should build upon the success of the  
15    Commercial Orbital Transportation Services Pro-  
16    gram and Commercial Resupply Services Program  
17    that have allowed private sector companies to part-  
18    ner with NASA to deliver cargo and scientific experi-  
19    ments to the ISS since 2012;

20          (8) the 21st Century Launch Complex Program  
21    has enabled significant modernization and infra-  
22    structure improvements at launch sites across the  
23    United States to support NASA's Commercial Re-  
24    supply Services Program and other civil and com-  
25    mercial space flight missions; and

1           (9) the 21st Century Launch Complex Program  
2       should be continued in a manner that leverages  
3       State and private investments to achieve the goals of  
4       that program.

5       (c) REAFFIRMATION.—Congress reaffirms—

6           (1) its commitment to the use of a commercially  
7       developed, private sector launch and delivery system  
8       to the ISS for crew missions as expressed in the Na-  
9       tional Aeronautics and Space Administration Au-  
10      thorization Act of 2005 (Public Law 109–155; 119  
11      Stat. 2895), the National Aeronautics and Space  
12      Administration Authorization Act of 2008 (Public  
13      Law 110–422; 122 Stat. 4779), and the National  
14      Aeronautics and Space Administration Authorization  
15      Act of 2010 (42 U.S.C. 18301 et seq.); and

16          (2) the requirement under section  
17      50111(b)(1)(A) of title 51, United States Code, that  
18      the Administration shall make use of United States  
19      commercially provided ISS crew transfer and crew  
20      rescue services to the maximum extent practicable.

21       (d) USE OF NON-UNITED STATES HUMAN SPACE  
22      FLIGHT TRANSPORTATION CAPABILITIES.—Section  
23      201(a) of the National Aeronautics and Space Administra-  
24      tion Authorization Act of 2010 (42 U.S.C. 18311(a)) is  
25      amended to read as follows:

1       “(a) USE OF NON-UNITED STATES HUMAN SPACE  
2 FLIGHT TRANSPORTATION SERVICES.—

3               “(1) IN GENERAL.—The Federal Government  
4 may not acquire human space flight transportation  
5 services from a foreign entity unless—

6                       “(A) no United States Government-oper-  
7 ated human space flight capability is available;

8                       “(B) no United States commercial provider  
9 is available; and

10                      “(C) it is a qualified foreign entity.

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

12                      “(A) COMMERCIAL PROVIDER.—The term  
13 ‘commercial provider’ means any person pro-  
14 viding human space flight transportation serv-  
15 ices, primary control of which is held by persons  
16 other than the Federal Government, a State or  
17 local government, or a foreign government.

18                      “(B) QUALIFIED FOREIGN ENTITY.—The  
19 term ‘qualified foreign entity’ means a foreign  
20 entity that is in compliance with all applicable  
21 safety standards and is not prohibited from  
22 providing space transportation services under  
23 other law.

24                      “(C) UNITED STATES COMMERCIAL PRO-  
25 VIDER.—The term ‘United States commercial

1 provider' means a commercial provider, orga-  
2 nized under the laws of the United States or of  
3 a State, that is more than 50 percent owned by  
4 United States nationals.

5 “(3) ARRANGEMENTS WITH FOREIGN ENTI-  
6 TIES.—Nothing in this subsection shall prevent the  
7 Administrator from negotiating or entering into  
8 human space flight transportation arrangements  
9 with foreign entities to ensure safety of flight and  
10 continued ISS operations.”.

11 (e) COMMERCIAL CREW PROGRAM.—

12 (1) OBJECTIVE.—The objective of the Commer-  
13 cial Crew Program shall be to assist in the develop-  
14 ment and certification of commercially provided  
15 transportation that—

16 (A) can carry United States government  
17 astronauts safely, reliably, and affordably to  
18 and from the ISS;

19 (B) can serve as a crew rescue vehicle; and

20 (C) can accomplish subparagraphs (A) and  
21 (B) as soon as practicable.

22 (2) PRIMARY CONSIDERATION.—The objective  
23 described in paragraph (1) shall be the primary con-  
24 sideration in the acquisition strategy for the Com-  
25 mercial Crew Program.

1           (3) SAFETY.—

2                   (A) IN GENERAL.—The Administrator  
3           shall protect the safety of government astro-  
4           nauts by ensuring that each commercially pro-  
5           vided transportation system under this sub-  
6           section meets all applicable human rating re-  
7           quirements in accordance with section  
8           403(b)(1) of the National Aeronautics and  
9           Space Administration Authorization Act of  
10          2010 (42 U.S.C. 18342(b)(1)).

11                   (B) LESSONS LEARNED.—Consistent with  
12          the findings and recommendations of the Co-  
13          lumbia Accident Investigation Board, the Ad-  
14          ministration shall ensure that safety and the  
15          minimization of the probability of loss of crew  
16          are the critical priorities of the Commercial  
17          Crew Program.

18           (4) COST MINIMIZATION.—The Administrator  
19          shall strive through the competitive selection process  
20          to minimize the life cycle cost to the Administration  
21          through the planned period of commercially provided  
22          crew transportation services.

23          (f) COMMERCIAL CARGO PROGRAM.—Section 401 of  
24          the National Aeronautics and Space Administration Au-  
25          thorization Act of 2010 (42 U.S.C. 18341) is amended

1 by striking “Commercial Orbital Transportation Services”  
2 and inserting “Commercial Resupply Services”.

3 (g) COMPETITION.—It is the policy of the United  
4 States that, to foster the competitive development, oper-  
5 ation, improvement, and commercial availability of space  
6 transportation services, and to minimize the life cycle cost  
7 to the Administration, the Administrator shall procure  
8 services for Federal Government access to and return from  
9 the ISS, whenever practicable, via fair and open competi-  
10 tion for well-defined, milestone-based, Federal Acquisition  
11 Regulation-based contracts under section 201(a) of the  
12 National Aeronautics and Space Administration Author-  
13 ization Act of 2010 (42 U.S.C. 18311(a)).

14 (h) TRANSPARENCY.—

15 (1) SENSE OF CONGRESS.—It is the sense of  
16 Congress that cost transparency and schedule trans-  
17 parency aid in effective program management and  
18 risk assessment.

19 (2) IN GENERAL.—The Administrator shall, to  
20 the greatest extent practicable and in a manner that  
21 does not add costs or schedule delays to the pro-  
22 gram, ensure all Commercial Crew Program and  
23 Commercial Resupply Services Program providers  
24 provide evidence-based support for their costs and  
25 schedules.

1 (i) ISS CARGO RESUPPLY SERVICES LESSONS  
 2 LEARNED.—Not later than 120 days after the date of en-  
 3 actment of this Act, the Administrator shall submit to the  
 4 appropriate committees of Congress a report that—

5 (1) identifies the lessons learned to date from  
 6 previous and existing Commercial Resupply Services  
 7 contracts;

8 (2) indicates whether changes are needed to the  
 9 manner in which the Administration procures and  
 10 manages similar services prior to the issuance of fu-  
 11 ture Commercial Resupply Services procurement op-  
 12 portunities; and

13 (3) identifies any lessons learned from the Com-  
 14 mercial Resupply Services contracts that should be  
 15 applied to the procurement and management of com-  
 16 mercially provided crew transfer services to and  
 17 from the ISS or to other future procurements.

18 **SEC. 303. ISS TRANSITION PLAN.**

19 (a) FINDINGS.—Congress finds that—

20 (1) NASA has been both the primary supplier  
 21 and consumer of human space flight capabilities and  
 22 services of the ISS and in low-Earth orbit; and

23 (2) according to the National Research Council  
 24 report “Pathways to Exploration: Rationales and  
 25 Approaches for a U.S. Program of Human Space

1 Exploration” extending ISS beyond 2020 to 2024 or  
2 2028 will have significant negative impacts on the  
3 schedule of crewed missions to Mars, without signifi-  
4 cant increases in funding.

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

7 (1) an orderly transition for United States  
8 human space flight activities in low-Earth orbit from  
9 the current regime, that relies heavily on NASA  
10 sponsorship, to a regime where NASA is one of  
11 many customers of a low-Earth orbit commercial  
12 human space flight enterprise may be necessary; and

13 (2) decisions about the long-term future of the  
14 ISS impact the ability to conduct future deep space  
15 exploration activities, and that such decisions re-  
16 garding the ISS should be considered in the context  
17 of the human exploration roadmap under section  
18 432 of this Act.

19 (c) REPORTS.—Section 50111 of title 51, United  
20 States Code, is amended by adding at the end the fol-  
21 lowing:

22 “(c) ISS TRANSITION PLAN.—

23 “(1) IN GENERAL.—The Administrator, in co-  
24 ordination with the ISS management entity (as de-  
25 fined in section 2 of the National Aeronautics and

1       Space Administration Transition Authorization Act  
2       of 2017), ISS partners, the scientific user commu-  
3       nity, and the commercial space sector, shall develop  
4       a plan to transition in a step-wise approach from the  
5       current regime that relies heavily on NASA sponsor-  
6       ship to a regime where NASA could be one of many  
7       customers of a low-Earth orbit non-governmental  
8       human space flight enterprise.

9               “(2) REPORTS.—Not later than December 1,  
10       2017, and biennially thereafter until 2023, the Ad-  
11       ministrator shall submit to the Committee on Com-  
12       merce, Science, and Transportation of the Senate  
13       and the Committee on Science, Space, and Tech-  
14       nology of the House of Representatives a report that  
15       includes—

16               “(A) a description of the progress in  
17       achieving the Administration’s deep space  
18       human exploration objectives on ISS and pros-  
19       pects for accomplishing future mission require-  
20       ments, space exploration objectives, and other  
21       research objectives on future commercially sup-  
22       plied low-Earth orbit platforms or migration of  
23       those objectives to cis-lunar space;

24               “(B) the steps NASA is taking and will  
25       take, including demonstrations that could be

1 conducted on the ISS, to stimulate and facili-  
 2 tate commercial demand and supply of products  
 3 and services in low-Earth orbit;

4 “(C) an identification of barriers pre-  
 5 venting the commercialization of low-Earth  
 6 orbit, including issues relating to policy, regula-  
 7 tions, commercial intellectual property, data,  
 8 and confidentiality, that could inhibit the use of  
 9 the ISS as a commercial incubator;

10 “(D) the criteria for defining the ISS as a  
 11 research success;

12 “(E) the criteria used to determine wheth-  
 13 er the ISS is meeting the objective under sec-  
 14 tion 301(b)(2) of the National Aeronautics and  
 15 Space Administration Transition Authorization  
 16 Act of 2017;

17 “(F) an assessment of whether the criteria  
 18 under subparagraphs (D) and (E) are con-  
 19 sistent with the research areas defined in, and  
 20 recommendations and schedules under, the cur-  
 21 rent National Academies of Sciences, Engineer-  
 22 ing, and Medicine Decadal Survey on Biological  
 23 and Physical Sciences in Space;

24 “(G) any necessary contributions that ISS  
 25 extension would make to enabling execution of

1 the human exploration roadmap under section  
2 432 of the National Aeronautics and Space Ad-  
3 ministration Transition Authorization Act of  
4 2017;

5 “(H) the cost estimates for operating the  
6 ISS to achieve the criteria required under sub-  
7 paragraphs (D) and (E) and the contributions  
8 identified under subparagraph (G);

9 “(I) the cost estimates for extending oper-  
10 ations of the ISS to 2024, 2028, and 2030;

11 “(J) an evaluation of the feasible and pre-  
12 ferred service life of the ISS beyond the period  
13 described in section 503 of the National Aero-  
14 nautics and Space Administration Authorization  
15 Act of 2010 (42 U.S.C. 18353), through at  
16 least 2028, as a unique scientific, commercial,  
17 and space exploration-related facility, includ-  
18 ing—

19 “(i) a general discussion of inter-  
20 national partner capabilities and prospects  
21 for extending the partnership;

22 “(ii) the cost associated with extend-  
23 ing the service life;

24 “(iii) an assessment on the technical  
25 limiting factors of the service life of the

1 ISS, including a list of critical components  
2 and their expected service life and avail-  
3 ability; and

4 “(iv) such other information as may  
5 be necessary to fully describe the justifica-  
6 tion for and feasibility of extending the  
7 service life of the ISS, including the poten-  
8 tial scientific or technological benefits to  
9 the Federal Government, public, or to aca-  
10 demic or commercial entities;

11 “(K) an identification of the necessary ac-  
12 tions and an estimate of the costs to deorbit the  
13 ISS once it has reached the end of its service  
14 life;

15 “(L) the impact on deep space exploration  
16 capabilities, including a crewed mission to Mars  
17 in the 2030s, if the preferred service life of the  
18 ISS is extended beyond 2024 and NASA main-  
19 tains a flat budget profile; and

20 “(M) an evaluation of the functions, roles,  
21 and responsibilities for management and oper-  
22 ation of the ISS and a determination of—

23 “(i) those functions, roles, and re-  
24 sponsibilities the Federal Government

1           should retain during the lifecycle of the  
2           ISS;

3           “(ii) those functions, roles, and re-  
4           sponsibilities that could be transferred to  
5           the commercial space sector;

6           “(iii) the metrics that would indicate  
7           the commercial space sector’s readiness  
8           and ability to assume the functions, roles,  
9           and responsibilities described in clause (ii);  
10          and

11          “(iv) any necessary changes to any  
12          agreements or other documents and the  
13          law to enable the activities described in  
14          subparagraphs (A) and (B).

15          “(3) DEMONSTRATIONS.—If additional Govern-  
16          ment crew, power, and transportation resources are  
17          available after meeting the Administration’s require-  
18          ments for ISS activities defined in the human explo-  
19          ration roadmap and related research, demonstrations  
20          identified under paragraph (2) may—

21               “(A) test the capabilities needed to meet  
22               future mission requirements, space exploration  
23               objectives, and other research objectives de-  
24               scribed in paragraph (2)(A); and

“(B) demonstrate or test capabilities, including commercial modules or deep space habitats, Environmental Control and Life Support Systems, orbital satellite assembly, exploration space suits, a node that enables a wide variety of activity, including multiple commercial modules and airlocks, additional docking or berthing ports for commercial crew and cargo, opportunities for the commercial space sector to cost share for transportation and other services on the ISS, other commercial activities, or services obtained through alternate acquisition approaches.”.

**SEC. 304. SPACE COMMUNICATIONS.**

(a) PLAN.—The Administrator shall develop a plan, in consultation with relevant Federal agencies, to meet the Administration’s projected space communication and navigation needs for low-Earth orbit and deep space operations in the 20-year period following the date of enactment of this Act.

(b) CONTENTS.—The plan shall include—

(1) the lifecycle cost estimates and a 5-year funding profile;

1           (2) the performance capabilities required to  
2 meet the Administration's projected space commu-  
3 nication and navigation needs;

4           (3) the measures the Administration will take  
5 to sustain the existing space communications and  
6 navigation architecture;

7           (4) an identification of the projected space com-  
8 munications and navigation network and infrastruc-  
9 ture needs;

10          (5) a description of the necessary upgrades to  
11 meet the needs identified in paragraph (4), includ-  
12 ing—

13               (A) an estimate of the cost of the up-  
14 grades;

15               (B) a schedule for implementing the up-  
16 grades; and

17               (C) an assessment of whether and how any  
18 related missions will be impacted if resources  
19 are not secured at the level needed;

20          (6) the cost estimates for the maintenance of  
21 existing space communications network capabilities  
22 necessary to meet the needs identified in paragraph  
23 (4);

1           (7) the criteria for prioritizing resources for the  
2       upgrades described in paragraph (5) and the mainte-  
3       nance described in paragraph (6);

4           (8) an estimate of any reimbursement amounts  
5       the Administration may receive from other Federal  
6       agencies;

7           (9) an identification of the projected Tracking  
8       and Data Relay Satellite System needs in the 20-  
9       year period following the date of enactment of this  
10      Act, including in support of relevant Federal agen-  
11      cies, and cost and schedule estimates to maintain  
12      and upgrade the Tracking and Data Relay Satellite  
13      System to meet the projected needs;

14          (10) the measures the Administration is taking  
15      to meet space communications needs after all Track-  
16      ing and Data Relay Satellite System third-genera-  
17      tion communications satellites are operational; and

18          (11) the measures the Administration is taking  
19      to mitigate threats to electromagnetic spectrum use.

20      (c) SCHEDULE.—Not later than 1 year after the date  
21      of enactment of this Act, the Administrator shall submit  
22      the plan to the appropriate committees of Congress.

1 **SEC. 305. INDEMNIFICATION; NASA LAUNCH SERVICES AND**  
 2 **REENTRY SERVICES.**

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

6 **“§ 20148. Indemnification; NASA launch services and**  
 7 **reentry services**

8 “(a) IN GENERAL.—Under such regulations in con-  
 9 formity with this section as the Administrator shall pre-  
 10 scribe taking into account the availability, cost, and terms  
 11 of liability insurance, any contract between the Adminis-  
 12 tration and a provider may provide that the United States  
 13 will indemnify the provider against successful claims (in-  
 14 cluding reasonable expenses of litigation or settlement) by  
 15 third parties for death, bodily injury, or loss of or damage  
 16 to property resulting from launch services and reentry  
 17 services carried out under the contract that the contract  
 18 defines as unusually hazardous or nuclear in nature, but  
 19 only to the extent the total amount of successful claims  
 20 related to the activities under the contract—

21 “(1) is more than the amount of insurance or  
 22 demonstration of financial responsibility described in  
 23 subsection (c)(3); and

24 “(2) is not more than the amount specified in  
 25 section 50915(a)(1)(B).

1       “(b) TERMS OF INDEMNIFICATION.—A contract  
 2 made under subsection (a) that provides indemnification  
 3 shall provide for—

4           “(1) notice to the United States of any claim or  
 5 suit against the provider for death, bodily injury, or  
 6 loss of or damage to property; and

7           “(2) control of or assistance in the defense by  
 8 the United States, at its election, of that claim or  
 9 suit and approval of any settlement.

10       “(c) LIABILITY INSURANCE OF THE PROVIDER.—

11           “(1) IN GENERAL.—The provider under sub-  
 12 section (a) shall obtain liability insurance or dem-  
 13 onstrate financial responsibility in amounts to com-  
 14 pensate for the maximum probable loss from claims  
 15 by—

16           “(A) a third party for death, bodily injury,  
 17 or property damage or loss resulting from a  
 18 launch service or reentry service carried out  
 19 under the contract; and

20           “(B) the United States Government for  
 21 damage or loss to Government property result-  
 22 ing from a launch service or reentry service car-  
 23 ried out under the contract.

24       “(2) MAXIMUM PROBABLE LOSSES.—

1           “(A) IN GENERAL.—The Administrator  
 2           shall determine the maximum probable losses  
 3           under subparagraphs (A) and (B) of paragraph  
 4           (1) not later than 90 days after the date that  
 5           the provider requests such a determination and  
 6           submits all information the Administrator re-  
 7           quires.

8           “(B) REVISIONS.—The Administrator may  
 9           revise a determination under subparagraph (A)  
 10          of this paragraph if the Administrator deter-  
 11          mines the revision is warranted based on new  
 12          information.

13          “(3) AMOUNT OF INSURANCE.—For the total  
 14          claims related to one launch or reentry, a provider  
 15          shall not be required to obtain insurance or dem-  
 16          onstrate financial responsibility of more than—

17                 “(A)(i) \$500,000,000 under paragraph  
 18                 (1)(A); or

19                 “(ii) \$100,000,000 under paragraph  
 20                 (1)(B); or

21                 “(B) the maximum liability insurance  
 22                 available on the world market at reasonable  
 23                 cost.

24          “(4) COVERAGE.—An insurance policy or dem-  
 25          onstration of financial responsibility under this sub-

1 section shall protect the following, to the extent of  
 2 their potential liability for involvement in launch  
 3 services or reentry services:

4 “(A) The Government.

5 “(B) Personnel of the Government.

6 “(C) Related entities of the Government.

7 “(D) Related entities of the provider.

8 “(E) Government astronauts.

9 “(d) NO INDEMNIFICATION WITHOUT CROSS-WAIV-  
 10 ER.—Notwithstanding subsection (a), the Administrator  
 11 may not indemnify a provider under this section unless  
 12 there is a cross-waiver between the Administration and the  
 13 provider as described in subsection (e).

14 “(e) CROSS-WAIVERS.—

15 “(1) IN GENERAL.—The Administrator, on be-  
 16 half of the United States and its departments, agen-  
 17 cies, and instrumentalities, shall reciprocally waive  
 18 claims with a provider under which each party to the  
 19 waiver agrees to be responsible, and agrees to ensure  
 20 that its related entities are responsible, for damage  
 21 or loss to its property, or for losses resulting from  
 22 any injury or death sustained by its employees or  
 23 agents, as a result of activities arising out of the  
 24 performance of the contract.

1           “(2) LIMITATION.—The waiver made by the  
2       Government under paragraph (1) shall apply only to  
3       the extent that the claims are more than the amount  
4       of insurance or demonstration of financial responsi-  
5       bility required under subsection (c)(1)(B).

6           “(f) WILLFUL MISCONDUCT.—Indemnification under  
7       subsection (a) may exclude claims resulting from the will-  
8       ful misconduct of the provider or its related entities.

9           “(g) CERTIFICATION OF JUST AND REASONABLE  
10      AMOUNT.—No payment may be made under subsection  
11      (a) unless the Administrator or the Administrator’s des-  
12      ignee certifies that the amount is just and reasonable.

13          “(h) PAYMENTS.—

14               “(1) IN GENERAL.—Upon the approval by the  
15      Administrator, payments under subsection (a) may  
16      be made from funds appropriated for such pay-  
17      ments.

18               “(2) LIMITATION.—The Administrator shall not  
19      approve payments under paragraph (1), except to  
20      the extent provided in an appropriation law or to the  
21      extent additional legislative authority is enacted pro-  
22      viding for such payments.

23               “(3) ADDITIONAL APPROPRIATIONS.—If the  
24      Administrator requests additional appropriations to  
25      make payments under this subsection, then the re-

1       quest for those appropriations shall be made in ac-  
 2       cordance with the procedures established under sec-  
 3       tion 50915.

4       “(i) RULES OF CONSTRUCTION.—

5               “(1) IN GENERAL.—The authority to indemnify  
 6       under this section shall not create any rights in  
 7       third persons that would not otherwise exist by law.

8               “(2) OTHER AUTHORITY.—Nothing in this sec-  
 9       tion may be construed as prohibiting the Adminis-  
 10      trator from indemnifying a provider or any other  
 11      NASA contractor under other law, including under  
 12      Public Law 85–804 (50 U.S.C. 1431 et seq.).

13              “(3) ANTI-DEFICIENCY ACT.—Notwithstanding  
 14      any other provision of this section—

15                   “(A) all obligations under this section are  
 16                   subject to the availability of funds; and

17                   “(B) nothing in this section may be con-  
 18                   strued to require obligation or payment of  
 19                   funds in violation of sections 1341, 1342, 1349  
 20                   through 1351, and 1511 through 1519 of title  
 21                   31, United States Code (commonly referred to  
 22                   as the ‘Anti-Deficiency Act’).

23              “(j) RELATIONSHIP TO OTHER LAWS.—The Admin-  
 24      istrator may not provide indemnification under this sec-

1 tion for an activity that requires a license or permit under  
2 chapter 509.

3 “(k) DEFINITIONS.—In this section:

4 “(1) GOVERNMENT ASTRONAUT.—The term  
5 ‘government astronaut’ has the meaning given the  
6 term in section 50902.

7 “(2) LAUNCH SERVICES.—The term ‘launch  
8 services’ has the meaning given the term in section  
9 50902.

10 “(3) PROVIDER.—The term ‘provider’ means a  
11 person that provides domestic launch services or do-  
12 mestic reentry services to the Government.

13 “(4) REENTRY SERVICES.—The term ‘reentry  
14 services’ has the meaning given the term in section  
15 50902.

16 “(5) RELATED ENTITY.—The term ‘related en-  
17 tity’ means a contractor or subcontractor.

18 “(6) THIRD PARTY.—The term ‘third party’  
19 means a person except—

20 “(A) the United States Government;

21 “(B) related entities of the Government in-  
22 volved in launch services or reentry services;

23 “(C) a provider;

24 “(D) related entities of the provider in-  
25 volved in launch services or reentry services; or

1 “(E) a government astronaut.”.

2 (b) CONFORMING AMENDMENT.—The table of con-  
3 tents for subchapter III of chapter 201 of title 51, United  
4 States Code, is amended by inserting after the item relat-  
5 ing to section 20147 the following:

“20148. Indemnification; NASA launch services and reentry services.”.

6 **TITLE IV—ADVANCING HUMAN**  
7 **DEEP SPACE EXPLORATION**  
8 **Subtitle A—Human Space Flight**  
9 **and Exploration Goals and Ob-**  
10 **jectives**

11 **SEC. 411. HUMAN SPACE FLIGHT AND EXPLORATION LONG-**  
12 **TERM GOALS.**

13 Section 202(a) of the National Aeronautics and  
14 Space Administration Authorization Act of 2010 (42  
15 U.S.C. 18312(a)) is amended to read as follows:

16 “(a) LONG-TERM GOALS.—The long-term goals of  
17 the human space flight and exploration efforts of NASA  
18 shall be—

19 “(1) to expand permanent human presence be-  
20 yond low-Earth orbit and to do so, where practical,  
21 in a manner involving international, academic, and  
22 industry partners;

23 “(2) crewed missions and progress toward  
24 achieving the goal in paragraph (1) to enable the po-  
25 tential for subsequent human exploration and the ex-

1       tension of human presence throughout the solar sys-  
2       tem; and

3           “(3) to enable a capability to extend human  
4       presence, including potential human habitation on  
5       another celestial body and a thriving space economy  
6       in the 21st Century.”.

7   **SEC. 412. KEY OBJECTIVES.**

8       Section 202(b) of the National Aeronautics and  
9       Space Administration Authorization Act of 2010 (42  
10      U.S.C. 18312(b)) is amended—

11           (1) in paragraph (3), by striking “; and” and  
12      inserting a semicolon;

13           (2) in paragraph (4), by striking the period at  
14      the end and inserting “; and”; and

15           (3) by adding at the end the following:

16           “(5) to achieve human exploration of Mars and  
17      beyond through the prioritization of those tech-  
18      nologies and capabilities best suited for such a mis-  
19      sion in accordance with the stepping stone approach  
20      to exploration under section 70504 of title 51,  
21      United States Code.”.

22   **SEC. 413. VISION FOR SPACE EXPLORATION.**

23       Section 20302 of title 51, United States Code, is  
24      amended—

1           (1) in subsection (a), by inserting “in cis-lunar  
2           space or” after “sustained human presence”;

3           (2) by amending subsection (b) to read as fol-  
4           lows:

5           “(b) FUTURE EXPLORATION OF MARS.—The Admin-  
6           istrator shall manage human space flight programs, in-  
7           cluding the Space Launch System and Orion, to enable  
8           humans to explore Mars and other destinations by defin-  
9           ing a series of sustainable steps and conducting mission  
10          planning, research, and technology development on a time-  
11          table that is technically and fiscally possible, consistent  
12          with section 70504.”; and

13          (3) by adding at the end the following:

14          “(c) DEFINITIONS.—In this section:

15               “(1) ORION.—The term ‘Orion’ means the mul-  
16               tipurpose crew vehicle described under section 303  
17               of the National Aeronautics and Space Administra-  
18               tion Authorization Act of 2010 (42 U.S.C. 18323).

19               “(2) SPACE LAUNCH SYSTEM.—The term  
20               ‘Space Launch System’ means has the meaning  
21               given the term in section 3 of the National Aero-  
22               nautics and Space Administration Authorization Act  
23               of 2010 (42 U.S.C. 18302).”.

1 **SEC. 414. STEPPING STONE APPROACH TO EXPLORATION.**

2 Section 70504 of title 51, United States Code, is  
3 amended to read as follows:

4 **“§ 70504. Stepping stone approach to exploration**

5 “(a) IN GENERAL.—The Administration—

6 “(1) may conduct missions to intermediate des-  
7 tinations in sustainable steps in accordance with sec-  
8 tion 20302(b) of this title, and on a timetable deter-  
9 mined by the availability of funding, in order to  
10 achieve the objective of human exploration of Mars  
11 specified in section 202(b)(5) of the National Aero-  
12 nautics and Space Administration Authorization Act  
13 of 2010 (42 U.S.C. 18312(b)(5)); and

14 “(2) shall incorporate any such missions into  
15 the human exploration roadmap under section 432  
16 of the National Aeronautics and Space Administra-  
17 tion Transition Authorization Act of 2017.

18 “(b) COST-EFFECTIVENESS.—In order to maximize  
19 the cost-effectiveness of the long-term space exploration  
20 and utilization activities of the United States, the Admin-  
21 istrator shall take all necessary steps, including engaging  
22 international, academic, and industry partners, to ensure  
23 that activities in the Administration’s human space explo-  
24 ration program balance how those activities might also  
25 help meet the requirements of future exploration and utili-

1 zation activities leading to human habitation on the sur-  
2 face of Mars.

3 “(c) COMPLETION.—Within budgetary consider-  
4 ations, once an exploration-related project enters its devel-  
5 opment phase, the Administrator shall seek, to the max-  
6 imum extent practicable, to complete that project without  
7 undue delays.

8 “(d) INTERNATIONAL PARTICIPATION.—In order to  
9 achieve the goal of successfully conducting a crewed mis-  
10 sion to the surface of Mars, the President may invite the  
11 United States partners in the ISS program and other na-  
12 tions, as appropriate, to participate in an international ini-  
13 tiative under the leadership of the United States.”.

14 **SEC. 415. UPDATE OF EXPLORATION PLAN AND PROGRAMS.**

15 Section 70502(2) of title 51, United States Code, is  
16 amended to read as follows:

17 “(2) implement an exploration research and  
18 technology development program to enable human  
19 and robotic operations consistent with section  
20 20302(b) of this title;”.

21 **SEC. 416. REPEALS.**

22 (a) SPACE SHUTTLE CAPABILITY ASSURANCE.—Sec-  
23 tion 203 of the National Aeronautics and Space Adminis-  
24 tration Authorization Act of 2010 (42 U.S.C. 18313) is  
25 amended—

1 (1) by striking subsection (b);

2 (2) in subsection (d), by striking “subsection  
3 (c)” and inserting “subsection (b)”; and

4 (3) by redesignating subsections (c) and (d) as  
5 subsections (b) and (c), respectively.

6 (b) SHUTTLE PRICING POLICY FOR COMMERCIAL  
7 AND FOREIGN USERS.—Chapter 703 of title 51, United  
8 States Code, and the item relating to that chapter in the  
9 table of chapters for that title, are repealed.

10 (c) SHUTTLE PRIVATIZATION.—Section 50133 of  
11 title 51, United States Code, and the item relating to that  
12 section in the table of sections for chapter 501 of that  
13 title, are repealed.

14 **SEC. 417. ASSURED ACCESS TO SPACE.**

15 Section 70501 of title 51, United States Code, is  
16 amended—

17 (1) by amending subsection (a) to read as fol-  
18 lows:

19 “(a) POLICY STATEMENT.—In order to ensure con-  
20 tinuous United States participation and leadership in the  
21 exploration and utilization of space and as an essential  
22 instrument of national security, it is the policy of the  
23 United States to maintain an uninterrupted capability for  
24 human space flight and operations—

25 “(1) in low-Earth orbit; and

“(2) beyond low-Earth orbit once the capabilities described in section 421(f) of the National Aeronautics and Space Administration Transition Authorization Act of 2017 become available.”; and

(2) in subsection (b), by striking “Committee on Science and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate describing the progress being made toward developing the Crew Exploration Vehicle and the Crew Launch Vehicle” and inserting “Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives describing the progress being made toward developing the Space Launch System and Orion”.

## **Subtitle B—Assuring Core Capabilities for Exploration**

### **SEC. 421. SPACE LAUNCH SYSTEM, ORION, AND EXPLORATION GROUND SYSTEMS.**

(a) FINDINGS.—Congress makes the following findings:

(1) NASA has made steady progress in developing and testing the Space Launch System and Orion exploration systems with the successful Explo-

1       ration Flight Test of Orion in December of 2014,  
2       the final qualification test firing of the 5-segment  
3       Space Launch System boosters in June 2016, and a  
4       full thrust, full duration test firing of the RS-25  
5       Space Launch System core stage engine in August  
6       2016.

7           (2) Through the 21st Century Launch Complex  
8       program and Exploration Ground Systems pro-  
9       grams, NASA has made significant progress in  
10      transforming exploration ground systems infrastruc-  
11      ture to meet NASA’s mission requirements for the  
12      Space Launch System and Orion and to modernize  
13      NASA’s launch complexes to the benefit of the civil,  
14      defense, and commercial space sectors.

15      (b) SPACE LAUNCH SYSTEM.—

16           (1) SENSE OF CONGRESS.—It is the sense of  
17      Congress that use of the Space Launch System and  
18      Orion, with contributions from partnerships with the  
19      private sector, academia, and the international com-  
20      munity, is the most practical approach to reaching  
21      the Moon, Mars, and beyond.

22           (2) REAFFIRMATION.—Congress reaffirms the  
23      policy and minimum capability requirements for the  
24      Space Launch System under section 302 of the Na-

1        tional Aeronautics and Space Administration Au-  
2        thorization Act of 2010 (42 U.S.C. 18322).

3        (c) SENSE OF CONGRESS ON SPACE LAUNCH SYS-  
4        TEM, ORION, AND EXPLORATION GROUND SYSTEMS.—It  
5        is the sense of Congress that—

6            (1) as the United States works to send humans  
7        on a series of missions to Mars in the 2030s, the  
8        United States national space program should con-  
9        tinue to make progress on its commitment by fully  
10       developing the Space Launch System, Orion, and re-  
11       lated Exploration Ground Systems;

12           (2) using the Space Launch System and Orion  
13       for a wide range of contemplated missions will facili-  
14       tate the national defense, science, and exploration  
15       objectives of the United States;

16           (3) the United States should have continuity of  
17       purpose for the Space Launch System and Orion in  
18       deep space exploration missions, using them begin-  
19       ning with the uncrewed mission, EM–1, planned for  
20       2018, followed by the crewed mission, EM–2, in cis-  
21       lunar space planned for 2021, and for subsequent  
22       missions beginning with EM–3 extending into cis-  
23       lunar space and eventually to Mars;

24           (4) the President’s annual budget requests for  
25       the Space Launch System and Orion development,

1 test, and operational phases should strive to accu-  
2 rately reflect the resource requirements of each of  
3 those phases;

4 (5) the fully integrated Space Launch System,  
5 including an upper stage needed to go beyond low-  
6 Earth orbit, will safely enable human space explo-  
7 ration of the Moon, Mars, and beyond; and

8 (6) the Administrator should budget for and  
9 undertake a robust ground test and uncrewed and  
10 crewed flight test and demonstration program for  
11 the Space Launch System and Orion in order to pro-  
12 mote safety and reduce programmatic risk.

13 (d) IN GENERAL.—The Administrator shall continue  
14 the development of the fully integrated Space Launch Sys-  
15 tem, including an upper stage needed to go beyond low-  
16 Earth orbit, in order to safely enable human space explo-  
17 ration of the Moon, Mars, and beyond over the course of  
18 the next century as required in section 302(c) of the Na-  
19 tional Aeronautics and Space Administration Authoriza-  
20 tion Act of 2010 (42 U.S.C. 18322(c)).

21 (e) REPORT.—

22 (1) IN GENERAL.—Not later than 60 days after  
23 the date of enactment of this Act, the Administrator  
24 shall submit to the appropriate committees of Con-  
25 gress a report addressing the ability of Orion to

1 meet the needs and the minimum capability require-  
2 ments described in section 303(b)(3) of the National  
3 Aeronautics and Space Administration Authorization  
4 Act of 2010 (42 U.S.C. 18323(b)(3)).

5 (2) CONTENTS.—The report shall detail—

6 (A) those components and systems of  
7 Orion that ensure it is in compliance with sec-  
8 tion 303(b)(3) of that Act (42 U.S.C.  
9 18323(b)(3));

10 (B) the expected date that Orion, inte-  
11 grated with a vehicle other than the Space  
12 Launch System, could be available to transport  
13 crew and cargo to the ISS;

14 (C) any impacts to the deep space explo-  
15 ration missions under subsection (f) of this sec-  
16 tion due to enabling Orion to meet the min-  
17 imum capability requirements described in sec-  
18 tion 303(b)(3) of that Act (42 U.S.C.  
19 18323(b)(3)) and conducting the mission de-  
20 scribed in subparagraph (B) of this paragraph;  
21 and

22 (D) the overall cost and schedule impacts  
23 associated with enabling Orion to meet the min-  
24 imum capability requirements described in sec-  
25 tion 303(b)(3) of that Act (42 U.S.C.

1           18323(b)(3)) and conducting the mission de-  
2           scribed in subparagraph (B) of this paragraph.

3       (f) EXPLORATION MISSIONS.—The Administrator  
4 shall continue development of—

5           (1) an uncrewed exploration mission to dem-  
6           onstrate the capability of both the Space Launch  
7           System and Orion as an integrated system by 2018;

8           (2) subject to applicable human rating proc-  
9           esses and requirements, a crewed exploration mis-  
10          sion to demonstrate the Space Launch System, in-  
11          cluding the Core Stage and Exploration Upper  
12          Stages, by 2021;

13          (3) subsequent missions beginning with EM-3  
14          at operational flight rate sufficient to maintain safe-  
15          ty and operational readiness using the Space Launch  
16          System and Orion to extend into cis-lunar space and  
17          eventually to Mars; and

18          (4) a deep space habitat as a key element in a  
19          deep space exploration architecture along with the  
20          Space Launch System and Orion.

21       (g) OTHER USES.—The Administrator shall assess  
22 the utility of the Space Launch System for use by the  
23 science community and for other Federal Government  
24 launch needs, including consideration of overall cost and  
25 schedule savings from reduced transit times and increased

1 science returns enabled by the unique capabilities of the  
2 Space Launch System.

3 (h) UTILIZATION REPORT.—

4 (1) IN GENERAL.—The Administrator, in con-  
5 sultation with the Secretary of Defense and the Di-  
6 rector of National Intelligence, shall prepare a re-  
7 port that addresses the effort and budget required to  
8 enable and utilize a cargo variant of the 130-ton  
9 Space Launch System configuration described in  
10 section 302(c) of the National Aeronautics and  
11 Space Administration Authorization Act of 2010 (42  
12 U.S.C. 18322(c)).

13 (2) CONTENTS.—In preparing the report, the  
14 Administrator shall—

15 (A) consider the technical requirements of  
16 the scientific and national security communities  
17 related to a cargo variant of the Space Launch  
18 System; and

19 (B) directly assess the utility and esti-  
20 mated cost savings obtained by using a cargo  
21 variant of the Space Launch System for na-  
22 tional security and space science missions.

23 (3) SUBMISSION TO CONGRESS.—Not later than  
24 180 days after the date of enactment of this Act, the

1 Administrator shall submit the report to the appro-  
2 priate committees of Congress.

### 3 **Subtitle C—Journey to Mars**

#### 4 **SEC. 431. FINDINGS ON HUMAN SPACE EXPLORATION.**

5 Congress makes the following findings:

6 (1) In accordance with section 204 of the Na-  
7 tional Aeronautics and Space Administration Au-  
8 thorization Act of 2010 (124 Stat. 2813), the Na-  
9 tional Academies of Sciences, Engineering, and Med-  
10 icine, through its Committee on Human Spaceflight,  
11 conducted a review of the goals, core capabilities,  
12 and direction of human space flight, and published  
13 the findings and recommendations in a 2014 report  
14 entitled, “Pathways to Exploration: Rationales and  
15 Approaches for a U.S. Program of Human Space  
16 Exploration”.

17 (2) The Committee on Human Spaceflight in-  
18 cluded leaders from the aerospace, scientific, secu-  
19 rity, and policy communities.

20 (3) With input from the public, the Committee  
21 on Human Spaceflight concluded that many prac-  
22 tical and aspirational rationales for human space  
23 flight together constitute a compelling case for con-  
24 tinued national investment and pursuit of human  
25 space exploration toward the horizon goal of Mars.

1           (4) According to the Committee on Human  
2       Spaceflight, the rationales include economic benefits,  
3       national security, national prestige, inspiring stu-  
4       dents and other citizens, scientific discovery, human  
5       survival, and a sense of shared destiny.

6           (5) The Committee on Human Spaceflight af-  
7       firmed that Mars is the appropriate long-term goal  
8       for the human space flight program.

9           (6) The Committee on Human Spaceflight rec-  
10      ommended that NASA define a series of sustainable  
11      steps and conduct mission planning and technology  
12      development as needed to achieve the long-term goal  
13      of placing humans on the surface of Mars.

14          (7) Expanding human presence beyond low-  
15      Earth orbit and advancing toward human missions  
16      to Mars requires early planning and timely decisions  
17      to be made in the near-term on the necessary  
18      courses of action for commitments to achieve short-  
19      term and long-term goals and objectives.

20          (8) In addition to the 2014 report described in  
21      paragraph (1), there are several independently devel-  
22      oped reports or concepts that describe potential  
23      Mars architectures or concepts and identify Mars as  
24      the long-term goal for human space exploration, in-  
25      cluding NASA’s “The Global Exploration Roadmap”

1 of 2013, “NASA’s Journey to Mars—Pioneering  
2 Next Steps in Space Exploration” of 2015, NASA  
3 Jet Propulsion Laboratory’s “Minimal Architecture  
4 for Human Journeys to Mars” of 2015, and Explore  
5 Mars’ “The Humans to Mars Report 2016”.

6 **SEC. 432. HUMAN EXPLORATION ROADMAP.**

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

9 (1) expanding human presence beyond low-  
10 Earth orbit and advancing toward human missions  
11 to Mars in the 2030s requires early strategic plan-  
12 ning and timely decisions to be made in the near-  
13 term on the necessary courses of action for commit-  
14 ments to achieve short-term and long-term goals and  
15 objectives;

16 (2) for strong and sustained United States  
17 leadership, a need exists to advance a human explo-  
18 ration roadmap, addressing exploration objectives in  
19 collaboration with international, academic, and in-  
20 dustry partners;

21 (3) an approach that incrementally advances to-  
22 ward a long-term goal is one in which nearer-term  
23 developments and implementation would influence  
24 future development and implementation; and

(4) a human exploration roadmap should begin with low-Earth orbit, then address in greater detail progress beyond low-Earth orbit to cis-lunar space, and then address future missions aimed at human arrival and activities near and then on the surface of Mars.

(b) HUMAN EXPLORATION ROADMAP.—

(1) IN GENERAL.—The Administrator shall develop a human exploration roadmap, including a critical decision plan, to expand human presence beyond low-Earth orbit to the surface of Mars and beyond, considering potential interim destinations such as cis-lunar space and the moons of Mars.

(2) SCOPE.—The human exploration roadmap shall include—

(A) an integrated set of exploration, science, and other goals and objectives of a United States human space exploration program to achieve the long-term goal of human missions near or on the surface of Mars in the 2030s;

(B) opportunities for international, academic, and industry partnerships for exploration-related systems, services, research, and technology if those opportunities provide cost-

1 savings, accelerate program schedules, or other-  
2 wise benefit the goals and objectives developed  
3 under subparagraph (A);

4 (C) sets and sequences of precursor mis-  
5 sions in cis-lunar space and other missions or  
6 activities necessary—

7 (i) to demonstrate the proficiency of  
8 the capabilities and technologies identified  
9 under subparagraph (D); and

10 (ii) to meet the goals and objectives  
11 developed under subparagraph (A), includ-  
12 ing anticipated timelines and missions for  
13 the Space Launch System and Orion;

14 (D) an identification of the specific capa-  
15 bilities and technologies, including the Space  
16 Launch System, Orion, a deep space habitat,  
17 and other capabilities, that facilitate the goals  
18 and objectives developed under subparagraph  
19 (A);

20 (E) a description of how cis-lunar ele-  
21 ments, objectives, and activities advance the  
22 human exploration of Mars;

23 (F) an assessment of potential human  
24 health and other risks, including radiation expo-  
25 sure;

1 (G) mitigation plans, whenever possible, to  
2 address the risks identified in subparagraph  
3 (F);

4 (H) a description of those technologies al-  
5 ready under development across the Federal  
6 Government or by other entities that facilitate  
7 the goals and objectives developed under sub-  
8 paragraph (A);

9 (I) a specific process for the evolution of  
10 the capabilities of the fully integrated Orion  
11 with the Space Launch System and a descrip-  
12 tion of how these systems facilitate the goals  
13 and objectives developed under subparagraph  
14 (A) and demonstrate the capabilities and tech-  
15 nologies described in subparagraph (D);

16 (J) a description of the capabilities and  
17 technologies that need to be demonstrated or  
18 research data that could be gained through the  
19 utilization of the ISS and the status of the de-  
20 velopment of such capabilities and technologies;

21 (K) a framework for international coopera-  
22 tion in the development of all capabilities and  
23 technologies identified under this section, in-  
24 cluding an assessment of the risks posed by re-  
25 lying on international partners for capabilities

1 and technologies on the critical path of develop-  
2 ment;

3 (L) a process for partnering with non-  
4 governmental entities using Space Act Agree-  
5 ments or other acquisition instruments for fu-  
6 ture human space exploration; and

7 (M) include information on the phasing of  
8 planned intermediate destinations, Mars mis-  
9 sion risk areas and potential risk mitigation ap-  
10 proaches, technology requirements and phasing  
11 of required technology development activities,  
12 the management strategy to be followed, related  
13 ISS activities, planned international collabo-  
14 rative activities, potential commercial contribu-  
15 tions, and other activities relevant to the  
16 achievement of the goal established in this sec-  
17 tion.

18 (3) CONSIDERATIONS.—In developing the  
19 human exploration roadmap, the Administrator shall  
20 consider—

21 (A) using key exploration capabilities,  
22 namely the Space Launch System and Orion;

23 (B) using existing commercially available  
24 technologies and capabilities or those tech-

1 nologies and capabilities being developed by in-  
2 dustry for commercial purposes;

3 (C) establishing an organizational ap-  
4 proach to ensure collaboration and coordination  
5 among NASA's Mission Directorates under sec-  
6 tion 821, when appropriate, including to collect  
7 and return to Earth a sample from the Martian  
8 surface;

9 (D) building upon the initial uncrewed  
10 mission, EM-1, and first crewed mission, EM-  
11 2, of the Space Launch System and Orion to  
12 establish a sustainable cadence of missions ex-  
13 tending human exploration missions into cis-  
14 lunar space, including anticipated timelines and  
15 milestones;

16 (E) developing the robotic and precursor  
17 missions and activities that will demonstrate,  
18 test, and develop key technologies and capabili-  
19 ties essential for achieving human missions to  
20 Mars, including long-duration human oper-  
21 ations beyond low-Earth orbit, space suits, solar  
22 electric propulsion, deep space habitats, envi-  
23 ronmental control life support systems, Mars  
24 lander and ascent vehicle, entry, descent, land-

ing, ascent, Mars surface systems, and in-situ resource utilization;

(F) demonstrating and testing 1 or more habitat modules in cis-lunar space to prepare for Mars missions;

(G) using public-private, firm fixed-price partnerships, where practicable;

(H) collaborating with international, academic, and industry partners, when appropriate;

(I) any risks to human health and sensitive onboard technologies, including radiation exposure;

(J) any risks identified through research outcomes under the NASA Human Research Program's Behavioral Health Element; and

(K) the recommendations and ideas of several independently developed reports or concepts that describe potential Mars architectures or concepts and identify Mars as the long-term goal for human space exploration, including the reports described under section 431.

(4) CRITICAL DECISION PLAN ON HUMAN SPACE EXPLORATION.—As part of the human exploration

roadmap, the Administrator shall include a critical decision plan—

(A) identifying and defining key decisions guiding human space exploration priorities and plans that need to be made before June 30, 2020, including decisions that may guide human space exploration capability development, precursor missions, long-term missions, and activities;

(B) defining decisions needed to maximize efficiencies and resources for reaching the near, intermediate, and long-term goals and objectives of human space exploration; and

(C) identifying and defining timelines and milestones for a sustainable cadence of missions beginning with EM-3 for the Space Launch System and Orion to extend human exploration from cis-lunar space to the surface of Mars.

(5) REPORTS.—

(A) INITIAL HUMAN EXPLORATION ROADMAP.—The Administrator shall submit to the appropriate committees of Congress—

(i) an initial human exploration roadmap, including a critical decision plan, before December 1, 2017; and

1                   (ii) an updated human exploration  
2                   roadmap periodically as the Administrator  
3                   considers necessary but not less than bien-  
4                   nially.

5                   (B) CONTENTS.—Each human exploration  
6                   roadmap under this paragraph shall include a  
7                   description of—

8                   (i) the achievements and goals accom-  
9                   plished in the process of developing such  
10                  capabilities and technologies during the 2-  
11                  year period prior to the submission of the  
12                  human exploration roadmap; and

13                  (ii) the expected goals and achieve-  
14                  ments in the following 2- year period.

15                  (C) SUBMISSION WITH BUDGET.—Each  
16                  human exploration roadmap under this section  
17                  shall be included in the budget for that fiscal  
18                  year transmitted to Congress under section  
19                  1105(a) of title 31, United States Code.

20 **SEC. 433. ADVANCED SPACE SUIT CAPABILITY.**

21                  Not later than 90 days after the date of enactment  
22                  of this Act, the Administrator shall submit to the appro-  
23                  priate committees of Congress a detailed plan for achiev-  
24                  ing an advanced space suit capability that aligns with the  
25                  crew needs for exploration enabled by the Space Launch

1 System and Orion, including an evaluation of the merit  
2 of delivering the planned suit system for use on the ISS.

3 **SEC. 434. ASTEROID ROBOTIC REDIRECT MISSION.**

4 (a) FINDINGS.—Congress makes the following find-  
5 ings:

6 (1) NASA initially estimated that the Asteroid  
7 Robotic Redirect Mission would launch in December  
8 2020 and cost no more than \$1,250,000,000, ex-  
9 cluding launch and operations.

10 (2) On July 15, 2016, NASA conducted its Key  
11 Decision Point–B review of the Asteroid Robotic Re-  
12 direct Mission or approval for Phase B in mission  
13 formulation.

14 (3) During the Key Decision Point–B review,  
15 NASA estimated that costs have grown to  
16 \$1,400,000,000 excluding launch and operations for  
17 a launch in December 2021 and the agency must  
18 evaluate whether to accept the increase or reduce the  
19 Asteroid Robotic Redirect Mission’s scope to stay  
20 within the cost cap set by the Administrator.

21 (4) In April 2015, the NASA Advisory Coun-  
22 cil—

23 (A) issued a finding that—

24 (i) high-performance solar electric  
25 propulsion will likely be an important part

1 of an architecture to send humans to  
2 Mars; and

3 (ii) maneuvering a large test mass is  
4 not necessary to provide a valid in-space  
5 test of a new solar electric propulsion  
6 stage;

7 (B) determined that a solar electric propul-  
8 sion mission will contribute more directly to the  
9 goal of sending humans to Mars if the mission  
10 is focused entirely on development and valida-  
11 tion of the solar electric propulsion stage; and

12 (C) determined that other possible motiva-  
13 tions for acquiring and maneuvering a boulder,  
14 such as asteroid science and planetary defense,  
15 do not have value commensurate with their  
16 probable cost.

17 (5) The Asteroid Robotic Redirect Mission is  
18 competing for resources with other critical explo-  
19 ration development programs, including the Space  
20 Launch System, Orion, commercial crew, and a hab-  
21 itation module.

22 (6) In 2014, the NASA Advisory Council rec-  
23 ommended that NASA conduct an independent cost  
24 and technical assessment of the Asteroid Robotic  
25 Redirect Mission.

1           (7) In 2015, the NASA Advisory Council rec-  
2           ommended that NASA preserve the following key ob-  
3           jectives if the program needed to be descoped:

4                   (A) Development of high power solar elec-  
5           tric propulsion.

6                   (B) Ability to maneuver in a low gravity  
7           environment in deep space.

8           (8) In January 2015 and July 2015, the NASA  
9           Advisory Council expressed its concern to NASA  
10          about the potential for growing costs for the pro-  
11          gram and highlighted that choices would need to be  
12          made about the program's content.

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

15                   (1) the technological and scientific goals of the  
16          Asteroid Robotic Redirect Mission have not been  
17          demonstrated to Congress to be commensurate with  
18          the cost; and

19                   (2) alternative missions may provide a more  
20          cost effective and scientifically beneficial means to  
21          demonstrate the technologies needed for a human  
22          mission to Mars that would otherwise be dem-  
23          onstrated by the Asteroid Robotic Redirect Mission.

1       (c) EVALUATION AND REPORT.—Not later than 180  
2 days after the date of enactment of this Act, the Adminis-  
3 trator shall—

4           (1) conduct an evaluation of—

5               (A) alternative approaches to the Asteroid  
6 Robotic Redirect Mission for demonstrating the  
7 technologies and capabilities needed for a  
8 human mission to Mars that would otherwise be  
9 demonstrated by the Asteroid Robotic Redirect  
10 Mission;

11            (B) the scientific and technical benefits of  
12 the alternative approaches under subparagraph  
13 (A) to future human space exploration com-  
14 pared to scientific and technical benefits of the  
15 Asteroid Redirect Robotic Mission;

16            (C) the commercial benefits of the alter-  
17 native approaches identified in subparagraph  
18 (A), including the impact on the development of  
19 domestic solar electric propulsion technology to  
20 bolster United States competitiveness in the  
21 global marketplace; and

22            (D) a comparison of the estimated costs of  
23 the alternative approaches identified in sub-  
24 paragraph (A); and

1           (2) submit to the appropriate committees of  
2 Congress a report on the evaluation under para-  
3 graph (1), including any recommendations.

4 **SEC. 435. MARS 2033 REPORT.**

5           (a) IN GENERAL.—Not later than 120 days after the  
6 date of enactment of this Act, the Administrator shall con-  
7 tract with an independent, non-governmental systems en-  
8 gineering and technical assistance organization to study  
9 a Mars human space flight mission to be launched in  
10 2033.

11          (b) CONTENTS.—The study shall include—

12           (1) a technical development, test, fielding, and  
13 operations plan using the Space Launch System,  
14 Orion, and other systems to successfully launch such  
15 a Mars human space flight mission by 2033;

16           (2) an annual budget profile, including cost es-  
17 timates, for the technical development, test, fielding,  
18 and operations plan to carry out a Mars human  
19 space flight mission by 2033; and

20           (3) a comparison of the annual budget profile  
21 to the 5-year budget profile contained in the Presi-  
22 dent's budget request for fiscal year 2017 under sec-  
23 tion 1105 of title 31, United States Code.

24           (c) REPORT.—Not later than 180 days after the date  
25 of enactment of this Act, the Administrator shall submit

1 to the appropriate committees of Congress a report on the  
 2 study, including findings and recommendations regarding  
 3 the Mars 2033 human space flight mission described in  
 4 subsection (a).

5 (d) ASSESSMENT.—Not later than 60 days after the  
 6 date the report is submitted under subsection (c), the Ad-  
 7 ministrator shall submit to the appropriate committees of  
 8 Congress an assessment by the NASA Advisory Council  
 9 of whether the proposal for a Mars human space flight  
 10 mission to be launched in 2033 is in the strategic interests  
 11 of the United States in space exploration.

## 12 **Subtitle D—TREAT Astronauts Act**

### 13 **SEC. 441. SHORT TITLE.**

14 This subtitle may be cited as the “To Research,  
 15 Evaluate, Assess, and Treat Astronauts Act” or the  
 16 “TREAT Astronauts Act”.

### 17 **SEC. 442. FINDINGS; SENSE OF CONGRESS.**

18 (a) FINDINGS.—Congress makes the following find-  
 19 ings:

20 (1) Human space exploration can pose signifi-  
 21 cant challenges and is full of substantial risk, which  
 22 has ultimately claimed the lives of 24 NASA astro-  
 23 nauts serving in the line of duty.

24 (2) As United States government astronauts  
 25 participate in long-duration and exploration space

1 flight missions they may experience increased health  
2 risks, such as vision impairment, bone  
3 demineralization, and behavioral health and perform-  
4 ance risks, and may be exposed to galactic cosmic  
5 radiation. Exposure to high levels of radiation and  
6 microgravity can result in acute and long-term  
7 health consequences that can increase the risk of  
8 cancer and tissue degeneration and have potential  
9 effects on the musculoskeletal system, central nerv-  
10 ous system, cardiovascular system, immune function,  
11 and vision.

12 (3) To advance the goal of long-duration and  
13 exploration space flight missions, United States gov-  
14 ernment astronaut Scott Kelly participated in a 1-  
15 year twins study in space while his identical twin  
16 brother, former United States government astronaut  
17 Mark Kelly, acted as a human control specimen on  
18 Earth, providing an understanding of the physical,  
19 behavioral, microbiological, and molecular reaction of  
20 the human body to an extended period of time in  
21 space.

22 (4) Since the Administration currently provides  
23 medical monitoring, diagnosis, and treatment for  
24 United States government astronauts during their  
25 active employment, given the unknown long-term

1 health consequences of long-duration space explo-  
2 ration, the Administration has requested statutory  
3 authority from Congress to provide medical moni-  
4 toring, diagnosis, and treatment to former United  
5 States government astronauts for psychological and  
6 medical conditions associated with human space  
7 flight.

8 (b) SENSE OF CONGRESS.—It is the sense of Con-  
9 gress that—

10 (1) the United States should continue to seek  
11 the unknown and lead the world in space exploration  
12 and scientific discovery as the Administration pre-  
13 pares for long-duration and exploration space flight  
14 in deep space and an eventual mission to Mars;

15 (2) data relating to the health of astronauts will  
16 become increasingly valuable to improving our un-  
17 derstanding of many diseases humans face on Earth;

18 (3) the Administration should provide the type  
19 of monitoring, diagnosis, and treatment described in  
20 subsection (a) only for conditions the Administration  
21 considers unique to the training or exposure to the  
22 space flight environment of United States govern-  
23 ment astronauts and should not require any former  
24 United States Government astronauts to participate  
25 in the Administration's monitoring;

1           (4) such monitoring, diagnosis, and treatment  
 2           should not replace a former United States govern-  
 3           ment astronaut's private health insurance;

4           (5) expanded data acquired from such moni-  
 5           toring, diagnosis, and treatment should be used to  
 6           tailor treatment, inform the requirements for new  
 7           space flight medical hardware, and develop controls  
 8           in order to prevent disease occurrence in the astro-  
 9           naut corps; and

10          (6) the 340-day space mission of Scott Kelly  
 11          aboard the ISS—

12                 (A) was pivotal for the goal of the United  
 13                 States for humans to explore deep space and  
 14                 Mars as the mission generated new insight into  
 15                 how the human body adjusts to weightlessness,  
 16                 isolation, radiation, and the stress of long-dura-  
 17                 tion space flight; and

18                 (B) will help support the physical and  
 19                 mental well-being of astronauts during longer  
 20                 space exploration missions in the future.

21 **SEC. 443. MEDICAL MONITORING AND RESEARCH RELAT-**  
 22 **ING TO HUMAN SPACE FLIGHT.**

23           (a) IN GENERAL.—Subchapter III of chapter 201 of  
 24           title 51, United States Code, as amended by section 305

1 of this Act, is further amended by adding at the end the  
2 following:

3 **“§ 20149. Medical monitoring and research relating to**  
4 **human space flight**

5 “(a) IN GENERAL.—Notwithstanding any other pro-  
6 vision of law, the Administrator may provide for—

7 “(1) the medical monitoring and diagnosis of a  
8 former United States government astronaut or a  
9 former payload specialist for conditions that the Ad-  
10 ministrator considers potentially associated with  
11 human space flight; and

12 “(2) the treatment of a former United States  
13 government astronaut or a former payload specialist  
14 for conditions that the Administrator considers asso-  
15 ciated with human space flight, including scientific  
16 and medical tests for psychological and medical con-  
17 ditions.

18 “(b) REQUIREMENTS.—

19 “(1) NO COST SHARING.—The medical moni-  
20 toring, diagnosis, or treatment described in sub-  
21 section (a) shall be provided without any deductible,  
22 copayment, or other cost sharing obligation.

23 “(2) ACCESS TO LOCAL SERVICES.—The med-  
24 ical monitoring, diagnosis, and treatment described  
25 in subsection (a) may be provided by a local health

1 care provider if it is inadvisable due to the health  
2 of the applicable former United States government  
3 astronaut or former payload specialist for that  
4 former United States government astronaut or  
5 former payload specialist to travel to the Lyndon B.  
6 Johnson Space Center, as determined by the Admin-  
7 istrator.

8 “(3) SECONDARY PAYMENT.—Payment or reim-  
9 bursement for the medical monitoring, diagnosis, or  
10 treatment described in subsection (a) shall be sec-  
11 ondary to any obligation of the United States Gov-  
12 ernment or any third party under any other provi-  
13 sion of law or contractual agreement to pay for or  
14 provide such medical monitoring, diagnosis, or treat-  
15 ment. Any costs for items and services that may be  
16 provided by the Administrator for medical moni-  
17 toring, diagnosis, or treatment under subsection (a)  
18 that are not paid for or provided under such other  
19 provision of law or contractual agreement, due to the  
20 application of deductibles, copayments, coinsurance,  
21 other cost sharing, or otherwise, are reimbursable by  
22 the Administrator on behalf of the former United  
23 States government astronaut or former payload spe-  
24 cialist involved to the extent such items or services  
25 are authorized to be provided by the Administrator

1 for such medical monitoring, diagnosis, or treatment  
2 under subsection (a).

3 “(4) **CONDITIONAL PAYMENT.**—The Adminis-  
4 trator may provide for conditional payments for or  
5 provide medical monitoring, diagnosis, or treatment  
6 described in subsection (a) that is obligated to be  
7 paid for or provided by the United States or any  
8 third party under any other provision of law or con-  
9 tractual agreement to pay for or provide such med-  
10 ical monitoring, diagnosis, or treatment if—

11 “(A) payment for (or the provision of)  
12 such medical monitoring, diagnosis, or treat-  
13 ment services has not been made (or provided)  
14 or cannot reasonably be expected to be made  
15 (or provided) promptly by the United States or  
16 such third party, respectively; and

17 “(B) such payment (or such provision of  
18 services) by the Administrator is conditioned on  
19 reimbursement by the United States or such  
20 third party, respectively, for such medical moni-  
21 toring, diagnosis, or treatment.

22 “(c) **EXCLUSIONS.**—The Administrator may not—

23 “(1) provide for medical monitoring or diag-  
24 nosis of a former United States government astro-  
25 naut or former payload specialist under subsection

1 (a) for any psychological or medical condition that  
2 is not potentially associated with human space flight;

3 “(2) provide for treatment of a former United  
4 States government astronaut or former payload spe-  
5 cialist under subsection (a) for any psychological or  
6 medical condition that is not associated with human  
7 space flight; or

8 “(3) require a former United States govern-  
9 ment astronaut or former payload specialist to par-  
10 ticipate in the medical monitoring, diagnosis, or  
11 treatment authorized under subsection (a).

12 “(d) PRIVACY.—Consistent with applicable provisions  
13 of Federal law relating to privacy, the Administrator shall  
14 protect the privacy of all medical records generated under  
15 subsection (a) and accessible to the Administration.

16 “(e) REGULATIONS.—The Administrator shall pro-  
17 mulgate such regulations as are necessary to carry out this  
18 section.

19 “(f) DEFINITION OF UNITED STATES GOVERNMENT  
20 ASTRONAUT.—In this section, the term ‘United States  
21 government astronaut’ has the meaning given the term  
22 ‘government astronaut’ in section 50902, except it does  
23 not include an individual who is an international partner  
24 astronaut.

1       “(g) DATA USE AND DISCLOSURE.—The Adminis-  
 2 trator may use or disclose data acquired in the course of  
 3 medical monitoring, diagnosis, or treatment of a former  
 4 United States government astronaut or a former payload  
 5 specialist under subsection (a), in accordance with sub-  
 6 section (d). Former United States government astronaut  
 7 or former payload specialist participation in medical moni-  
 8 toring, diagnosis, or treatment under subsection (a) shall  
 9 constitute consent for the Administrator to use or disclose  
 10 such data.”.

11       (b) TABLE OF CONTENTS.—The table of contents for  
 12 chapter 201 of title 51, United States Code, as amended  
 13 by section 305 of this Act, is further amended by inserting  
 14 after the item relating to section 20148 the following:

“20149. Medical monitoring and research relating to human space flight.”.

15       (c) ANNUAL REPORTS.—

16           (1) IN GENERAL.—Each fiscal year, not later  
 17 than the date of submission of the President’s an-  
 18 nual budget request for that fiscal year under sec-  
 19 tion 1105 of title 31, United States Code, the Ad-  
 20 ministrator shall publish a report, in accordance  
 21 with applicable Federal privacy laws, on the activi-  
 22 ties of the Administration under section 20149 of  
 23 title 51, United States Code.

24           (2) CONTENTS.—Each report under paragraph

25       (1) shall include a detailed cost accounting of the

1 Administration's activities under section 20149 of  
2 title 51, United States Code, and a 5-year budget  
3 estimate.

4 (3) SUBMISSION TO CONGRESS.—The Adminis-  
5 trator shall submit to the appropriate committees of  
6 Congress each report under paragraph (1) not later  
7 than the date of submission of the President's an-  
8 nual budget request for that fiscal year under sec-  
9 tion 1105 of title 31, United States Code.

10 (d) COST ESTIMATE.—

11 (1) REQUIREMENT.—Not later than 90 days  
12 after the date of enactment of this Act, the Adminis-  
13 trator shall enter into an arrangement with an inde-  
14 pendent external organization to undertake an inde-  
15 pendent cost estimate of the cost to the Administra-  
16 tion and the Federal Government to implement and  
17 administer the activities of the Administration under  
18 section 20149 of title 51, United States Code. The  
19 independent external organization may not be a  
20 NASA entity, such as the Office of Safety and Mis-  
21 sion Assurance.

22 (2) SUBMITTAL TO CONGRESS.—Not later than  
23 1 year after the date of the enactment of this Act,  
24 the Administrator shall submit to the appropriate

1 committees of Congress the independent cost esti-  
 2 mate under paragraph (1).

3 (e) PRIVACY STUDY.—

4 (1) STUDY.—The Administrator shall carry out  
 5 a study on any potential privacy or legal issues re-  
 6 lated to the possible sharing beyond the Federal  
 7 Government of data acquired under the activities of  
 8 the Administration under section 20149 of title 51,  
 9 United States Code.

10 (2) REPORT.—Not later than 270 days after  
 11 the date of enactment of this Act, the Administrator  
 12 shall submit to the appropriate committees of Con-  
 13 gress a report containing the results of the study  
 14 carried out under paragraph (1).

15 (f) INSPECTOR GENERAL AUDIT.—The Inspector  
 16 General of NASA shall periodically audit or review, as the  
 17 Inspector General considers necessary to prevent waste,  
 18 fraud, and abuse, the activities of the Administration  
 19 under section 20149 of title 51, United States Code.

## 20 **TITLE V—ADVANCING SPACE** 21 **SCIENCE**

### 22 **SEC. 501. MAINTAINING A BALANCED SPACE SCIENCE** 23 **PORTFOLIO.**

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

(1) a balanced and adequately funded set of activities, consisting of research and analysis grant programs, technology development, suborbital research activities, and small, medium, and large space missions, contributes to a robust and productive science program and serves as a catalyst for innovation and discovery; and

(2) the Administrator should set science priorities by following the guidance provided by the scientific community through the National Academies of Sciences, Engineering, and Medicine's decadal surveys.

(b) **POLICY.**—It is the policy of the United States to ensure, to the extent practicable, a steady cadence of large, medium, and small science missions.

**SEC. 502. PLANETARY SCIENCE.**

(a) **FINDINGS.**—Congress finds that—

(1) Administration support for planetary science is critical to enabling greater understanding of the solar system and the origin of the Earth;

(2) the United States leads the world in planetary science and can augment its success in that area with appropriate international, academic, and industry partnerships;

(3) a mix of small, medium, and large planetary science missions is required to sustain a steady cadence of planetary exploration; and

(4) robotic planetary exploration is a key component of preparing for future human exploration.

(b) MISSION PRIORITIES.—

(1) IN GENERAL.—In accordance with the priorities established in the most recent Planetary Science Decadal Survey, the Administrator shall ensure, to the greatest extent practicable, the completion of a balanced set of Discovery, New Frontiers, and Flagship missions at the cadence recommended by the most recent Planetary Science Decadal Survey.

(2) MISSION PRIORITY ADJUSTMENTS.—Consistent with the set of missions described in paragraph (1), and while maintaining the continuity of scientific data and steady development of capabilities and technologies, the Administrator may seek, if necessary, adjustments to mission priorities, schedule, and scope in light of changing budget projections.

**SEC. 503. JAMES WEBB SPACE TELESCOPE.**

It is the sense of Congress that—

(1) the James Webb Space Telescope will—

1           (A) significantly advance our under-  
2           standing of star and planet formation, and im-  
3           prove our knowledge of the early universe; and

4           (B) support United States leadership in  
5           astrophysics;

6           (2) consistent with annual Government Ac-  
7           countability Office reviews of the James Webb Space  
8           Telescope program, the Administrator should con-  
9           tinue robust surveillance of the performance of the  
10          James Webb Space Telescope project and continue  
11          to improve the reliability of cost estimates and con-  
12          tractor performance data and other major space  
13          flight projects in order to enhance NASA's ability to  
14          successfully deliver the James Webb Space Telescope  
15          on-time and within budget;

16          (3) the on-time and on-budget delivery of the  
17          James Webb Space Telescope is a high congressional  
18          priority; and

19          (4) the Administrator should ensure that inte-  
20          grated testing is appropriately timed and sufficiently  
21          comprehensive to enable potential issues to be identi-  
22          fied and addressed early enough to be handled with-  
23          in the James Webb Space Telescope's development  
24          schedule and prior to its launch.

1 **SEC. 504. WIDE-FIELD INFRARED SURVEY TELESCOPE.**

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

4 (1) the Wide-Field Infrared Survey Telescope  
5 (referred to in this section as “WFIRST”) mission  
6 has the potential to enable scientific discoveries that  
7 will transform our understanding of the universe;  
8 and

9 (2) the Administrator, to the extent practicable,  
10 should make progress on the technologies and capa-  
11 bilities needed to position the Administration to  
12 meet the objectives, as outlined in the 2010 National  
13 Academies’ Astronomy and Astrophysics Decadal  
14 Survey, in a way that maximizes the scientific pro-  
15 ductivity of meeting those objectives for the re-  
16 sources invested.

17 (b) CONTINUITY OF DEVELOPMENT.—The Adminis-  
18 trator shall ensure that the concept definition and pre-  
19 formulation activities of the WFIRST mission continue  
20 while the James Webb Space Telescope is being com-  
21 pleted.

22 **SEC. 505. MARS 2020 ROVER.**

23 It is the sense of Congress that—

24 (1) the Mars 2020 mission, to develop a Mars  
25 rover and to enable the return of samples to Earth,  
26 should remain a priority for NASA; and

1 (2) the Mars 2020 mission—

2 (A) should significantly increase our un-  
3 derstanding of Mars;

4 (B) should help determine whether life pre-  
5 viously existed on that planet; and

6 (C) should provide opportunities to gather  
7 knowledge and demonstrate technologies that  
8 address the challenges of future human expedi-  
9 tions to Mars.

10 **SEC. 506. EUROPA.**

11 (a) FINDINGS.—Congress makes the following find-  
12 ings:

13 (1) Studies of Europa, Jupiter’s moon, indicate  
14 that Europa may provide a habitable environment,  
15 as it contains key ingredients known to support life.

16 (2) In 2012, using the Hubble Space Telescope,  
17 NASA scientists observed water vapor around the  
18 south polar region of Europa, which provides poten-  
19 tial evidence of water plumes in that region.

20 (3) For decades, the Europa mission has con-  
21 sistently ranked as a high priority mission for the  
22 scientific community.

23 (4) The Europa mission was ranked as the top  
24 priority mission in the previous Planetary Science  
25 Decadal Survey and ranked as the second-highest

1 priority in the current Planetary Science Decadal  
2 Survey.

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

5 (1) the Europa mission could provide another  
6 avenue in which to capitalize on our Nation’s cur-  
7 rent investment in the Space Launch System that  
8 would significantly reduce the transit time for such  
9 a deep space mission; and

10 (2) a scientific, robotic exploration mission to  
11 Europa, as prioritized in both Planetary Science  
12 Decadal Surveys, should be supported.

13 **SEC. 507. CONGRESSIONAL DECLARATION OF POLICY AND**  
14 **PURPOSE.**

15 Section 20102(d) of title 51, United States Code, is  
16 amended by adding at the end the following:

17 “(10) The search for life’s origin, evolution, dis-  
18 tribution, and future in the universe.”.

19 **SEC. 508. EXTRASOLAR PLANET EXPLORATION STRATEGY.**

20 (a) STRATEGY.—

21 (1) IN GENERAL.—The Administrator shall  
22 enter into an arrangement with the National Acad-  
23 emies to develop a science strategy for the study and  
24 exploration of extrasolar planets, including the use  
25 of the Transiting Exoplanet Survey Satellite, the

1 James Webb Space Telescope, a potential Wide-  
2 Field Infrared Survey Telescope mission, or any  
3 other telescope, spacecraft, or instrument, as appro-  
4 priate.

5 (2) REQUIREMENTS.—The strategy shall—

6 (A) outline key scientific questions;

7 (B) identify the most promising research  
8 in the field;

9 (C) indicate the extent to which the mis-  
10 sion priorities in existing decadal surveys ad-  
11 dress the key extrasolar planet research and ex-  
12 ploration goals;

13 (D) identify opportunities for coordination  
14 with international partners, commercial part-  
15 ners, and not-for-profit partners; and

16 (E) make recommendations regarding the  
17 activities under subparagraphs (A) through  
18 (D), as appropriate.

19 (b) USE OF STRATEGY.—The Administrator shall use  
20 the strategy—

21 (1) to inform roadmaps, strategic plans, and  
22 other activities of the Administration as they relate  
23 to extrasolar planet research and exploration; and

1           (2) to provide a foundation for future activities  
2           and initiatives related to extrasolar planet research  
3           and exploration.

4           (c) REPORT TO CONGRESS.—Not later than 18  
5           months after the date of enactment of this Act, the Na-  
6           tional Academies shall submit to the Administrator and  
7           to the appropriate committees of Congress a report con-  
8           taining the strategy developed under subsection (a).

9   **SEC. 509. ASTROBIOLOGY STRATEGY.**

10          (a) STRATEGY.—

11               (1) IN GENERAL.—The Administrator shall  
12               enter into an arrangement with the National Acad-  
13               emies to develop a science strategy for astrobiology  
14               that would outline key scientific questions, identify  
15               the most promising research in the field, and indi-  
16               cate the extent to which the mission priorities in ex-  
17               isting decadal surveys address the search for life's  
18               origin, evolution, distribution, and future in the Uni-  
19               verse.

20               (2) RECOMMENDATIONS.—The strategy shall  
21               include recommendations for coordination with inter-  
22               national partners.

23               (b) USE OF STRATEGY.—The Administrator shall use  
24               the strategy developed under subsection (a) in planning

1 and funding research and other activities and initiatives  
2 in the field of astrobiology.

3 (c) REPORT TO CONGRESS.—Not later than 18  
4 months after the date of enactment of this Act, the Na-  
5 tional Academies shall submit to the Administrator and  
6 to the appropriate committees of Congress a report con-  
7 taining the strategy developed under subsection (a).

8 **SEC. 510. ASTROBIOLOGY PUBLIC-PRIVATE PARTNERSHIPS.**

9 Not later than 180 days after the date of enactment  
10 of this Act, the Administrator shall submit to the appro-  
11 priate committees of Congress a report describing how the  
12 Administration can expand collaborative partnerships to  
13 study life’s origin, evolution, distribution, and future in  
14 the universe.

15 **SEC. 511. NEAR-EARTH OBJECTS.**

16 Section 321 of the National Aeronautics and Space  
17 Administration Authorization Act of 2005 (51 U.S.C. note  
18 prec. 71101) is amended by adding at the end the fol-  
19 lowing:

20 “(e) PROGRAM REPORT.—The Director of the Office  
21 of Science and Technology Policy and the Administrator  
22 shall submit to the Committee on Commerce, Science, and  
23 Transportation of the Senate and the Committee on  
24 Science, Space, and Technology of the House of Rep-  
25 resentatives, not later than 1 year after the date of enact-

1 ment of the National Aeronautics and Space Administra-  
2 tion Transition Authorization Act of 2017, an initial re-  
3 port that provides—

4 “(1) recommendations for carrying out the Sur-  
5 vey program and an associated proposed budget;

6 “(2) an analysis of possible options that the Ad-  
7 ministration could employ to divert an object on a  
8 likely collision course with Earth; and

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

15 “(f) ANNUAL REPORTS.—After the initial report  
16 under subsection (e), the Administrator shall annually  
17 transmit to the Committee on Commerce, Science, and  
18 Transportation of the Senate and the Committee on  
19 Science, Space, and Technology of the House of Rep-  
20 resentatives a report that includes—

21 “(1) a summary of all activities carried out  
22 under subsection (d) since the date of enactment of  
23 the National Aeronautics and Space Administration  
24 Transition Authorization Act of 2017, including the

1 progress toward achieving 90 percent completion of  
2 the survey described in subsection (d); and

3 “(2) a summary of expenditures for all activi-  
4 ties carried out under subsection (d) since the date  
5 of enactment of the National Aeronautics and Space  
6 Administration Transition Authorization Act of  
7 2017.

8 “(g) ASSESSMENT.—The Administrator, in collabora-  
9 tion with other relevant Federal agencies, shall carry out  
10 a technical and scientific assessment of the capabilities  
11 and resources—

12 “(1) to accelerate the survey described in sub-  
13 section (d); and

14 “(2) to expand the Administration’s Near-Earth  
15 Object Program to include the detection, tracking,  
16 cataloguing, and characterization of potentially haz-  
17 ardous near-Earth objects less than 140 meters in  
18 diameter.

19 “(h) TRANSMITTAL.—Not later than 270 days after  
20 the date of enactment of the National Aeronautics and  
21 Space Administration Transition Authorization Act of  
22 2017, the Administrator shall transmit the results of the  
23 assessment under subsection (g) to the Committee on  
24 Commerce, Science, and Transportation of the Senate and

1 the Committee on Science, Space, and Technology of the  
2 House of Representatives.”.

3 **SEC. 512. NEAR-EARTH OBJECTS PUBLIC-PRIVATE PART-**  
4 **NERSHIPS.**

5 (a) SENSE OF CONGRESS.—It is the sense of Con-  
6 gress that the Administration should seek to leverage the  
7 capabilities of the private sector and philanthropic organi-  
8 zations to the maximum extent practicable in carrying out  
9 the Near-Earth Object Survey Program in order to meet  
10 the goal of that program under section 321(d)(1) of the  
11 National Aeronautics and Space Administration Author-  
12 ization Act of 2005 (51 U.S.C. note prec. 71101(d)(1)).

13 (b) REPORT.—Not later than 180 days after the date  
14 of enactment of this Act, the Administrator shall submit  
15 to the appropriate committees of Congress a report de-  
16 scribing how the Administration can expand collaborative  
17 partnerships to detect, track, catalogue, and categorize  
18 near-Earth objects.

19 **SEC. 513. ASSESSMENT OF SCIENCE MISSION EXTENSIONS.**

20 Section 30504 of title 51, United States Code, is  
21 amended to read as follows:

22 **“§ 30504. Assessment of science mission extensions**

23 **“(a) ASSESSMENTS.—**

24 **“(1) IN GENERAL.—**The Administrator shall  
25 carry out triennial reviews within each of the Science

1 divisions to assess the cost and benefits of extending  
2 the date of the termination of data collection for  
3 those missions that exceed their planned missions’  
4 lifetime.

5 “(2) CONSIDERATIONS.—In conducting an as-  
6 sessment under paragraph (1), the Administrator  
7 shall consider whether and how extending missions  
8 impacts the start of future missions.

9 “(b) CONSULTATION AND CONSIDERATION OF PO-  
10 TENTIAL BENEFITS OF INSTRUMENTS ON MISSIONS.—  
11 When deciding whether to extend a mission that has an  
12 operational component, the Administrator shall—

13 “(1) consult with any affected Federal agency;  
14 and

15 “(2) take into account the potential benefits of  
16 instruments on missions that are beyond their  
17 planned mission lifetime.

18 “(c) REPORTS.—The Administrator shall submit to  
19 the Committee on Commerce, Science, and Transportation  
20 of the Senate and the Committee on Science, Space, and  
21 Technology of the House of Representatives, at the same  
22 time as the submission to Congress of the Administra-  
23 tion’s annual budget request for each fiscal year, a report  
24 detailing any assessment under subsection (a) that was  
25 carried out during the previous year.”.

1 **SEC. 514. STRATOSPHERIC OBSERVATORY FOR INFRARED**  
2 **ASTRONOMY.**

3 The Administrator may not terminate science oper-  
4 ations of the Stratospheric Observatory for Infrared As-  
5 tronomy before December 31, 2017.

6 **SEC. 515. RADIOISOTOPE POWER SYSTEMS.**

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

9 (1) exploration of the outer reaches of the solar  
10 system is enabled by radioisotope power systems;

11 (2) establishing continuity in the production of  
12 the material needed for radioisotope power systems  
13 is essential to maintaining the availability of such  
14 systems for future deep space exploration missions;  
15 and

16 (3) Federal agencies supporting the Adminis-  
17 tration through the production of such material  
18 should do so in a cost effective manner so as not to  
19 impose excessive reimbursement requirements on the  
20 Administration.

21 (b) ANALYSIS OF REQUIREMENTS AND RISKS.—The  
22 Director of the Office of Science and Technology Policy  
23 and the Administrator, in consultation with the heads of  
24 other Federal agencies, shall conduct an analysis of—

25 (1) the requirements of the Administration for  
26 radioisotope power system material that is needed to

1 carry out planned, high priority robotic missions in  
2 the solar system and other surface exploration activi-  
3 ties beyond low-Earth orbit; and

4 (2) the risks to missions of the Administration  
5 in meeting those requirements, or any additional re-  
6 quirements, due to a lack of adequate radioisotope  
7 power system material.

8 (c) CONTENTS OF ANALYSIS.—The analysis con-  
9 ducted under subsection (b) shall—

10 (1) detail the Administration’s current pro-  
11 jected mission requirements and associated time-  
12 frames for radioisotope power system material;

13 (2) explain the assumptions used to determine  
14 the Administration’s requirements for the material,  
15 including—

16 (A) the planned use of advanced thermal  
17 conversion technology such as advanced  
18 thermocouples and Stirling generators and con-  
19 verters; and

20 (B) the risks and implications of, and con-  
21 tingencies for, any delays or unanticipated tech-  
22 nical challenges affecting or related to the Ad-  
23 ministration’s mission plans for the anticipated  
24 use of advanced thermal conversion technology;

1           (3) assess the risk to the Administration's pro-  
2           grams of any potential delays in achieving the sched-  
3           ule and milestones for planned domestic production  
4           of radioisotope power system material;

5           (4) outline a process for meeting any additional  
6           Administration requirements for the material;

7           (5) estimate the incremental costs required to  
8           increase the amount of material produced each year,  
9           if such an increase is needed to support additional  
10          Administration requirements for the material;

11          (6) detail how the Administration and other  
12          Federal agencies will manage, operate, and fund  
13          production facilities and the design and development  
14          of all radioisotope power systems used by the Ad-  
15          ministration and other Federal agencies as nec-  
16          essary;

17          (7) specify the steps the Administration will  
18          take, in consultation with the Department of En-  
19          ergy, to preserve the infrastructure and workforce  
20          necessary for production of radioisotope power sys-  
21          tems and ensure that its reimbursements to the De-  
22          partment of Energy associated with such preserva-  
23          tion are equitable and justified; and

24          (8) detail how the Administration has imple-  
25          mented or rejected the recommendations from the

1 National Research Council’s 2009 report titled “Ra-  
2 dioisotope Power Systems: An Imperative for Main-  
3 taining U.S. Leadership in Space Exploration.”

4 (d) REPORT TO CONGRESS.—Not later than 180 days  
5 after the date of enactment of this Act, the Administrator  
6 shall submit the results of the analysis to the appropriate  
7 committees of Congress.

8 **SEC. 516. ASSESSMENT OF MARS ARCHITECTURE.**

9 (a) ASSESSMENT.—The Administrator shall enter  
10 into an arrangement with the National Academies of  
11 Sciences, Engineering, and Medicine to assess—

12 (1) the Administration’s Mars exploration ar-  
13 chitecture and its responsiveness to the strategies,  
14 priorities, and guidelines put forward by the Na-  
15 tional Academies’ planetary science decadal surveys  
16 and other relevant National Academies Mars-related  
17 reports;

18 (2) the long-term goals of the Administration’s  
19 Mars Exploration Program and such program’s abil-  
20 ity to optimize the science return, given the current  
21 fiscal posture of the program;

22 (3) the Mars exploration architecture’s relation-  
23 ship to Mars-related activities to be undertaken by  
24 foreign agencies and organizations; and

1           (4) the extent to which the Mars exploration ar-  
 2           chitecture represents a reasonably balanced mission  
 3           portfolio.

4           (b) REPORT TO CONGRESS.—Not later than 18  
 5           months after the date of enactment of this Act, the Ad-  
 6           ministrator shall submit the results of the assessment to  
 7           the appropriate committees of Congress.

8   **SEC. 517. COLLABORATION.**

9           The Administration shall continue to develop first-of-  
 10          a-kind instruments that, once proved, can be transitioned  
 11          to other agencies for operations. Whenever responsibilities  
 12          for the development of sensors or for measurements are  
 13          transferred to the Administration from another agency,  
 14          the Administration shall seek, to the extent possible, to  
 15          be reimbursed for the assumption of such responsibilities.

16           **TITLE VI—AERONAUTICS**

17   **SEC. 601. SENSE OF CONGRESS ON AERONAUTICS.**

18          It is the sense of Congress that—

19           (1) a robust aeronautics research portfolio will  
 20          help maintain the United States status as a leader  
 21          in aviation, enhance the competitiveness of the  
 22          United States in the world economy, and improve  
 23          the quality of life of all citizens;

24           (2) aeronautics research is essential to the Ad-  
 25          ministration’s mission, continues to be an important

1 core element of the Administration's mission, and  
2 should be supported;

3 (3) the Administrator should coordinate and  
4 consult with relevant Federal agencies and the pri-  
5 vate sector to minimize duplication of efforts and le-  
6 verage resources; and

7 (4) carrying aeronautics research to a level of  
8 maturity that allows the Administration's research  
9 results to be transferred to the users, whether pri-  
10 vate or public sector, is critical to their eventual  
11 adoption.

12 **SEC. 602. TRANSFORMATIVE AERONAUTICS RESEARCH.**

13 It is the sense of Congress that the Administrator  
14 should look strategically into the future and ensure that  
15 the Administration's Center personnel are at the leading  
16 edge of aeronautics research by encouraging investigations  
17 into the early-stage advancement of new processes, novel  
18 concepts, and innovative technologies that have the poten-  
19 tial to meet national aeronautics needs.

20 **SEC. 603. HYPERSONIC RESEARCH.**

21 (a) ROADMAP FOR HYPERSONIC RESEARCH.—Not  
22 later than 1 year after the date of enactment of this Act,  
23 the Administrator, in consultation with the heads of other  
24 relevant Federal agencies, shall develop and submit to the

1 appropriate committees of Congress a research and devel-  
2 opment roadmap for hypersonic aircraft research.

3 (b) OBJECTIVE.—The objective of the roadmap is to  
4 explore hypersonic science and technology using air-  
5 breathing propulsion concepts, through a mix of theo-  
6 retical work, basic and applied research, and development  
7 of flight research demonstration vehicles.

8 (c) CONTENTS.—The roadmap shall recommend ap-  
9 propriate Federal agency contributions, coordination ef-  
10 forts, and technology milestones.

11 **SEC. 604. SUPERSONIC RESEARCH.**

12 (a) FINDINGS.—Congress finds that—

13 (1) the ability to fly commercial aircraft over  
14 land at supersonic speeds without adverse impacts  
15 on the environment or on local communities could  
16 open new global markets and enable new transpor-  
17 tation capabilities; and

18 (2) continuing the Administration’s research  
19 program is necessary to assess the impact in a rel-  
20 evant environment of commercial supersonic flight  
21 operations and provide the basis for establishing ap-  
22 propriate sonic boom standards for such flight oper-  
23 ations.

24 (b) ROADMAP FOR SUPERSONIC RESEARCH.—

1           (1) IN GENERAL.—Not later than 1 year after  
2           the date of enactment of this Act, the Administrator  
3           shall develop and submit to the appropriate commit-  
4           tees of Congress a roadmap that allows for flexible  
5           funding profiles for supersonic aeronautics research  
6           and development.

7           (2) OBJECTIVE.—The objective of the roadmap  
8           is to develop and demonstrate, in a relevant environ-  
9           ment, airframe and propulsion technologies to mini-  
10          mize the environmental impact, including noise, of  
11          supersonic overland flight in an efficient and eco-  
12          nomical manner.

13          (3) CONTENTS.—The roadmap shall include—

14                (A) the baseline research as embodied by  
15                the Administration’s existing research on super-  
16                sonic flight;

17                (B) a list of specific technological, environ-  
18                mental, and other challenges that must be over-  
19                come to minimize the environmental impact, in-  
20                cluding noise, of supersonic overland flight;

21                (C) a research plan to address the chal-  
22                lenges under subparagraph (B), including a  
23                project timeline for accomplishing relevant re-  
24                search goals;

1           (D) a plan for coordination with stake-  
2           holders, including relevant government agencies  
3           and industry; and

4           (E) a plan for how the Administration will  
5           ensure that sonic boom research is coordinated  
6           as appropriate with relevant Federal agencies.

7 **SEC. 605. ROTORCRAFT RESEARCH.**

8       (a) ROADMAP FOR ROTORCRAFT RESEARCH.—Not  
9       later than 1 year after the date of enactment of this Act,  
10      the Administrator, in consultation with the heads of other  
11      relevant Federal agencies, shall prepare and submit to the  
12      appropriate committees of Congress a roadmap for re-  
13      search relating to rotorcraft and other runway-inde-  
14      pendent air vehicles.

15      (b) OBJECTIVE.—The objective of the roadmap is to  
16      develop and demonstrate improved safety, noise, and envi-  
17      ronmental impact in a relevant environment.

18      (c) CONTENTS.—The roadmap shall include specific  
19      goals for the research, a timeline for implementation,  
20      metrics for success, and guidelines for collaboration and  
21      coordination with industry and other Federal agencies.

# 1 **TITLE VII—SPACE TECHNOLOGY**

## 2 **SEC. 701. SPACE TECHNOLOGY INFUSION.**

3 (a) SENSE OF CONGRESS ON SPACE TECHNOLOGY.—

4 It is the sense of Congress that space technology is crit-  
5 ical—

6 (1) to developing technologies and capabilities  
7 that will make the Administration’s core missions  
8 more affordable and more reliable;

9 (2) to enabling a new class of Administration  
10 missions beyond low-Earth orbit; and

11 (3) to improving technological capabilities and  
12 promote innovation for the Administration and the  
13 Nation.

14 (b) SENSE OF CONGRESS ON PROPULSION TECH-  
15 NOLOGY.—It is the sense of Congress that advancing pro-  
16 pulsion technology would improve the efficiency of trips  
17 to Mars and could shorten travel time to Mars, reduce  
18 astronaut health risks, and reduce radiation exposure,  
19 consumables, and mass of materials required for the jour-  
20 ney.

21 (c) POLICY.—It is the policy of the United States  
22 that the Administrator shall develop technologies to sup-  
23 port the Administration’s core missions, as described in  
24 section 2(3) of the National Aeronautics and Space Ad-  
25 ministration Authorization Act of 2010 (42 U.S.C.

1 18301(3)), and support sustained investments in early  
 2 stage innovation, fundamental research, and technologies  
 3 to expand the boundaries of the national aerospace enter-  
 4 prise.

5 (d) PROPULSION TECHNOLOGIES.—A goal of propul-  
 6 sion technologies developed under subsection (c) shall be  
 7 to significantly reduce human travel time to Mars.

8 **SEC. 702. SPACE TECHNOLOGY PROGRAM.**

9 (a) SPACE TECHNOLOGY PROGRAM AUTHORIZED.—  
 10 The Administrator shall conduct a space technology pro-  
 11 gram (referred to in this section as the “Program”) to  
 12 research and develop advanced space technologies that  
 13 could deliver innovative solutions across the Administra-  
 14 tion’s space exploration and science missions.

15 (b) CONSIDERATIONS.—In conducting the Program,  
 16 the Administrator shall consider—

17 (1) the recommendations of the National Acad-  
 18 emies’ review of the Administration’s Space Tech-  
 19 nology roadmaps and priorities; and

20 (2) the applicable enabling aspects of the step-  
 21 ping stone approach to exploration under section  
 22 70504 of title 51, United States Code.

23 (c) REQUIREMENTS.—In conducting the Program,  
 24 the Administrator shall—

1           (1) to the extent practicable, use a competitive  
2       process to select research and development projects;

3           (2) to the extent practicable and appropriate,  
4       use small satellites and the Administration's sub-  
5       orbital and ground-based platforms to demonstrate  
6       space technology concepts and developments; and

7           (3) as appropriate, partner with other Federal  
8       agencies, universities, private industry, and foreign  
9       countries.

10       (d) SMALL BUSINESS PROGRAMS.—The Adminis-  
11     trator shall organize and manage the Administration's  
12     Small Business Innovation Research Program and Small  
13     Business Technology Transfer Program within the Pro-  
14     gram.

15       (e) NONDUPLICATION CERTIFICATION.—The Admin-  
16     istrator shall submit a budget for each fiscal year, as  
17     transmitted to Congress under section 1105(a) of title 31,  
18     United States Code, that avoids duplication of projects,  
19     programs, or missions conducted by Program with other  
20     projects, programs, or missions conducted by another of-  
21     fice or directorate of the Administration.

22       (f) COLLABORATION, COORDINATION, AND ALIGN-  
23     MENT.—

24           (1) IN GENERAL.—The Administrator shall—

1           (A) ensure that the Administration's  
2           projects, programs, and activities in support of  
3           technology research and development of ad-  
4           vanced space technologies are fully coordinated  
5           and aligned;

6           (B) ensure that the results the projects,  
7           programs, and activities under subparagraph  
8           (A) are shared and leveraged within the Admin-  
9           istration; and

10          (C) ensure that the organizational respon-  
11          sibility for research and development activities  
12          in support of human space exploration not initi-  
13          ated as of the date of enactment of this Act is  
14          established on the basis of a sound rationale.

15          (2) SENSE OF CONGRESS.—It is the sense of  
16          Congress that projects, programs, and missions  
17          being conducted by the Human Exploration and Op-  
18          erations Mission Directorate in support of research  
19          and development of advanced space technologies and  
20          systems focusing on human space exploration should  
21          continue in that Directorate.

22          (g) REPORT.—Not later than 180 days after the date  
23          of enactment of this Act, the Administrator shall provide  
24          to the appropriate committees of Congress a report—

1           (1) comparing the Administration’s space tech-  
2           nology investments with the high-priority technology  
3           areas identified by the National Academies in the  
4           National Research Council’s report on the Adminis-  
5           tration’s Space Technology Roadmaps; and

6           (2) including—

7                 (A) identification of how the Administra-  
8                 tion will address any gaps between the agency’s  
9                 investments and the recommended technology  
10                areas, including a projection of funding require-  
11                ments; and

12               (B) identification of the rationale described  
13                in subsection (f)(1)(C).

14       (h) ANNUAL REPORT.—The Administrator shall in-  
15       clude in the Administration’s annual budget request for  
16       each fiscal year the rationale for assigning organizational  
17       responsibility for, in the year prior to the budget fiscal  
18       year, each initiated project, program, and mission focused  
19       on research and development of advanced technologies for  
20       human space exploration.

1           **TITLE VIII—MAXIMIZING**  
2                   **EFFICIENCY**

3           **Subtitle A—Agency Information**  
4           **Technology and Cybersecurity**

5   **SEC. 811. INFORMATION TECHNOLOGY GOVERNANCE.**

6           (a) IN GENERAL.—The Administrator shall, in a  
7 manner that reflects the unique nature of NASA’s mission  
8 and expertise—

9               (1) ensure the NASA Chief Information Officer,  
10           Mission Directorates, and Centers have appropriate  
11           roles in the management, governance, and oversight  
12           processes related to information technology oper-  
13           ations and investments and information security pro-  
14           grams for the protection of NASA systems;

15               (2) ensure the NASA Chief Information Officer  
16           has the appropriate resources and insight to oversee  
17           NASA information technology and information secu-  
18           rity operations and investments;

19               (3) provide an information technology program  
20           management framework to increase the efficiency  
21           and effectiveness of information technology invest-  
22           ments, including relying on metrics for identifying  
23           and reducing potential duplication, waste, and cost;

24               (4) improve the operational linkage between the  
25           NASA Chief Information Officer and each NASA

mission directorate, center, and mission support office to ensure both agency and mission needs are considered in agency-wide information technology and information security management and oversight;

(5) review the portfolio of information technology investments and spending, including information technology-related investments included as part of activities within NASA mission directorates that may not be considered information technology, to ensure investments are recognized and reported appropriately based on guidance from the Office of Management and Budget;

(6) consider appropriate revisions to the charters of information technology boards and councils that inform information technology investment and operation decisions; and

(7) consider whether the NASA Chief Information Officer should have a seat on any boards or councils described in paragraph (6).

(b) GAO STUDY.—

(1) STUDY.—The Comptroller General of the United States shall conduct a study of the effectiveness of the Administration's Information Technology Governance in ensuring information technology re-

1 sources are aligned with agency missions and are  
2 cost effective and secure.

3 (2) CONTENTS.—The study shall include an as-  
4 sessment of—

5 (A) the resources available for overseeing  
6 Administration-wide information technology op-  
7 erations, investments, and security measures  
8 and the NASA Chief Information Officer’s visi-  
9 bility and involvement into information tech-  
10 nology oversight and access to those resources;

11 (B) the effectiveness and challenges of the  
12 Administration’s information technology struc-  
13 ture, decision making processes and authorities,  
14 including impacts on its ability to implement in-  
15 formation security; and

16 (C) the impact of NASA Chief Information  
17 Officer approval authority over information  
18 technology investments that exceed a defined  
19 monetary threshold, including any potential im-  
20 pacts of such authority on the Administration’s  
21 missions, flights programs and projects, re-  
22 search activities, and Center operations.

23 (3) REPORT.—Not later than 1 year after the  
24 date of enactment of this Act, the Comptroller Gen-  
25 eral shall submit to the appropriate committees of

1 Congress a report detailing the results of the study  
2 under paragraph (1), including any recommenda-  
3 tions.

4 **SEC. 812. INFORMATION TECHNOLOGY STRATEGIC PLAN.**

5 (a) IN GENERAL.—Subject to subsection (b), the Ad-  
6 ministrator shall develop an information technology stra-  
7 tegic plan to guide NASA information technology manage-  
8 ment and strategic objectives.

9 (b) REQUIREMENTS.—In developing the strategic  
10 plan, the Administrator shall ensure that the strategic  
11 plan addresses—

12 (1) the deadline under section 306(a) of title 5,  
13 United States Code; and

14 (2) the requirements under section 3506 of title  
15 44, United States Code.

16 (c) CONTENTS.—The strategic plan shall address, in  
17 a manner that reflects the unique nature of NASA’s mis-  
18 sion and expertise—

19 (1) near and long-term goals and objectives for  
20 leveraging information technology;

21 (2) a plan for how NASA will submit to Con-  
22 gress of a list of information technology projects, in-  
23 cluding completion dates and risk level in accordance  
24 with guidance from the Office of Management and  
25 Budget;

1           (3) an implementation overview for an agency-  
2 wide approach to information technology investments  
3 and operations, including reducing barriers to cross-  
4 center collaboration;

5           (4) coordination by the NASA Chief Informa-  
6 tion Officer with centers and mission directorates to  
7 ensure that information technology policies are effec-  
8 tively and efficiently implemented across the agency;

9           (5) a plan to increase the efficiency and effec-  
10 tiveness of information technology investments, in-  
11 cluding a description of how unnecessarily duplica-  
12 tive, wasteful, legacy, or outdated information tech-  
13 nology across NASA will be identified and elimi-  
14 nated, and a schedule for the identification and  
15 elimination of such information technology;

16           (6) a plan for improving the information secu-  
17 rity of agency information and agency information  
18 systems, including improving security control assess-  
19 ments and role-based security training of employees;  
20 and

21           (7) submission by NASA to Congress of infor-  
22 mation regarding high risk projects and cybersecu-  
23 rity risks.

24       (d) CONGRESSIONAL OVERSIGHT.—The Adminis-  
25 trator shall submit to the appropriate committees of Con-

1 gress the strategic plan under subsection (a) and any up-  
2 dates thereto.

3 **SEC. 813. CYBERSECURITY.**

4 (a) FINDING.—Congress finds that the security of  
5 NASA information and information systems is vital to the  
6 success of the mission of the agency.

7 (b) INFORMATION SECURITY PLAN.—

8 (1) IN GENERAL.—Not later than 1 year after  
9 the date of enactment of this Act, the Administrator  
10 shall implement the information security plan devel-  
11 oped under paragraph (2) and take such further ac-  
12 tions as the Administrator considers necessary to  
13 improve the information security system in accord-  
14 ance with this section.

15 (2) INFORMATION SECURITY PLAN.—Subject to  
16 paragraphs (3) and (4), the Administrator shall de-  
17 velop an agency-wide information security plan to  
18 enhance information security for NASA information  
19 and information infrastructure.

20 (3) REQUIREMENTS.—In developing the plan  
21 under paragraph (2), the Administrator shall ensure  
22 that the plan—

23 (A) reflects the unique nature of NASA’s  
24 mission and expertise;

1 (B) is informed by policies, standards,  
2 guidelines, and directives on information secu-  
3 rity required for Federal agencies;

4 (C) is consistent with the standards and  
5 guidelines under section 11331 of title 40,  
6 United States Code; and

7 (D) meets applicable National Institute of  
8 Standards and Technology information security  
9 standards and guidelines.

10 (4) CONTENTS.—The plan shall address—

11 (A) an overview of the requirements of the  
12 information security system;

13 (B) an agency-wide risk management  
14 framework for information security;

15 (C) a description of the information secu-  
16 rity system management controls and common  
17 controls that are necessary to ensure compli-  
18 ance with information security-related require-  
19 ments;

20 (D) an identification and assignment of  
21 roles, responsibilities, and management commit-  
22 ment for information security at the agency;

23 (E) coordination among organizational en-  
24 tities, including between each center, facility,  
25 mission directorate, and mission support office,

1           and among agency entities responsible for dif-  
2           ferent aspects of information security;

3           (F) the need to protect the information se-  
4           curity of mission-critical systems and activities  
5           and high-impact and moderate-impact informa-  
6           tion systems; and

7           (G) a schedule of frequent reviews and up-  
8           dates, as necessary, of the plan.

9   **SEC. 814. SECURITY MANAGEMENT OF FOREIGN NATIONAL**  
10           **ACCESS.**

11       The Administrator shall notify the appropriate com-  
12       mittees of Congress when the agency has implemented the  
13       information technology security recommendations from  
14       the National Academy of Public Administration on foreign  
15       national access management, based on reports from Janu-  
16       ary 2014 and March 2016.

17   **SEC. 815. CYBERSECURITY OF WEB APPLICATIONS.**

18       Not later than 180 days after the date of enactment  
19       of this Act, the Administrator shall, in a manner that re-  
20       flects the unique nature of NASA's mission and exper-  
21       tise—

22           (1) develop a plan, including such actions and  
23       milestones as are necessary, to fully remediate secu-  
24       rity vulnerabilities of NASA web applications within  
25       a timely fashion after discovery; and

(2) provide an update on its plan to implement the recommendation from the NASA Inspector General in the audit report dated July 10, 2014, (IG–14–023) to remove from the Internet or otherwise secure all NASA web applications in development or testing mode.

## **Subtitle B—Collaboration Among Mission Directorates and Other Matters**

### **SEC. 821. COLLABORATION AMONG MISSION DIRECTORATES.**

The Administrator shall encourage an interdisciplinary approach among all NASA mission directorates and divisions, whenever appropriate, for projects or missions—

(1) to improve coordination, and encourage collaboration and early planning on scope;

(2) to determine areas of overlap or alignment;

(3) to find ways to leverage across divisional perspectives to maximize outcomes; and

(4) to be more efficient with resources and funds.

### **SEC. 822. NASA LAUNCH CAPABILITIES COLLABORATION.**

(a) FINDINGS.—Congress makes the following findings:

1           (1) The Launch Services Program is respon-  
2           sible for the acquisition, management, and technical  
3           oversight of commercial launch services for NASA's  
4           science and robotic missions.

5           (2) The Commercial Crew Program is respon-  
6           sible for the acquisition, management, and technical  
7           oversight of commercial crew transportation systems.

8           (3) The Launch Services Program and Com-  
9           mercial Crew Program have worked together to gain  
10          exceptional technical insight into the contracted  
11          launch service providers that are common to both  
12          programs.

13          (4) The Launch Services Program has a long  
14          history of oversight of 12 different launch vehicles  
15          and over 80 launches.

16          (5) Co-location of the Launch Services Program  
17          and Commercial Crew Program has enabled the  
18          Commercial Crew Program to efficiently obtain the  
19          launch vehicle technical expertise of and provide en-  
20          gineering and analytical support to the Commercial  
21          Crew Program.

22          (b) SENSE OF CONGRESS.—It is the sense of Con-  
23          gress that—

24                (1) the Launch Services Program and Commer-  
25                cial Crew Program each benefit from communication

1 and coordination of launch manifests, technical in-  
2 formation, and common launch vehicle insight be-  
3 tween the programs; and

4 (2) such communication and coordination is en-  
5 abled by the co-location of the programs.

6 (c) IN GENERAL.—The Administrator shall pursue a  
7 strategy for acquisition of crewed transportation services  
8 and non-crewed launch services that continues to enhance  
9 communication, collaboration, and coordination between  
10 the Launch Services Program and the Commercial Crew  
11 Program.

12 **SEC. 823. DETECTION AND AVOIDANCE OF COUNTERFEIT**  
13 **PARTS.**

14 (a) FINDINGS.—Congress makes the following find-  
15 ings:

16 (1) A 2012 investigation by the Committee on  
17 Armed Services of the Senate of counterfeit elec-  
18 tronic parts in the Department of Defense supply  
19 chain from 2009 through 2010 uncovered 1,800  
20 cases and over 1,000,000 counterfeit parts and ex-  
21 posed the threat such counterfeit parts pose to serv-  
22 ice members and national security.

23 (2) Since 2010, the Comptroller General of the  
24 United States has identified in 3 separate reports  
25 the risks and challenges associated with counterfeit

1 parts and counterfeit prevention at both the Depart-  
2 ment of Defense and NASA, including inconsistent  
3 definitions of counterfeit parts, poorly targeted qual-  
4 ity control practices, and potential barriers to im-  
5 provements to these practices.

6 (b) SENSE OF CONGRESS.—It is the sense of Con-  
7 gress that the presence of counterfeit electronic parts in  
8 the NASA supply chain poses a danger to United States  
9 government astronauts, crew, and other personnel and a  
10 risk to the agency overall.

11 (c) REGULATIONS.—

12 (1) IN GENERAL.—Not later than 270 days  
13 after the date of enactment of this Act, the Adminis-  
14 trator shall revise the NASA Supplement to the  
15 Federal Acquisition Regulation to improve the detec-  
16 tion and avoidance of counterfeit electronic parts in  
17 the supply chain.

18 (2) CONTRACTOR RESPONSIBILITIES.—In revis-  
19 ing the regulations under paragraph (1), the Admin-  
20 istrator shall—

21 (A) require each covered contractor—

22 (i) to detect and avoid the use or in-  
23 clusion of any counterfeit parts in elec-  
24 tronic parts or products that contain elec-  
25 tronic parts;

(ii) to take such corrective actions as the Administrator considers necessary to remedy the use or inclusion described in clause (i); and

(iii) including a subcontractor, to notify the applicable NASA contracting officer not later than 30 calendar days after the date the covered contractor becomes aware, or has reason to suspect, that any end item, component, part or material contained in supplies purchased by NASA, or purchased by a covered contractor or subcontractor for delivery to, or on behalf of, NASA, contains a counterfeit electronic part or suspect counterfeit electronic part; and

(B) prohibit the cost of counterfeit electronic parts, suspect counterfeit electronic parts, and any corrective action described under subparagraph (A)(ii) from being included as allowable costs under agency contracts, unless—

(i)(I) the covered contractor has an operational system to detect and avoid counterfeit electronic parts and suspect counterfeit electronic parts that has been

1 reviewed and approved by NASA or the  
2 Department of Defense; and

3 (II) the covered contractor has  
4 provided the notice under subpara-  
5 graph (A)(iii); or

6 (ii) the counterfeit electronic parts or  
7 suspect counterfeit electronic parts were  
8 provided to the covered contractor as Gov-  
9 ernment property in accordance with part  
10 45 of the Federal Acquisition Regulation.

11 (3) SUPPLIERS OF ELECTRONIC PARTS.—In re-  
12 vising the regulations under paragraph (1), the Ad-  
13 ministrator shall—

14 (A) require NASA and covered contractors,  
15 including subcontractors, at all tiers—

16 (i) to obtain electronic parts that are  
17 in production or currently available in  
18 stock from—

19 (I) the original manufacturers of  
20 the parts or their authorized dealers;  
21 or

22 (II) suppliers who obtain such  
23 parts exclusively from the original  
24 manufacturers of the parts or their  
25 authorized dealers; and

1                   (ii) to obtain electronic parts that are  
2                   not in production or currently available in  
3                   stock from suppliers that meet qualifica-  
4                   tion requirements established under sub-  
5                   paragraph (C);

6                   (B) establish documented requirements  
7                   consistent with published industry standards or  
8                   Government contract requirements for—

9                   (i) notification of the agency; and

10                  (ii) inspection, testing, and authen-  
11                  tication of electronic parts that NASA or  
12                  a covered contractor, including a subcon-  
13                  tractor, obtains from any source other  
14                  than a source described in subparagraph  
15                  (A);

16                  (C) establish qualification requirements,  
17                  consistent with the requirements of section  
18                  2319 of title 10, United States Code, pursuant  
19                  to which NASA may identify suppliers that  
20                  have appropriate policies and procedures in  
21                  place to detect and avoid counterfeit electronic  
22                  parts and suspect counterfeit electronic parts;  
23                  and

24                  (D) authorize a covered contractor, includ-  
25                  ing a subcontractor, to identify and use addi-

1            tional suppliers beyond those identified under  
2            subparagraph (C) if—

3                    (i) the standards and processes for  
4                    identifying such suppliers comply with es-  
5                    tablished industry standards;

6                    (ii) the covered contractor assumes re-  
7                    sponsibility for the authenticity of parts  
8                    provided by such suppliers under para-  
9                    graph (2); and

10                   (iii) the selection of such suppliers is  
11                   subject to review and audit by NASA.

12           (d) DEFINITIONS.—In this section:

13                   (1) COVERED CONTRACTOR.—The term “cov-  
14                   ered contractor” means a contractor that supplies  
15                   an electronic part, or a product that contains an  
16                   electronic part, to NASA.

17                   (2) ELECTRONIC PART.—The term “electronic  
18                   part” means a discrete electronic component, includ-  
19                   ing a microcircuit, transistor, capacitor, resistor, or  
20                   diode, that is intended for use in a safety or mission  
21                   critical application.

22   **SEC. 824. EDUCATION AND OUTREACH.**

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

1           (1) United States competitiveness in the 21st  
2 century requires engaging the science, technology,  
3 engineering, and mathematics (referred to in this  
4 section as “STEM”) talent in all States;

5           (2) the Administration is uniquely positioned to  
6 educate and inspire students and the broader public  
7 on STEM subjects and careers;

8           (3) the Administration’s Education and Com-  
9 munication Offices, Mission Directorates, and Cen-  
10 ters have been effective in delivering educational  
11 content because of the strong engagement of Admin-  
12 istration scientists and engineers in the Administra-  
13 tion’s education and outreach activities;

14           (4) the Administration’s education and outreach  
15 programs, including the Experimental Program to  
16 Stimulate Competitive Research (EPSCoR) and the  
17 Space Grant College and Fellowship Program, re-  
18 flect the Administration’s successful commitment to  
19 growing and diversifying the national science and  
20 engineering workforce; and

21           (5) in order to grow and diversify the Nation’s  
22 engineering workforce, it is vital for the Administra-  
23 tion to bolster programs, such as High Schools  
24 United with NASA to Create Hardware (HUNCH)  
25 program, that conduct outreach activities to under-

1 served rural communities, vocational schools, and  
2 tribal colleges and universities and encourage new  
3 participation in the STEM workforce.

4 (b) CONTINUATION OF EDUCATION AND OUTREACH  
5 ACTIVITIES AND PROGRAMS.—

6 (1) IN GENERAL.—The Administrator shall con-  
7 tinue engagement with the public and education op-  
8 portunities for students via all the Administration’s  
9 mission directorates to the maximum extent prac-  
10 ticable.

11 (2) REPORT.—Not later than 60 days after the  
12 date of enactment of this Act, the Administrator  
13 shall submit to the appropriate committees of Con-  
14 gress a report on the Administration’s near-term  
15 outreach plans for advancing space law education.

16 **SEC. 825. LEVERAGING COMMERCIAL SATELLITE SERV-**  
17 **ICING CAPABILITIES ACROSS MISSION DI-**  
18 **RECTORATES.**

19 (a) FINDINGS.—Congress makes the following find-  
20 ings:

21 (1) Refueling and relocating aging satellites to  
22 extend their operational lifetimes is a capacity that  
23 NASA will substantially benefit from and is impor-  
24 tant for lowering the costs of ongoing scientific, na-  
25 tional security, and commercial satellite operations.

1           (2) The technologies involved in satellite serv-  
2       icing, such as dexterous robotic arms, propellant  
3       transfer systems, and solar electric propulsion, are  
4       all critical capabilities to support a human explo-  
5       ration mission to Mars.

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

8           (1) satellite servicing is a vital capability that  
9       will bolster the capacity and affordability of NASA’s  
10      ongoing scientific and human exploration operations  
11      while simultaneously enhancing the ability of domes-  
12      tic companies to compete in the global marketplace;  
13      and

14          (2) future NASA satellites and spacecraft  
15      across mission directorates should be constructed in  
16      a manner that allows for servicing in order to maxi-  
17      mize operational longevity and affordability.

18      (c) LEVERAGING OF CAPABILITIES.—The Adminis-  
19      trator shall—

20          (1) identify orbital assets in both the Science  
21      Mission Directorate and the Human Exploration  
22      and Operations Mission Directorate that could ben-  
23      efit from satellite servicing-related technologies; and

24          (2) work across all NASA mission directorates  
25      to evaluate opportunities for the private sector to

1 perform such services or advance technical capabili-  
2 ties by leveraging the technologies and techniques  
3 developed by NASA programs and other industry  
4 programs.

5 **SEC. 826. FLIGHT OPPORTUNITIES.**

6 (a) DEVELOPMENT OF PAYLOADS.—

7 (1) IN GENERAL.—In order to conduct nec-  
8 essary research, the Administrator shall continue  
9 and, as the Administrator considers appropriate, ex-  
10 pand the development of technology payloads for—

11 (A) scientific research; and

12 (B) investigating new or improved capabili-  
13 ties.

14 (2) FUNDS.—For the purpose of carrying out  
15 paragraph (1), the Administrator shall make funds  
16 available for—

17 (A) flight testing;

18 (B) payload development; and

19 (C) hardware related to subparagraphs (A)  
20 and (B).

21 (b) REAFFIRMATION OF POLICY.—Congress reaf-  
22 firms that the Administrator should provide flight oppor-  
23 tunities for payloads to microgravity environments and  
24 suborbital altitudes as authorized by section 907 of the

1 National Aeronautics and Space Administration Author-  
2 ization Act of 2010 (42 U.S.C. 18405).

3 **SEC. 827. SENSE OF CONGRESS ON SMALL CLASS LAUNCH**  
4 **MISSIONS.**

5 It is the sense of Congress that—

6 (1) Venture Class Launch Services contracts  
7 awarded under the Launch Services Program will  
8 expand opportunities for future dedicated launches  
9 of CubeSats and other small satellites and small or-  
10 bital science missions; and

11 (2) principal investigator-led small orbital  
12 science missions, including CubeSat class, Small Ex-  
13 plorer (SMEX) class, and Venture class, offer valu-  
14 able opportunities to advance science at low cost,  
15 train the next generation of scientists and engineers,  
16 and enable participants to acquire skills in systems  
17 engineering and systems integration that are critical  
18 to maintaining the Nation’s leadership in space and  
19 to enhancing United States innovation and competi-  
20 tiveness abroad.

21 **SEC. 828. BASELINE AND COST CONTROLS.**

22 Section 30104(a)(1) of title 51, United States Code,  
23 is amended by striking “Procedural Requirements  
24 7120.5c, dated March 22, 2005” and inserting “Proce-  
25 dural Requirements 7120.5E, dated August 14, 2012”.

1 **SEC. 829. COMMERCIAL TECHNOLOGY TRANSFER PRO-**  
 2 **GRAM.**

3 Section 50116(a) of title 51, United States Code, is  
 4 amended by inserting “, while protecting national secu-  
 5 rity” after “research community”.

6 **SEC. 830. AVOIDING ORGANIZATIONAL CONFLICTS OF IN-**  
 7 **TEREST IN MAJOR ADMINISTRATION ACQUI-**  
 8 **SITION PROGRAMS.**

9 (a) REVISED REGULATIONS REQUIRED.—Not later  
 10 than 270 days after the date of enactment of this Act,  
 11 the Administrator shall revise the Administration Supple-  
 12 ment to the Federal Acquisition Regulation to provide uni-  
 13 form guidance and recommend revised requirements for  
 14 organizational conflicts of interest by contractors in major  
 15 acquisition programs in order to address the elements  
 16 identified in subsection (b).

17 (b) ELEMENTS.—The revised regulations under sub-  
 18 section (a) shall, at a minimum—

19 (1) address organizational conflicts of interest  
 20 that could potentially arise as a result of—

21 (A) lead system integrator contracts on  
 22 major acquisition programs and contracts that  
 23 follow lead system integrator contracts on such  
 24 programs, particularly contracts for production;

25 (B) the ownership of business units per-  
 26 forming systems engineering and technical as-

1           sistance functions, professional services, or  
 2           management support services in relation to  
 3           major acquisition programs by contractors who  
 4           simultaneously own business units competing to  
 5           perform as either the prime contractor or the  
 6           supplier of a major subsystem or component for  
 7           such programs;

8           (C) the award of major subsystem con-  
 9           tracts by a prime contractor for a major acqui-  
 10          sition program to business units or other affili-  
 11          ates of the same parent corporate entity, and  
 12          particularly the award of subcontracts for soft-  
 13          ware integration or the development of a pro-  
 14          prietary software system architecture; or

15          (D) the performance by, or assistance of,  
 16          contractors in technical evaluations on major  
 17          acquisition programs;

18          (2) require the Administration to request advice  
 19          on systems architecture and systems engineering  
 20          matters with respect to major acquisition programs  
 21          from objective sources independent of the prime con-  
 22          tractor;

23          (3) require that a contract for the performance  
 24          of systems engineering and technical assistance  
 25          functions for a major acquisition program contains

1 a provision prohibiting the contractor or any affiliate  
 2 of the contractor from participating as a prime con-  
 3 tractor or a major subcontractor in the development  
 4 of a system under the program; and

5 (4) establish such limited exceptions to the re-  
 6 quirement in paragraphs (2) and (3) as the Admin-  
 7 istrator considers necessary to ensure that the Ad-  
 8 ministration has continued access to advice on sys-  
 9 tems architecture and systems engineering matters  
 10 from highly qualified contractors with domain expe-  
 11 rience and expertise, while ensuring that such advice  
 12 comes from sources that are objective and unbiased.

13 **SEC. 831. PROTECTION OF APOLLO LANDING SITES.**

14 (a) ASSESSMENT.—The Director of the Office of  
 15 Science and Technology Policy, in consultation with rel-  
 16 evant Federal agencies and stakeholders, shall assess the  
 17 issues relating to protecting and preserving historically  
 18 important Apollo Program lunar landing sites and Apollo  
 19 program artifacts residing on the lunar surface, including  
 20 those pertaining to Apollo 11 and Apollo 17.

21 (b) CONTENTS.—In conducting the assessment, the  
 22 Director shall include—

23 (1) a determination of what risks to the protec-  
 24 tion and preservation of those sites and artifacts  
 25 exist or may exist in the future;

(2) a determination of what measures are required to ensure such protection and preservation;

(3) a determination of the extent to which additional domestic legislation or international treaties or agreements will be required; and

(4) specific recommendations for protecting and preserving those lunar landing sites and artifacts.

(c) REPORT.—Not later than 1 year after the date of enactment of this Act, the Director shall submit to the appropriate committees of Congress the results of the assessment.

**SEC. 832. NASA LEASE OF NON-EXCESS PROPERTY.**

Section 20145(g) of title 51, United States Code, is amended by striking “10 years after December 26, 2007” and inserting “December 31, 2018”.

**SEC. 833. TERMINATION LIABILITY.**

It is the sense of Congress that—

(1) the ISS, the Space Launch System, and the Orion will enable the Nation to continue operations in low-Earth orbit and to send its astronauts to deep space;

(2) the James Webb Space Telescope will revolutionize our understanding of star and planet formation and how galaxies evolved, and will advance the search for the origins of our universe;

1           (3) as a result of their unique capabilities and  
2           their critical contribution to the future of space ex-  
3           ploration, these systems have been designated by  
4           Congress and the Administration as priority invest-  
5           ments;

6           (4) contractors are currently holding program  
7           funding, estimated to be in the hundreds of millions  
8           of dollars, to cover the potential termination liability  
9           should the Government choose to terminate a pro-  
10          gram for convenience;

11          (5) as a result, hundreds of millions of taxpayer  
12          dollars are unavailable for meaningful work on these  
13          programs;

14          (6) according to the Government Accountability  
15          Office, the Administration procures most of its  
16          goods and services through contracts, and it termi-  
17          nates very few of them;

18          (7) in fiscal year 2010, the Administration ter-  
19          minated 28 of 16,343 active contracts and orders, a  
20          termination rate of about 0.17 percent; and

21          (8) the Administration should vigorously pursue  
22          a policy on termination liability that maximizes the  
23          utilization of its appropriated funds to make max-  
24          imum progress in meeting established technical goals

1 and schedule milestones on these high-priority pro-  
2 grams.

3 **SEC. 834. INDEPENDENT REVIEWS.**

4 Not later than 270 days after the date of enactment  
5 of this Act, the Administrator shall submit to the appro-  
6 priate committees of Congress a report describing—

7 (1) the Administration’s procedures for con-  
8 ducting independent reviews of projects and pro-  
9 grams at lifecycle milestones;

10 (2) how the Administration ensures the inde-  
11 pendence of the individuals who conduct those re-  
12 views prior to their assignment;

13 (3) the internal and external entities inde-  
14 pendent of project and program management that  
15 conduct reviews of projects and programs at life  
16 cycle milestones; and

17 (4) how the Administration ensures the inde-  
18 pendence of such entities and their members.

19 **SEC. 835. NASA ADVISORY COUNCIL.**

20 (a) ASSESSMENT.—The Administrator shall enter  
21 into an arrangement with the National Academy of Public  
22 Administration to assess the effectiveness of the NASA  
23 Advisory Council and to make recommendations to Con-  
24 gress for any change to—

25 (1) the functions of the Council;

1           (2) the appointment of members to the Council;

2           (3) the qualifications for members of the Coun-

3       cil;

4           (4) the duration of terms of office for members

5       of the Council;

6           (5) the frequency of meetings of the Council;

7           (6) the structure of leadership and Committees

8       of the Council; and

9           (7) the levels of professional staffing for the  
10       Council.

11       (b) CONSIDERATIONS.—In carrying out the assess-  
12       ment under subsection (a), the National Academy of Pub-  
13       lic Administration shall—

14           (1) consider the impacts of broadening the  
15       Council's role to include providing consultation and  
16       advice to Congress under section 20113(g) of title  
17       51, United States Code;

18           (2) consider the past activities of the Council  
19       and the activities of other analogous Federal advi-  
20       sory bodies; and

21           (3) any other issues that the National Academy  
22       of Public Administration determines could poten-  
23       tially impact the effectiveness of the Council.

24       (c) REPORT.—The National Academy of Public Ad-  
25       ministration shall submit to the appropriate committees

1 of Congress the results of the assessment, including any  
2 recommendations.

3 (d) CONSULTATION AND ADVICE.—

4 (1) IN GENERAL.—Section 20113(g) of title 51,  
5 United States Code, is amended by inserting “and  
6 Congress” after “advice to the Administration”.

7 (2) SUNSET.—Effective September 30, 2017,  
8 section 20113(g) of title 51, United States Code, is  
9 amended by striking “and Congress”.

10 **SEC. 836. COST ESTIMATION.**

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

13 (1) realistic cost estimating is critically impor-  
14 tant to the ultimate success of major space develop-  
15 ment projects; and

16 (2) the Administration has devoted significant  
17 efforts over the past 5 years to improving its cost es-  
18 timating capabilities, but it is important that the  
19 Administration continue its efforts to develop and  
20 implement guidance in establishing realistic cost es-  
21 timates.

22 (b) GUIDANCE AND CRITERIA.—The Administrator  
23 shall provide to its acquisition programs and projects, in  
24 a manner consistent with the Administration’s Space  
25 Flight Program and Project Management Requirements—

1           (1) guidance on when to use an Independent  
2       Cost Estimate and Independent Cost Assessment;  
3       and

4           (2) criteria to use to make a determination  
5       under paragraph (1).

6       **SEC. 837. FACILITIES AND INFRASTRUCTURE.**

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

9           (1) the Administration must address, mitigate,  
10       and reverse, where possible, the deterioration of its  
11       facilities and infrastructure, as their condition is  
12       hampering the effectiveness and efficiency of re-  
13       search performed by both the Administration and in-  
14       dustry participants making use of Administration fa-  
15       cilities, thus harming the competitiveness of the  
16       United States aerospace industry;

17          (2) the Administration has a role in providing  
18       laboratory capabilities to industry participants that  
19       are not economically viable as commercial entities  
20       and thus are not available elsewhere;

21          (3) to ensure continued access to reliable and  
22       efficient world-class facilities by researchers, the Ad-  
23       ministration should establish strategic partnerships  
24       with other Federal agencies, State agencies, FAA-li-

1 censed spaceports, institutions of higher education,  
2 and industry, as appropriate; and

3 (4) decisions on whether to dispose of, main-  
4 tain, or modernize existing facilities must be made  
5 in the context of meeting Administration and other  
6 needs, including those required to meet the activities  
7 supporting the human exploration roadmap under  
8 section 432 of this Act, considering other national  
9 laboratory needs as the Administrator deems appro-  
10 priate.

11 (b) POLICY.—It is the policy of the United States  
12 that the Administration maintain reliable and efficient fa-  
13 cilities and infrastructure and that decisions on whether  
14 to dispose of, maintain, or modernize existing facilities or  
15 infrastructure be made in the context of meeting future  
16 Administration needs.

17 (c) PLAN.—

18 (1) IN GENERAL.—The Administrator shall de-  
19 velop a facilities and infrastructure plan.

20 (2) GOAL.—The goal of the plan is to position  
21 the Administration to have the facilities and infra-  
22 structure, including laboratories, tools, and ap-  
23 proaches, necessary to meet future Administration  
24 and other Federal agencies' laboratory needs.

25 (3) CONTENTS.—The plan shall identify—

1 (A) current Administration and other Fed-  
2 eral agency laboratory needs;

3 (B) future Administration research and de-  
4 velopment and testing needs;

5 (C) a strategy for identifying facilities and  
6 infrastructure that are candidates for disposal,  
7 that is consistent with the national strategic di-  
8 rection set forth in—

9 (i) the National Space Policy;

10 (ii) the National Aeronautics Re-  
11 search, Development, Test, and Evaluation  
12 Infrastructure Plan;

13 (iii) the National Aeronautics and  
14 Space Administration Authorization Act of  
15 2005 (Public Law 109–155; 119 Stat.  
16 2895), National Aeronautics and Space  
17 Administration Authorization Act of 2008  
18 (Public Law 110–422; 122 Stat. 4779),  
19 and National Aeronautics and Space Ad-  
20 ministration Authorization Act of 2010 (42  
21 U.S.C. 18301 et seq.); and

22 (iv) the human exploration roadmap  
23 under section 432 of this Act;

24 (D) a strategy for the maintenance, repair,  
25 upgrading, and modernization of Administra-

tion facilities and infrastructure, including laboratories and equipment;

(E) criteria for—

(i) prioritizing deferred maintenance tasks;

(ii) maintaining, repairing, upgrading, or modernizing Administration facilities and infrastructure; and

(iii) implementing processes, plans, and policies for guiding the Administration's Centers on whether to maintain, repair, upgrade, or modernize a facility or infrastructure and for determining the type of instrument to be used;

(F) an assessment of modifications needed to maximize usage of facilities that offer unique and highly specialized benefits to the aerospace industry and the American public; and

(G) implementation steps, including a timeline, milestones, and an estimate of resources required for carrying out the plan.

(d) REQUIREMENT TO ESTABLISH POLICY.—

(1) IN GENERAL.—Not later than 180 days after the date of enactment of this Act, the Administrator shall establish and make publicly available a

1 policy that guides the Administration’s use of exist-  
 2 ing authorities to out-grant, lease, excess to the  
 3 General Services Administration, sell, decommission,  
 4 demolish, or otherwise transfer property, facilities,  
 5 or infrastructure.

6 (2) CRITERIA.—The policy shall include criteria  
 7 for the use of authorities, best practices, standard-  
 8 ized procedures, and guidelines for how to appro-  
 9 priately manage property, facilities, and infrastruc-  
 10 ture.

11 (e) SUBMISSION TO CONGRESS.—Not later than 1  
 12 year after the date of enactment of this Act, the Adminis-  
 13 trator shall submit to the appropriate committees of Con-  
 14 gress the plan developed under subsection (c).

15 **SEC. 838. HUMAN SPACE FLIGHT ACCIDENT INVESTIGA-**  
 16 **TIONS.**

17 Section 70702 of title 51, United States Code, is  
 18 amended—

19 (1) by amending subsection (a)(3) to read as  
 20 follows:

21 “(3) any other orbital or suborbital space vehi-  
 22 cle carrying humans that is—

23 “(A) owned by the Federal Government; or

24 “(B) being used pursuant to a contract or

25 Space Act Agreement with the Federal Govern-

ment for carrying a government astronaut or a  
 researcher funded by the Federal Government;  
 or”; and

(2) by adding at the end the following:

“(c) DEFINITIONS.—In this section:

“(1) GOVERNMENT ASTRONAUT.—The term  
 ‘government astronaut’ has the meaning given the  
 term in section 50902.

“(2) SPACE ACT AGREEMENT.—The term  
 ‘Space Act Agreement’ means an agreement entered  
 into by the Administration pursuant to its other  
 transactions authority under section 20113(e).”.

**SEC. 839. ORBITAL DEBRIS.**

(a) FINDINGS.—Congress finds that—

(1) orbital debris poses serious risks to the  
 operational space capabilities of the United States;

(2) an international commitment and integrated  
 strategic plan are needed to mitigate the growth of  
 orbital debris wherever possible; and

(3) the delay in the Office of Science and Tech-  
 nology Policy’s submission of a report on the status  
 of international coordination and development of or-  
 bital debris mitigation strategies is inconsistent with  
 such risks.

(b) REPORTS.—

1           (1) COORDINATION.—Not later than 90 days  
2     after the date of enactment of this Act, the Adminis-  
3     trator shall submit to the appropriate committees of  
4     Congress a report on the status of efforts to coordi-  
5     nate with foreign countries within the Inter-Agency  
6     Space Debris Coordination Committee to mitigate  
7     the effects and growth of orbital debris under sec-  
8     tion 1202(b)(1) of the National Aeronautics and  
9     Space Administration Authorization Act of 2010 (42  
10    U.S.C. 18441(b)(1)).

11          (2) MITIGATION STRATEGY.—Not later than 90  
12    days after the date of enactment of this Act, the Di-  
13    rector of the Office of Science and Technology Policy  
14    shall submit to the appropriate committees of Con-  
15    gress a report on the status of the orbital debris  
16    mitigation strategy required under section  
17    1202(b)(2) of the National Aeronautics and Space  
18    Administration Authorization Act of 2010 (42  
19    U.S.C. 18441(b)(2)).

20 **SEC. 840. REVIEW OF ORBITAL DEBRIS REMOVAL CON-**  
21 **CEPTS.**

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

24           (1) orbital debris in low-Earth orbit poses sig-  
25    nificant risks to spacecraft;

1           (2) such orbital debris may increase due to col-  
2       lisions between existing debris objects; and

3           (3) understanding options to address and re-  
4       move orbital debris is important for ensuring safe  
5       and effective spacecraft operations in low-Earth  
6       orbit.

7       (b) REVIEW.—

8           (1) IN GENERAL.—Not later than 270 days  
9       after the date of enactment of this Act, the Adminis-  
10      trator—

11           (A) in collaboration with the heads of other  
12          relevant Federal agencies, shall solicit and re-  
13          view concepts and options for removing orbital  
14          debris from low-Earth orbit; and

15           (B) shall submit to the appropriate com-  
16          mittees of Congress a report on the solicitation  
17          and review under subparagraph (A), including  
18          recommendations on the best options for de-  
19          creasing the risks associated with orbital debris.

20           (2) REQUIREMENTS.—The solicitation and re-  
21       view under paragraph (1) shall address the require-  
22       ments for and feasibility of developing and imple-  
23       menting each of the options.

1 **SEC. 841. SPACE ACT AGREEMENTS.**

2 (a) SENSE OF CONGRESS.—It is the sense of Con-  
3 gress that, when used appropriately, Space Act Agree-  
4 ments can provide significant value in furtherance of  
5 NASA’s mission.

6 (b) FUNDED SPACE ACT AGREEMENTS.—To the ex-  
7 tent appropriate, the Administrator shall seek to maximize  
8 the value of contributions provided by other parties under  
9 a funded Space Act Agreement in order to advance  
10 NASA’s mission.

11 (c) NON-EXCLUSIVITY.—

12 (1) IN GENERAL.—The Administrator shall, to  
13 the greatest extent practicable, issue each Space Act  
14 Agreement—

15 (A) except as provided in paragraph (2),  
16 on a nonexclusive basis;

17 (B) in a manner that ensures all non-gov-  
18 ernment parties have equal access to NASA re-  
19 sources; and

20 (C) exercising reasonable care not to reveal  
21 unique or proprietary information.

22 (2) EXCLUSIVITY.—If the Administrator deter-  
23 mines an exclusive arrangement is necessary, the  
24 Administrator shall, to the greatest extent prac-  
25 ticable, issue the Space Act Agreement—

1 (A) utilizing a competitive selection process  
2 when exclusive arrangements are necessary; and

3 (B) pursuant to public announcements  
4 when exclusive arrangements are necessary.

5 (d) TRANSPARENCY.—The Administrator shall pub-  
6 licly disclose on the Administration’s website and make  
7 available in a searchable format each Space Act Agree-  
8 ment, including an estimate of committed NASA resources  
9 and the expected benefits to agency objectives for each  
10 agreement, with appropriate redactions for proprietary,  
11 sensitive, or classified information, not later than 60 days  
12 after such agreement is signed by the parties.

13 (e) ANNUAL REPORTS.—

14 (1) REQUIREMENT.—Not later than 90 days  
15 after the end of each fiscal year, the Administrator  
16 shall submit to the appropriate committees of Con-  
17 gress a report on the use of Space Act Agreement  
18 authority by the Administration during the previous  
19 fiscal year.

20 (2) CONTENTS.—The report shall include for  
21 each Space Act Agreement in effect at the time of  
22 the report—

23 (A) an indication of whether the agreement  
24 is a reimbursable, non-reimbursable, or funded  
25 Space Act Agreement;

1 (B) a description of—

2 (i) the subject and terms;

3 (ii) the parties;

4 (iii) the responsible—

5 (I) Mission Directorate;

6 (II) Center; or

7 (III) headquarters element;

8 (iv) the value;

9 (v) the extent of the cost sharing  
10 among Federal Government and non-Fed-  
11 eral sources;

12 (vi) the time period or schedule; and

13 (vii) all milestones; and

14 (C) an indication of whether the agreement  
15 was renewed during the previous fiscal year.

16 (3) ANTICIPATED AGREEMENTS.—The report  
17 shall include a list of all anticipated reimbursable,  
18 non-reimbursable, and funded Space Act Agreements  
19 for the upcoming fiscal year.

20 (4) CUMULATIVE PROGRAM BENEFITS.—The  
21 report shall include, with respect to each Space Act  
22 Agreement covered by the report, a summary of—

23 (A) the technology areas in which research  
24 projects were conducted under that agreement;

1 (B) the extent to which the use of that  
2 agreement—

3 (i) has contributed to a broadening of  
4 the technology and industrial base avail-  
5 able for meeting Administration needs; and

6 (ii) has fostered within the technology  
7 and industrial base new relationships and  
8 practices that support the United States;  
9 and

10 (C) the total amount of value received by  
11 the Federal Government during the fiscal year  
12 under that agreement.

Passed the Senate February 17 (legislative day,  
February 16), 2017.

Attest:

*Secretary.*



115TH CONGRESS  
1ST Session

**S. 442**

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**AN ACT**

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