

Calendar No. 696

114TH CONGRESS
2D SESSION

S. 3346

[Report No. 114–390]

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

IN THE SENATE OF THE UNITED STATES

SEPTEMBER 15, 2016

Mr. CRUZ (for himself, Mr. NELSON, Mr. RUBIO, Mr. PETERS, Mr. WICKER,
Mr. UDALL, Ms. CANTWELL, Mr. THUNE, and Mrs. MURRAY) introduced
the following bill; which was read twice and referred to the Committee
on Commerce, Science, and Transportation

DECEMBER 5, 2016

Reported by Mr. THUNE, with an amendment

[Strike out all after the enacting clause and insert the part printed in *italic*]

A BILL

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 2016”.

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.

TITLE IV—ADVANCING HUMAN DEEP SPACE EXPLORATION

Subtitle A—Human Exploration Goals and Objectives

Sec. 411. Human exploration long-term goals.

Sec. 412. Goals and objectives.

Sec. 413. Vision for space exploration.

Sec. 414. Exploration plan and programs.

Sec. 415. Stepping stone approach to exploration.

Subtitle B—Assuring Core Capabilities for Exploration

Sec. 421. Space Launch System and Orion.

Subtitle C—Journey to Mars

Sec. 431. Space technology infusion.

Sec. 432. Findings on human space exploration.

Sec. 433. Strategic framework for human spaceflight and exploration.

Sec. 434. Advanced space suit capability.

Sec. 435. Asteroid robotic redirect mission.

Subtitle D—Scott Kelly Human Spaceflight and Exploration 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. Sense of Congress on wide-field infrared survey telescope.
 Sec. 505. Sense of Congress on Mars 2020 rover.
 Sec. 506. Europa.

TITLE VI—MAXIMIZING EFFICIENCY

Subtitle A—Agency Information Technology and Cybersecurity

Sec. 611. Information technology governance.
 Sec. 612. Information technology strategic plan.
 Sec. 613. Cybersecurity.
 Sec. 614. Oversight implementation progress.
 Sec. 615. Software oversight.
 Sec. 616. Security management of foreign national access.
 Sec. 617. Cybersecurity of web applications.

Subtitle B—Collaboration Among Mission Directorates and Other Matters

Sec. 621. Collaboration among mission directorates.
 Sec. 622. NASA launch capabilities collaboration.
 Sec. 623. Commercial space launch cooperation.
 Sec. 624. Detection and avoidance of counterfeit parts.
 Sec. 625. Education and outreach.

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

1 (B) the Committee on Science, Space, and
2 Technology of the House of Representatives.

3 (4) ~~CIS-LUNAR SPACE.~~—The term “~~cis-lunar~~
4 space” means the region of space from the Earth
5 out to and including the region around the surface
6 of the Moon.

7 (5) ~~DEEP SPACE.~~—The term “~~deep space~~”
8 means the region of space beyond low-Earth orbit,
9 to include ~~cis-lunar~~ space.

10 (6) ~~GOVERNMENT ASTRONAUT.~~—The term
11 “~~government astronaut~~” has the meaning given the
12 term in section 50902 of title 51, United States
13 Code.

14 (7) ~~ISS.~~—The term “~~ISS~~” means the Inter-
15 national Space Station.

16 (8) ~~ISS MANAGEMENT ENTITY.~~—The term
17 “~~ISS management entity~~” means the organization
18 with which the Administrator has a cooperative
19 agreement under section 504(a) of the National Aer-
20 onautics and Space Administration Authorization
21 Act of 2010 (42 U.S.C. 18354(a)).

22 (9) ~~NASA.~~—The term “~~NASA~~” means the Na-
23 tional Aeronautics and Space Administration.

24 (10) ~~ORION.~~—The term “~~Orion~~” means the
25 multipurpose crew vehicle described under section

1 ~~303~~ of the National Aeronautics and Space Adminis-
 2 tration Authorization Act of 2010 (42 U.S.C.
 3 ~~18323~~).

4 ~~(11)~~ SPACE LAUNCH SYSTEM.—The term
 5 “Space Launch System” has the meaning given the
 6 term in section ~~3~~ of the National Aeronautics and
 7 Space Administration Authorization Act of 2010 (42
 8 U.S.C. ~~18302~~).

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, \$4,532,000,000.~~

15 ~~(2) For Space Operations, \$4,950,700,000.~~

16 ~~(3) For Science, \$5,395,000,000.~~

17 ~~(4) For Aeronautics, \$601,000,000.~~

18 ~~(5) For Space Technology, \$686,500,000.~~

19 ~~(6) For Education, \$108,000,000.~~

20 ~~(7) For Safety, Security, and Mission Services,~~
 21 ~~\$2,796,700,000.~~

22 ~~(8) For Construction and Environmental Com-~~
 23 ~~pliance and Restoration, \$400,000,000.~~

24 ~~(9) For Inspector General, \$38,100,000.~~

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

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

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

8 (1) the United States, in collaboration with its
 9 international, academic, and industry partners,
 10 should sustain and build upon our national space
 11 commitments and investments across Administra-
 12 tions with a continuity of purpose to advance recent
 13 achievements of space exploration and space science
 14 to extend humanity’s reach into deep space, includ-
 15 ing eis-lunar space, the Moon, the surface and
 16 moons of Mars, and beyond;

17 (2) NASA leaders can best leverage investments
 18 in the United States space program by continuing to
 19 develop a balanced portfolio for space exploration
 20 and space science, including continued development
 21 of the Space Launch System, Orion, Commercial
 22 Crew and Commercial Resupply Services, the James
 23 Webb Space Telescope, and the ongoing operations
 24 of the International Space Station;

1 (3) a national, government-led space program
2 that builds on current science and exploration pro-
3 grams and advances human knowledge and capabili-
4 ties and opens the frontier beyond Earth for our-
5 selves, our international partners, commercial enter-
6 prise, and science is of critical importance to our na-
7 tional destiny and to a future guided by United
8 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) United States Government astronauts
20 changed the trajectory of human history toward the
21 promise of the stars, and it is imperative that the
22 United States maintain and enhance its leadership
23 in space exploration and continue to expand freedom
24 and opportunities in space for all Americans that are

1 consistent with the Constitution of the United
2 States; and

3 ~~(7) NASA is and should remain a multimission~~
4 ~~agency with a balanced and robust set of core mis-~~
5 ~~sions in science, space technology, aeronautics,~~
6 ~~human space flight and exploration, and education.~~

7 **SEC. 202. FINDINGS.**

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

10 (1) Challenges of the past, such as the cancella-
11 tion of major programs, have disrupted completion
12 of major space systems thereby—

13 (A) impeding planning and pursuit of na-
14 tional objectives in human space exploration;

15 (B) placing the Nation's investment in
16 space exploration at risk; and

17 (C) degrading the aerospace industrial
18 base.

19 (2) The National Aeronautics and Space Ad-
20 ministration Authorization Act of 2010 (42 U.S.C.
21 18301 et seq.) reflects a broad, bipartisan agree-
22 ment on the path forward for NASA's core missions
23 in science, space technology, aeronautics, human
24 space flight and exploration, and education, which

1 serves as the foundation for the policy updates by
2 this Act.

3 ~~(3)~~ Sustaining the investment and maximizing
4 utilization of the ISS and ISS National Laboratory
5 with our international and industry partners is—

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

8 ~~(B)~~ imperative to continuing United States
9 global leadership in human space exploration,
10 science, research, technology development, and
11 education opportunities that contribute to devel-
12 opment of the next generation of American sci-
13 entists, engineers, and leaders, and to creating
14 the opportunity for economic development of
15 low-Earth orbit.

16 ~~(4)~~ NASA has made measurable progress in de-
17 velopment and testing of the Space Launch System
18 and Orion exploration systems with the near-term
19 objectives of the initial integrated test flight and
20 launch in 2018, a human mission in 2021, and con-
21 tinued missions in eis-lunar space and eventually to
22 the surface of Mars.

23 ~~(5)~~ The Commercial Crew Program is on sched-
24 ule to reestablish the capability to launch United

1 States government astronauts from United States
2 soil into orbit by the end of 2018.

3 (6) The Aerospace Safety Advisory Panel, in its
4 2015 Annual Report, urged continuity of purpose
5 noting concerns over the potential for cost overruns
6 and schedule slips that could accompany significant
7 changes to core NASA programs.

8 **TITLE III—MAXIMIZING UTILIZA-**
9 **TION OF THE ISS AND LOW-**
10 **EARTH ORBIT**

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

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

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

17 (2) expansion of partnerships, scientific re-
18 search, commercial applications, and exploration
19 testbed capabilities of the ISS is essential to ensur-
20 ing the greatest return on investments made by the
21 United States and its international space partners in
22 the development, assembly, and operations of that
23 unique facility;

24 (3) stable and successful Commercial Cargo and
25 Commercial Crew programs are critical to ensuring

1 timely provisioning of the ISS and to reestablishing
2 the capability to launch United States government
3 astronauts from United States soil into orbit;

4 (4) sustaining United States leadership and
5 progress in human space exploration is enabled by
6 continuing utilization of the ISS—

7 (A) to facilitate the commercialization and
8 economic development of low-Earth orbit;

9 (B) to serve as a testbed for technologies;
10 and to conduct scientific research and develop-
11 ment; and

12 (C) as an orbital facility enabling research
13 upon—

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

16 (ii) the development of in-space sys-
17 tems enabling human space exploration be-
18 yond low-Earth orbit;

19 (5) the Administrator should continue to sup-
20 port the development of the Commercial Crew Pro-
21 gram as planned to end reliance upon Russian
22 transport of United States government astronauts to
23 the ISS which has not been possible since the retire-
24 ment of the Space Shuttle program in 2011; and

1 (6) the ISS should continue to provide a plat-
2 form for fundamental, microgravity, discovery-based
3 space life and physical sciences research that is crit-
4 ical for enabling space exploration, protecting hu-
5 mans in space, increasing pathways for commercial
6 space development that depend on advances in basic
7 research, and contribute to advancing science, tech-
8 nology, engineering, and mathematics research.

9 (b) CONTINUATION OF THE ISS.—Congress reaff-
10 irms the policy set forth in section 501 of the National
11 Aeronautics and Space Administration Authorization Act
12 of 2010 (42 U.S.C. 18351) that it shall be the policy of
13 the United States, in consultation with its international
14 partners in the ISS program, to support full and complete
15 utilization of the ISS through at least 2024.

16 **SEC. 302. TRANSPORTATION TO ISS.**

17 (a) SENSE OF CONGRESS ON COMMERCIAL CREW
18 AND COMMERCIAL CARGO PROGRAMS.—It is the sense of
19 Congress that—

20 (1) NASA should build upon the success of the
21 Commercial Orbital Transportation Services and
22 Commercial Resupply Services programs that have
23 allowed private sector companies to partner with
24 NASA to deliver cargo and scientific experiments to
25 the ISS since 2012;

1 (2) once certified to meet NASA's safety and
2 reliability requirements and fully operational to meet
3 ISS crew transfer needs; the Commercial Crew Pro-
4 gram transportation systems should serve as the pri-
5 mary means of transporting United States govern-
6 ment astronauts and international partner astro-
7 nauts from United States soil to and from the ISS;

8 (3) Commercial Crew Program transportation
9 systems should have the capability of serving as ISS
10 emergency crew rescue vehicles;

11 (4) the 21st Century Launch Complex Program
12 has enabled significant modernization and infra-
13 structure improvements at launch sites across the
14 United States to support NASA's Commercial Re-
15 supply Services and other civil and commercial space
16 flight missions; and

17 (5) the 21st Century Launch Complex Program
18 should be continued in a manner that leverages
19 State and private investments to achieve the goals of
20 the program.

21 (b) UNITED STATES POLICY.—It is the policy of the
22 United States that, to foster the competitive development,
23 operation, improvement and commercial availability of
24 space transportation services, services for Federal Govern-
25 ment access to and return from the ISS, whenever prac-

1 ticable, shall be procured via fair and open competition
 2 for well-defined, milestone-based, Federal Acquisition
 3 Regulation-based contracts under section 201(a) of the
 4 National Aeronautics and Space Administration Author-
 5 ization Act of 2010 (42 U.S.C. 18311(a)).

6 (c) ~~COMMERCIAL CARGO PROGRAM.~~—Section 401 of
 7 the National Aeronautics and Space Administration Au-
 8 thorization Act of 2010 (42 U.S.C. 18341) is amended
 9 by striking “Commercial Orbital Transportation Services”
 10 and inserting “Commercial Resupply Services”.

11 (d) ~~CREW SAFETY.~~—The Administrator shall protect
 12 the safety of United States crews by ensuring commercial
 13 crew systems meet all applicable human rating require-
 14 ments in accordance with section 403(b)(1) of the Na-
 15 tional Aeronautics and Space Administration Authoriza-
 16 tion Act of 2010 (42 U.S.C. 18342(b)(1)).

17 **SEC. 303. ISS TRANSITION PLAN.**

18 (a) ~~FINDINGS.~~—Congress finds that ~~NASA~~ has been
 19 both the primary supplier and consumer of human space
 20 flight capabilities and services of the ISS and in low-Earth
 21 orbit.

22 (b) ~~SENSE OF CONGRESS.~~—It is the sense of Con-
 23 gress that an orderly transition is needed for United
 24 States human space flight activities in low-Earth orbit
 25 from the current regime, that relies heavily on NASA

1 sponsorship, to a regime where NASA is one of many cus-
 2 tomers of a low-Earth orbit commercial human space
 3 flight enterprise.

4 (e) REPORTS.—Section 50111 of title 51, United
 5 States Code, is amended by adding at the end the fol-
 6 lowing:

7 “(e) ISS TRANSITION PLAN.—

8 “(1) IN GENERAL.—The Administrator, in co-
 9 ordination with the ISS management entity, ISS
 10 partners, the scientific user community, and the
 11 commercial space sector shall develop a plan to tran-
 12 sition in a step-wise approach from the current re-
 13 gime that relies heavily on NASA sponsorship to a
 14 regime where NASA is one of many customers of a
 15 low-Earth orbit commercial human space flight en-
 16 terprise.

17 “(2) REPORTS.—Not later than 180 days after
 18 the date of enactment of the National Aeronautics
 19 and Space Administration Transition Authorization
 20 Act of 2016, and triennially thereafter until 2023,
 21 the Administrator shall submit to the appropriate
 22 committees of Congress a report that includes—

23 “(A) an identification of low-Earth orbit
 24 capabilities necessary to meet the Administra-
 25 tion’s deep space human space flight explo-

1 ration objectives and mission requirements be-
2 yond the period of operation and utilization of
3 the ISS described in section 503 of the Na-
4 tional Aeronautics and Space Administration
5 Authorization Act of 2010 (42 U.S.C. 18353),
6 if any;

7 “(B) steps NASA is taking and will take,
8 including demonstrations that could be con-
9 ducted on the ISS, to stimulate and facilitate
10 commercial demand and supply of products and
11 services in low-Earth orbit;

12 “(C) an assessment of current and pro-
13 jected commercial activities in low-Earth orbit,
14 including on the ISS, and their potential for
15 meeting the capabilities identified in subpara-
16 graph (A);

17 “(D) an identification of barriers pre-
18 venting the commercialization of low-Earth
19 orbit, including issues relating to policy, regula-
20 tions, commercial intellectual property, data,
21 and confidentiality that could inhibit the use of
22 the ISS as a commercial incubator;

23 “(E) an evaluation of the feasible and pre-
24 ferred service life of the ISS beyond the period
25 described in section 503 of the National Aero-

1 nautics and Space Administration Authorization
2 Act of 2010 (42 U.S.C. 18353), through at
3 least 2028, as a unique scientific, commercial,
4 and exploration-related facility, including—

5 “(i) a general discussion of inter-
6 national partner capabilities and prospects
7 for extending the partnership, to include
8 the potential for participation by additional
9 countries, for the purposes of the human
10 development and exploration of deep space;

11 “(ii) a review of essential systems,
12 equipment upgrades, or potential mainte-
13 nance that would be necessary to extend
14 ISS operations and utilization;

15 “(iii) an evaluation of the cost and
16 schedule requirements associated with the
17 development and delivery of essential sys-
18 tems, equipment upgrades, or potential
19 maintenance identified under clause (ii);

20 “(iv) an identification of possible
21 international, academic, or industry part-
22 ner contributions, cost-share, and program
23 transitions to provide the upgrades identi-
24 fied under clause (ii);

1 “(v) impacts on the goals and objec-
2 tives of the ISS National Laboratory and
3 the management entity responsible for op-
4 eration of the ISS National Laboratory;

5 “(vi) impacts on services provided by
6 the Commercial Resupply Services and
7 Commercial Crew Program to the ISS;

8 “(vii) impacts on the use of the ISS
9 as a testbed to transition functions of the
10 ISS to the commercial space sector and en-
11 hance economic development of low-Earth
12 orbit, including the evolution of self-sus-
13 taining commercial activities;

14 “(viii) an assessment on the technical
15 limiting factor of the ISS lifetime, includ-
16 ing a list of critical components and their
17 expected lifetime and availability;

18 “(ix) an evaluation of the potential for
19 expanding the use of ISS facilities to ac-
20 commodate the needs of researchers and
21 other users, including changes to policies,
22 regulations, and laws that would stimulate
23 greater private and public involvement on
24 the ISS; and

1 “(x) such other information as may be
2 necessary to fully describe the justification
3 for and feasibility of extending the service
4 life of the ISS, including the potential sci-
5 entific or technological benefits to the Fed-
6 eral Government or public, or to academic
7 or commercial entities;

8 “(F) an evaluation of the functions, roles,
9 and responsibilities for management and oper-
10 ation of the ISS and a determination of—

11 “(i) those functions, roles, and re-
12 sponsibilities the Federal Government
13 should retain during the lifecycle of the
14 ISS;

15 “(ii) those functions, roles, and re-
16 sponsibilities that could be transferred to
17 the commercial space sector;

18 “(iii) the metrics that would indicate
19 the commercial space sector’s readiness
20 and ability to assume the functions, roles,
21 and responsibilities described in clause (ii);
22 and

23 “(iv) any necessary changes to any
24 agreements or other documents and the

1 law to enable the activities described in
 2 subparagraphs (B) and (C); and

3 “(G) progress on meeting human explo-
 4 ration research objectives on ISS and prospects
 5 for accomplishing future exploration and other
 6 research objectives on future commercially sup-
 7 plied low-Earth orbit platforms or migration of
 8 those objectives to cis-lunar space.

9 “(3) DEMONSTRATIONS.—Demonstrations iden-
 10 tified under paragraph (2) may—

11 “(A) test the capabilities described in para-
 12 graph (2)(A); and

13 “(B) demonstrate or test capabilities, in-
 14 cluding commercial modules or deep space habi-
 15 tats, Environmental Control and Life Support
 16 Systems, orbital satellite assembly, exploration
 17 space suits, a node that enables a wide variety
 18 of activity, including multiple commercial mod-
 19 ules and airlocks, additional docking or berth-
 20 ing ports for commercial crew and cargo, oppor-
 21 tunities for the commercial space sector to cost
 22 share for transportation and other services on
 23 the ISS, and other commercial activities.”.

1 **TITLE IV—ADVANCING HUMAN**
 2 **DEEP SPACE EXPLORATION**
 3 **Subtitle A—Human Exploration**
 4 **Goals and Objectives**

5 **SEC. 411. HUMAN EXPLORATION LONG-TERM GOALS.**

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

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

12 “(1) to expand permanent human presence be-
 13 yond low-Earth orbit and to do so, where practical,
 14 in a manner involving international, academic, and
 15 industry partners; and

16 “(2) the peaceful settlement of a location in
 17 space or on another celestial body and a thriving
 18 space economy in the 21st century.”.

19 **SEC. 412. GOALS AND OBJECTIVES.**

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

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

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

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

4 “(5) to achieve human exploration of Mars, in-
5 cluding the establishment of a capability to extend
6 human presence, including potential human habi-
7 tation, on the surface of Mars.”.

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

9 Section 20302 of title 51, United States Code, is
10 amended—

11 (1) in subsection (a), by inserting “in eis-lunar
12 space or” after “sustained human presence”; and

13 (2) by amending subsection (b) to read as fol-
14 lows:

15 “(b) FUTURE EXPLORATION OF MARS.—The Admin-
16 istrator shall manage human space flight programs, in-
17 cluding the Space Launch System and Orion, to enable
18 humans to explore Mars and other destinations by defin-
19 ing a series of sustainable steps and conducting mission
20 planning, research, and technology development on a time-
21 table that is technically and fiscally possible, consistent
22 with section 70504.”.

23 **SEC. 414. EXPLORATION PLAN AND PROGRAMS.**

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

1 “(2) implement an exploration research and
 2 technology development program to enable human
 3 and robotic operations consistent with section
 4 20302(b) of this title;”.

5 **SEC. 415. STEPPING STONE APPROACH TO EXPLORATION.**

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

8 **“§ 70504. Stepping stone approach to exploration**

9 “(a) IN GENERAL.—In order to maximize the cost-
 10 effectiveness of the long-term exploration and utilization
 11 activities of the United States, the Administrator shall
 12 take all necessary steps, including engaging international,
 13 academic, and industry partners to ensure that activities
 14 in the Administration’s human exploration program bal-
 15 ance how those activities might also help meet the require-
 16 ments of future exploration and utilization activities lead-
 17 ing to human habitation on the surface of Mars.

18 “(b) COMPLETION.—Within budgetary consider-
 19 ations, once an exploration-related project enters its devel-
 20 opment phase, the Administrator shall seek, to the max-
 21 imum extent practicable, to complete that project without
 22 undue delays.”.

Subtitle B—Assuring Core Capabilities for Exploration

SEC. 421. SPACE LAUNCH SYSTEM AND ORION.

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

(2) Through the 21st Century Launch Complex program and Exploration Ground Systems (referred to in this section as “EGS”) programs, NASA has made significant progress in transforming exploration ground systems infrastructure to meet NASA’s mission requirements for the Space Launch System and Orion and to modernize NASA’s launch complexes to the benefit of the civil, defense, and commercial space sectors.

1 (b) SENSE OF CONGRESS ON SPACE LAUNCH SYS-
 2 TEM, ORION, AND EGS.—It is the sense of Congress
 3 that—

4 (1) as the United States works to send humans
 5 on a series of missions on or near Mars in the
 6 2030s, the United States national space program
 7 should continue to make progress on its commitment
 8 by fully developing the Space Launch System, Orion,
 9 and related exploration ground systems;

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

14 (3) continuity of purpose within the Space
 15 Launch System and Orion programs are imperative
 16 as NASA prepares for the uncrewed mission, EM-
 17 1, planned for 2018 followed by the crewed mission,
 18 EM-2, in eis-lunar space planned for 2021, and for
 19 subsequent missions beginning with EM-3 extending
 20 into eis-lunar space and eventually to Mars.

21 (c) IN GENERAL.—

22 (1) EXPLORATION MISSIONS.—The Adminis-
 23 trator shall continue development of—

24 (A) an uncrewed exploration mission to
 25 demonstrate the capability of both the Space

Launch System and Orion as an integrated system by 2018;

(B) a crewed exploration mission to demonstrate the Space Launch System, including the Core Stage and Exploration Upper Stages, and the crewed Orion by 2021;

(C) subsequent missions beginning with EM-3 using the Space Launch System and Orion to extend into cis-lunar space and eventually to Mars; and

(D) development of a deep space habitat as the next element in a deep space exploration architecture along with the Space Launch System and Orion.

(2) OTHER USES.—The Administrator shall assess the utility of the Space Launch System for use by the science community and for other Federal Government launch needs, including consideration of overall cost and schedule savings from reduced transit times and increased science returns enabled by the unique capabilities of the Space Launch System.

Subtitle C—Journey to Mars

SEC. 431. SPACE TECHNOLOGY INFUSION.

(a) SENSE OF CONGRESS.—It is the sense of Congress that advancing propulsion technology would improve

1 the efficiency of trips to Mars and could shorten travel
 2 time to Mars and reduce astronaut health risks, reduce
 3 radiation exposure, consumables, and mass of materials
 4 required for the journey.

5 (b) POLICY.—It is the policy of the United States
 6 that the Administrator shall develop technologies to sup-
 7 port the Administration’s core missions as described in
 8 section 2(3) of the National Aeronautics and Space Ad-
 9 ministration Authorization Act of 2010 (42 U.S.C.
 10 18301(3)) and support sustained investments in early
 11 stage innovation and fundamental research, and tech-
 12 nologies to expand the boundaries of the national aero-
 13 space enterprise.

14 (c) PROPULSION TECHNOLOGIES.—A goal of propul-
 15 sion technologies developed under subsection (b), shall be
 16 to significantly reduce human travel time to Mars.

17 **SEC. 432. FINDINGS ON HUMAN SPACE EXPLORATION.**

18 Congress makes the following findings:

19 (1) In accordance with section 204 of the Na-
 20 tional Aeronautics and Space Administration Au-
 21 thorization Act of 2010 (124 Stat. 2813), the Na-
 22 tional Academies of Sciences, Engineering, and Med-
 23 icine, through its Committee on Human Spaceflight,
 24 conducted a review of the goals, core capabilities,
 25 and direction of human space flight, and published

1 the findings and recommendations in a 2014 report
2 entitled, “Pathways to Exploration: Rationales and
3 Approaches for a U.S. Program of Human Space
4 Exploration”.

5 (2) The Committee on Human Spaceflight in-
6 cluded leaders from the aerospace, scientific, secu-
7 rity, and policy communities.

8 (3) With input from the public, the Committee
9 on Human Spaceflight concluded that many prac-
10 tical and aspirational rationales for human space
11 flight together constitute a compelling case for con-
12 tinued national investment and pursuit of human
13 space exploration toward the horizon goal of Mars.

14 (4) According to the Committee on Human
15 Spaceflight, the rationales include economic benefits,
16 national security, national prestige, inspiring stu-
17 dents and other citizens, scientific discovery, human
18 survival, and a sense of shared destiny.

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

22 (6) The Committee on Human Spaceflight rec-
23 ommended that NASA define a series of sustainable
24 steps and conduct mission planning and technology

development as needed to achieve the long-term goal of placing humans on the surface of Mars.

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

(8) In addition to the 2014 report described in paragraph (1), there are 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 NASA's "The Global Exploration Roadmap" of 2013, "NASA's Journey to Mars—Pioneering Next Steps in Space Exploration" of 2015, NASA Jet Propulsion Laboratory's "Minimal Architecture for Human Journeys to Mars" of 2015, and Explore Mars' "The Humans to Mars Report 2016".

SEC. 433. STRATEGIC FRAMEWORK FOR HUMAN SPACEFLIGHT AND EXPLORATION.

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

(1) expanding human presence beyond low-Earth orbit and advancing toward human missions

1 to Mars in the 2030s requires early planning and
 2 timely decisions to be made in the near-term on the
 3 necessary courses of action for commitments to
 4 achieve short-term and long-term goals and objec-
 5 tives;

6 (2) for strong and sustained United States
 7 leadership, a need exists to advance a strategic
 8 framework, addressing exploration objectives in col-
 9 laboration with international, academic, and industry
 10 partners;

11 (3) an approach that incrementally advances to-
 12 ward a long-term goal is one in which nearer-term
 13 developments and implementation would influence
 14 future development and implementation; and

15 (4) a strategic framework should begin with
 16 low-Earth orbit, then address progress beyond low-
 17 Earth orbit to cis-lunar space in greater detail than
 18 future missions ultimately aimed at human arrival
 19 and activities on or near Mars.

20 (b) STRATEGIC FRAMEWORK.—

21 (1) IN GENERAL.—The Administrator shall de-
 22 velop a strategic framework, including, a critical de-
 23 cision plan, to expand human presence beyond low-
 24 Earth orbit, including to cis-lunar space, the moons
 25 of Mars, the surface of Mars, and beyond.

1 (2) SCOPE.—The strategic framework shall in-
2 clude—

3 (A) an integrated set of exploration,
4 science, and other goals and objectives of a
5 United States human space exploration pro-
6 gram with the long-term goal of human mis-
7 sions near to or on the surface of Mars in the
8 2030s;

9 (B) opportunities for international, aca-
10 demic, and industry partnerships for explo-
11 ration-related systems, services, research, and
12 technology if those opportunities provide cost-
13 savings, accelerate program schedules, or other-
14 wise benefit the exploration objectives developed
15 under subparagraph (A);

16 (C) precursor missions in cis-lunar space
17 and other missions or activities necessary to
18 meet the exploration objectives developed under
19 subparagraph (A);

20 (D) capabilities and technologies, including
21 the Space Launch System, Orion, a deep space
22 habitat, and other capabilities, that enable the
23 exploration objectives developed under subpara-
24 graph (A);

(E) a description of how eis-lunar elements, objectives, and activities advance the human exploration of Mars;

(F) an assessment of potential human health and other risks, including radiation exposure; and

(G) mitigation plans, whenever possible, to address the risks identified in subparagraph (F).

(3) CONSIDERATIONS.—In developing the strategic framework, the Administrator shall consider—

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

(B) using existing commercially available technologies and capabilities or those technologies and capabilities being developed by industry for commercial purposes;

(C) an organizational approach to ensure collaboration and coordination among NASA's Mission Directorates under section 621, when appropriate;

(D) building upon the initial uncrewed mission, EM-1, and first crewed mission, EM-2, of the Space Launch System and Orion to establish a sustainable cadence of missions ex-

1 tending human exploration missions into eis-
2 lunar space;

3 (E) developing the precursor missions and
4 activities that will demonstrate, test, and de-
5 velop key technologies and capabilities essential
6 for achieving human missions to Mars, includ-
7 ing long-duration human operations beyond
8 low-Earth orbit, space suits, solar electric pro-
9 pulsion, deep space habitats, environmental con-
10 trol life support systems, Mars lander and as-
11 cent vehicle, entry, descent, landing, ascent,
12 Mars surface systems, and in-situ resource utili-
13 zation;

14 (F) demonstrating and testing one or more
15 habitat modules in eis-lunar space to prepare
16 for Mars missions;

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

19 (H) collaborating with international, aca-
20 demic, and industry partners, when appro-
21 priate;

22 (I) risks to human health and sensitive on-
23 board technologies, including radiation expo-
24 sure;

(J) evaluating the 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 432(8).

(4) CRITICAL DECISION PLAN ON HUMAN SPACE EXPLORATION.—As part of the strategic framework, 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; and

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

1 (5) **REPORTS.**—The Administrator shall submit
 2 an initial strategic framework, including a critical
 3 decision plan, to the appropriate committee of Con-
 4 gress before December 31, 2017, and an updated
 5 strategic framework biennially thereafter.

6 **SEC. 434. ADVANCED SPACE SUIT CAPABILITY.**

7 (a) **IN GENERAL.**—Not later than 90 days after the
 8 date of enactment of this Act, the Administrator shall sub-
 9 mit to the appropriate committees of Congress a detailed
 10 plan for achieving an advanced space suit capability that
 11 aligns with the crew needs for exploration enabled by the
 12 space launch system and Orion, including an evaluation
 13 of the merit of delivering the planned suit system for use
 14 on the ISS.

15 (b) **CONSIDERATIONS.**—In developing the detailed
 16 plan under subsection (a), the Administrator shall con-
 17 sider leveraging NASA’s existing investments and tech-
 18 nologies.

19 **SEC. 435. ASTEROID ROBOTIC REDIRECT MISSION.**

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

22 (1) NASA initially estimated that the Asteroid
 23 Robotic Redirect Mission would launch in December
 24 2020 and cost no more than \$1.25 billion, excluding
 25 launch and operations.

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

5 (3) During the Key Decision Point-B review,
 6 NASA estimated that costs have grown to \$1.4 bil-
 7 lion excluding launch and operations for a launch in
 8 December 2021 and the agency must evaluate
 9 whether to accept the increase or reduce the Aster-
 10 oid Robotic Redirect Mission's scope to stay within
 11 the cost cap set by the Administrator.

12 (4) In April 2015, the NASA Advisory Coun-
 13 cil—

14 (A) issued a finding that—

15 (i) high-performance solar electric
 16 propulsion will likely be an important part
 17 of an architecture to send humans to
 18 Mars; and

19 (ii) maneuvering a large test mass is
 20 not necessary to provide a valid in-space
 21 test of a new solar electric propulsion
 22 stage;

23 (B) determined that a solar electric propul-
 24 sion mission will contribute more directly to the
 25 goal of sending humans to Mars if the mission

1 is focused entirely on development and valida-
2 tion of the solar electric propulsion stage; and
3 ~~(C)~~ determined that other possible motiva-
4 tions for acquiring and maneuvering a boulder,
5 such as asteroid science and planetary defense,
6 do not have value commensurate with their
7 probable cost.

8 ~~(5)~~ The Asteroid Robotic Redirect Mission is
9 competing for resources with other critical explo-
10 ration development programs, including the Space
11 Launch System, Orion, commercial crew, and a hab-
12 itation module.

13 ~~(6)~~ In 2014, the NASA Advisory Council rec-
14 ommended that NASA conduct an independent cost
15 and technical assessment of the Asteroid Robotic
16 Redirect Mission.

17 ~~(7)~~ NASA completed the assessment under
18 paragraph ~~(6)~~ and reviewed it as part of the agen-
19 cy's Key Decision Point-B review.

20 ~~(8)~~ In 2015, the NASA Advisory Council rec-
21 ommended that NASA preserve the following key ob-
22 jectives if the program needed to be descoped:

23 (A) Development of high power solar elec-
24 tric propulsion.

1 (B) Ability to maneuver in a low gravity
2 environment in deep space.

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

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

10 (1) the technological and scientific goals of the
11 Asteroid Robotic Redirect Mission may not be com-
12 mensurate with the cost; and

13 (2) alternative missions may provide a more
14 cost effective and scientifically beneficial means to
15 demonstrate the technologies needed for a human
16 mission to Mars that would otherwise be dem-
17 onstrated by the Asteroid Robotic Redirect Mission.

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

21 (1) conduct an evaluation of—

22 (A) alternative approaches to the Asteroid
23 Robotic Redirect Mission for demonstrating the
24 technologies and capabilities needed for a
25 human mission to Mars that would otherwise be

demonstrated by the Asteroid Robotic Redirect Mission;

(B) the scientific and technical benefits of the alternative approaches identified in subparagraph (A) compared to the Asteroid Redirect Robotic Mission to future human exploration;

(C) the commercial benefits of the alternative approaches identified in subparagraph (A), including the impact on the development of domestic solar electric propulsion technology to bolster United States competitiveness in the global marketplace; and

(D) a comparison of the estimated costs of the alternative approaches identified in subparagraph (A); and

(2) submit to the appropriate Committees of Congress a report on the evaluation under paragraph (1), including any recommendations.

Subtitle D—Scott Kelly Human Spaceflight and Exploration Act

SEC. 441. SHORT TITLE.

This subtitle may be cited as the “Scott Kelly Human Spaceflight and Exploration Act”.

1 **SEC. 442. FINDINGS; SENSE OF CONGRESS.**

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

4 (1) Human space exploration can pose signifi-
5 cant challenges and is full of substantial risk, which
6 has ultimately claimed the lives of 24 National Aero-
7 nautics and Space Administration astronauts serving
8 in the line of duty.

9 (2) As United States government astronauts
10 participate in long-duration and exploration
11 spaceflight missions they may experience increased
12 health risks, such as vision impairment, bone
13 demineralization, and behavioral health and perform-
14 ance risks, and may be exposed to galactic cosmic
15 radiation. Exposure to high levels of radiation and
16 microgravity can result in acute and long-term
17 health consequences that can increase the risk of
18 cancer and tissue degeneration and have potential
19 effects on the musculoskeletal system, central nerv-
20 ous system, cardiovascular system, immune function,
21 and vision.

22 (3) To advance the goal of long-duration and
23 exploration spaceflight missions, United States gov-
24 ernment astronaut Scott Kelly participated in a 1-
25 year twins study in space while his identical twin
26 brother, former United States government astronaut

1 Mark Kelly, acted as a human control specimen on
2 Earth, providing an understanding of the physical,
3 behavioral, microbiological, and molecular reaction of
4 the human body to an extended period of time in
5 space.

6 (4) Since the Administration currently provides
7 medical monitoring, diagnosis, and treatment for
8 United States government astronauts during their
9 active employment, given the unknown long-term
10 health consequences of long-duration space explo-
11 ration, the Administration has requested statutory
12 authority from Congress to provide medical moni-
13 toring, diagnosis, and treatment to former crew-
14 members of human space flights for psychological
15 and medical conditions associated with human space
16 flight.

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

19 (1) the United States should continue to seek
20 the unknown and lead the world in space exploration
21 and scientific discovery as the Administration pre-
22 pares for long-duration and exploration spaceflight
23 in deep space and an eventual mission to Mars;

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

4 (3) the Administration should provide the type
5 of monitoring, diagnosis, and treatment described in
6 subsection (a) only for conditions the Administration
7 considers unique to the training or exposure to the
8 spaceflight environment of crewmembers of human
9 space flights and should not require any former
10 crewmembers to participate in the Administration's
11 monitoring;

12 (4) such monitoring, diagnosis, and treatment
13 should not replace a former crewmember's private
14 health insurance;

15 (5) expanded data acquired from such moni-
16 toring, diagnosis, and treatment should be used to
17 tailor treatment, inform the requirements for new
18 spaceflight medical hardware, and develop controls
19 in order to prevent disease occurrence in the astro-
20 naut corps;

21 (6) the Administration's existing radiation ex-
22 posure standards, which have been used for missions
23 pertaining to the Space Shuttle and the ISS, would
24 limit missions to durations of 150 to 250 days and
25 would pose significant challenges to long-duration or

1 exploration spaceflight or a multiyear mission to
 2 Mars; and

3 ~~(7) the 340-day space mission of Scott Kelly~~
 4 ~~aboard the ISS—~~

5 (A) was pivotal for the goal of the United
 6 States for humans to explore deep space and
 7 Mars as the mission generated new insight into
 8 how the human body adjusts to weightlessness,
 9 isolation, radiation, and the stress of long-dura-
 10 tion space flight; and

11 (B) will help support the physical and
 12 mental well-being of astronauts during longer
 13 space exploration missions in the future.

14 **SEC. 443. MEDICAL MONITORING AND RESEARCH RELAT-**
 15 **ING TO HUMAN SPACE FLIGHT.**

16 (a) ~~IN GENERAL.~~—Subchapter III of chapter 201 of
 17 title 51, United States Code, is amended by adding at the
 18 end the following:

19 **“§ 20148. Medical monitoring and research relating to**
 20 **human space flight**

21 ~~“(a) IN GENERAL.~~—Notwithstanding any other pro-
 22 vision of law, the Administrator may provide for the med-
 23 ical monitoring, diagnosis, and treatment of a United
 24 States government astronaut, or a former United States
 25 government astronaut or payload specialist for conditions

1 that the Administrator considers associated with human
 2 space flight, including scientific and medical tests for psy-
 3 chological and medical conditions.

4 “(b) ~~EXCLUSIONS.~~—The Administrator may not—

5 “(1) provide for medical monitoring, diagnosis,
 6 or treatment of a United States government astro-
 7 naut, or a former United States government astro-
 8 naut or payload specialist under subsection (a) for
 9 any psychological or medical condition that is not as-
 10 sociated with human space flight; or

11 “(2) require a former United States govern-
 12 ment astronaut or payload specialist to participate
 13 in the monitoring authorized under subsection (a).

14 “(c) ~~PRIVACY.~~—Consistent with applicable provisions
 15 of law relating to privacy, the Administrator shall protect
 16 the privacy of all medical records generated under sub-
 17 section (a) and accessible to the Administration.

18 “(d) ~~REGULATIONS.~~—The Administrator shall pro-
 19 mulgate such regulations as are necessary to carry out this
 20 section.”.

21 (b) ~~TABLE OF CONTENTS.~~—The table of contents for
 22 chapter 201 of title 51, United States Code, is amended
 23 by inserting after the item relating to section 20147 the
 24 following:

“20148. Medical monitoring and research relating to human space flight.”.

TITLE V—ADVANCING SPACE SCIENCE

SEC. 501. MAINTAINING A BALANCED SPACE SCIENCE PORTFOLIO.

(a) **SCIENCE PORTFOLIO.**—Section 803 of the National Aeronautics and Space Administration Authorization Act of 2010 (Public Law 111–267; 124 Stat. 2832) is amended to read as follows:

“SEC. 803. OVERALL SCIENCE PORTFOLIO.

“Congress restates its sense that—

“(1) a balanced and adequately funded set of activities, consisting of research and analysis grants 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 Academy of Sciences’ decadal surveys.”.

(b) **CONFORMING AMENDMENT.**—The item relating to section 803 in the table of contents in section 1(b) of the National Aeronautics and Space Administration Authorization Act of 2010 (Public Law 111–267; 124 Stat.

1 2806) is amended by striking “Overall science portfolio-
 2 sense of the Congress” and inserting “Overall science
 3 portfolio”.

4 **SEC. 502. PLANETARY SCIENCE.**

5 (a) FINDINGS.—Congress finds that—

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

9 (2) the United States leads the world in plan-
 10 etary science and can augment its success in that
 11 area with appropriate international, academic, and
 12 industry partnerships;

13 (3) a mix of small, medium, and large planetary
 14 science missions is required to sustain a steady ea-
 15 dence of planetary exploration; and

16 (4) robotic planetary exploration is a key com-
 17 ponent of preparing for future human exploration.

18 (b) MISSION PRIORITIES.—

19 (1) IN GENERAL.—In accordance with the pri-
 20 orities established in the most recent decadal survey
 21 for planetary science, the Administrator shall en-
 22 sure, to the greatest extent practicable, the comple-
 23 tion of a balanced set of Discovery, New Frontiers,
 24 and flagship missions.

1 (2) MISSION PRIORITY ADJUSTMENTS.—Con-
 2 sistent with the set of missions described in para-
 3 graph (1); and while maintaining the continuity of
 4 scientific data and steady development of capabilities
 5 and technologies, the Administrator may seek, if
 6 necessary, adjustments to mission priorities, sched-
 7 ule, and scope in light of changing budget projec-
 8 tions.

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

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

12 (1) the James Webb Space Telescope should
 13 significantly advance our understanding of star and
 14 planet formation, improve our knowledge of the early
 15 universe, and support United States leadership in
 16 astrophysics; and

17 (2) consistent with annual Government Ac-
 18 countability Office reviews of the James Webb Space
 19 Telescope program, the Administrator should con-
 20 tinue robust surveillance of the performance of the
 21 James Webb Space Telescope project and continue
 22 to improve the reliability of cost estimates and con-
 23 tractor performance data and other major
 24 spaceflight projects in order to enhance NASA's

1 ability to successfully deliver the James Webb Space
 2 Telescope on-time and within budget.

3 **SEC. 504. SENSE OF CONGRESS ON WIDE-FIELD INFRARED**
 4 **SURVEY TELESCOPE.**

5 It is the sense of Congress that—

6 (1) the Wide-Field Infrared Survey Telescope
 7 (commonly known as “WFIRST”) mission has the
 8 potential to enable scientific discoveries that will
 9 transform our understanding of the universe; and

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

18 **SEC. 505. SENSE OF CONGRESS ON MARS 2020 ROVER.**

19 It is the sense of Congress that—

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

23 (2) the Mars 2020 mission—

24 (A) should significantly increase our un-
 25 derstanding of Mars;

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

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

7 **SEC. 506. EUROPA.**

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

10 (1) Studies of Europa, Jupiter’s moon, indicate
11 that Europa may provide a habitable environment,
12 as it contains key ingredients known to support life
13 on Earth, including liquid water, heat, chemistry,
14 and time.

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

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

22 (4) The Europa mission was ranked as the top
23 priority mission in the previous Planetary Science
24 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 **TITLE VI—MAXIMIZING** 14 **EFFICIENCY**

15 **Subtitle A—Agency Information** 16 **Technology and Cybersecurity**

17 **SEC. 611. INFORMATION TECHNOLOGY GOVERNANCE.**

18 (a) IN GENERAL.—The Administrator, in consulta-
19 tion with the chief information officer of NASA, shall—

20 (1) ensure the NASA Chief Information Officer
21 has a significant role in the management, govern-
22 ance, and oversight processes related to information
23 technology operations and investments and informa-
24 tion security programs for the protection of NASA
25 systems;

1 (2) establish the NASA Chief Information Offi-
2 cer as a direct report to the Administrator;

3 (3) ensure the NASA Chief Information Officer
4 has the appropriate resources and insight to oversee
5 NASA information technology and information secu-
6 rity operations and investments;

7 (4) provide an information technology program
8 management framework to increase the efficiency
9 and effectiveness of information technology invest-
10 ments, including relying on metrics for identifying
11 and reducing potential duplication, waste, and cost;

12 (5) establish a monetary threshold for all agen-
13 cy information technology investments and related
14 contracts, including non-highly and highly special-
15 ized and specialized information technology, regard-
16 less of the procurement instrument, over which the
17 NASA Chief Information Officer shall have final ap-
18 proval;

19 (6) improve the operational linkage between the
20 NASA Chief Information Officer and each NASA
21 mission directorate, center, and mission support of-
22 fice to ensure both agency and mission needs are
23 considered in agency-wide information technology
24 and information security management and oversight;

1 (7) review the portfolio of information tech-
2 nology investments and spending, including informa-
3 tion technology-related investments included as part
4 of activities within NASA mission directorates that
5 may not be considered information technology, to en-
6 sure investments are recognized and reported appro-
7 priately based on guidance from the Office of Man-
8 agement and Budget;

9 (8) consider appropriate revisions to the char-
10 ters of information technology boards and councils
11 that inform information technology investment and
12 operation decisions; and

13 (9) consider whether the Chief Information Of-
14 ficer should have a seat on any boards or councils
15 described in paragraph (8).

16 **SEC. 612. INFORMATION TECHNOLOGY STRATEGIC PLAN.**

17 (a) IN GENERAL.—Subject to subsection (b), the
18 NASA Chief Information Officer, in consultation with the
19 chief information officer of each Administration center,
20 shall develop an information technology strategic plan to
21 guide NASA information technology management and
22 strategic objectives.

23 (b) REQUIREMENTS.—In developing the strategic
24 plan, the NASA Chief Information Officer shall ensure
25 that the strategic plan is consistent with—

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

3 (2) the requirements under section 3506 of title
4 44, United States Code.

5 (e) CONTENTS.—The strategic plan shall include—

6 (1) near and long-term goals and objectives for
7 leveraging information technology;

8 (2) a plan for how the NASA Chief Information
9 Officer will submit to Congress of a list of informa-
10 tion technology projects, including completion dates
11 and risk level in accordance with guidance from the
12 Office of Management and Budget;

13 (3) an implementation overview for an agency-
14 wide centralized approach to information technology
15 investments and operations, including reducing bar-
16 riers to cross-center collaboration;

17 (4) coordination by the NASA Chief Informa-
18 tion Officer with centers and mission directorates to
19 ensure that information technology policies are effec-
20 tively and efficiently implemented across the agency;

21 (5) a plan to increase the efficiency and effec-
22 tiveness of information technology investments, in-
23 cluding a description of how unnecessarily duplica-
24 tive, wasteful, legacy, or outdated information tech-
25 nology across NASA will be identified and elimi-

1 nated, and a schedule for the identification and
 2 elimination of such information technology;

3 (6) a plan for improving the information secu-
 4 rity of agency information and agency information
 5 systems, including improving security control assess-
 6 ments and role-based security training of employees;
 7 and

8 (7) submission by the NASA Chief Information
 9 Officer to Congress of information regarding high
 10 risk projects and cybersecurity risks.

11 (d) CONGRESSIONAL OVERSIGHT.—The NASA Chief
 12 Information Officer shall submit to the appropriate com-
 13 mittees of Congress the strategic plan under subsection
 14 (a) and any updates thereto.

15 **SEC. 613. CYBERSECURITY.**

16 (a) FINDING.—The security of NASA information
 17 and information systems is vital to the success of the mis-
 18 sion of the agency.

19 (b) INFORMATION SECURITY PLAN.—Section 1207 of
 20 the National Aeronautics and Space Administration Au-
 21 thorization Act of 2010 (42 U.S.C. 18445) is amended—

22 (1) by redesignating subsections (a) through (c)
 23 as subsections (b) through (d), respectively;

24 (2) by inserting before subsection (b), as redес-
 25 ignated, the following:

1 ~~“(a) AGENCY-WIDE INFORMATION SECURITY~~
 2 ~~PLAN.—~~

3 ~~“(1) IN GENERAL.—Not later than 1 year after~~
 4 ~~the date of enactment of the National Aeronautics~~
 5 ~~and Space Administration Transition Authorization~~
 6 ~~Act of 2016, the Administrator shall implement the~~
 7 ~~information security plan developed under paragraph~~
 8 ~~(2) and take such further actions as the Adminis-~~
 9 ~~trator considers necessary to improve the informa-~~
 10 ~~tion security system in accordance with this section.~~

11 ~~“(2) INFORMATION SECURITY PLAN.—Subject~~
 12 ~~to paragraphs (3), (4), and (5), the chief informa-~~
 13 ~~tion officer of NASA, shall develop an agency-wide~~
 14 ~~information security plan to enhance information se-~~
 15 ~~curity for NASA information and information infra-~~
 16 ~~structure.~~

17 ~~“(3) REQUIREMENTS.—In developing the plan~~
 18 ~~under paragraph (2), the chief information officer~~
 19 ~~shall ensure that the plan—~~

20 ~~“(A) is consistent with policies, standards,~~
 21 ~~guidelines, and directives on information secu-~~
 22 ~~rity under subchapter II of chapter 35 of title~~
 23 ~~44, United States Code;~~

1 “(B) is consistent with the standards and
2 guidelines under section 11331 of title 40,
3 United States Code; and

4 “(C) meets applicable National Institute of
5 Standards and Technology information security
6 standards and guidelines.

7 “(4) APPROVAL.—The chief information officer
8 shall submit the plan to the Administrator for ap-
9 proval prior to its implementation.

10 “(5) CONTENTS.—The plan shall include—

11 “(A) an overview of the requirements of
12 the 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
24 entities, including between each center, facility,
25 mission directorate, and mission support office;

and among agency entities responsible for different aspects of information security;

~~“(F) heightened consideration of the need to protect the information security of mission-critical systems and activities and high-impact and moderate-impact information systems; and~~

~~“(G) a schedule of frequent reviews and updates, as necessary, of the plan.”; and~~

~~(3) in subsection (b), as redesignated—~~

~~(A) in paragraph (1)—~~

~~(i) in subparagraph (B), by striking “; and” and inserting a semicolon;~~

~~(ii) in subparagraph (C), by striking the period at the end and inserting “; and”; and~~

~~(iii) by adding at the end the following:~~

~~“(D) an update on the agency’s efforts to apply additional information security protections to secure high-impact and moderate-impact information systems and mission-critical systems and activities, including those systems that control spacecraft and maintain critical data sources.”; and~~

1 (B) in paragraph (2), by striking “section
2 3545” and inserting “section 3555”.

3 **SEC. 614. OVERSIGHT IMPLEMENTATION PROGRESS.**

4 Not later than 90 days after the date of enactment
5 of this Act, and periodically thereafter until the informa-
6 tion security plan under section 1207 of the National Aer-
7 onautics and Space Administration Authorization Act of
8 2010 (42 U.S.C. 18445), as amended, is developed and
9 implemented agency-wide, the Administrator shall provide
10 to the appropriate committees of Congress an update on
11 the progress made toward implementation of or response
12 to—

13 (1) the information security plan under that
14 section; and

15 (2) the information security-related rec-
16 ommendations made by the NASA Inspector General
17 and the Comptroller General in the 5 years pre-
18 ceding the date of enactment of this Act.

19 **SEC. 615. SOFTWARE OVERSIGHT.**

20 The Administrator shall—

21 (1) develop a strategic plan to transition NASA
22 from legacy software by adopting a service-based ac-
23 quisition model in line with industry best practices;

24 (2) develop and implement an agency-wide soft-
25 ware license management policy to improve cen-

1 tralization, lifecycle management, and procurement
 2 education, including education on contract negotia-
 3 tions, relevant laws and regulations, and agency-wide
 4 contract terms and conditions; and

5 (3) direct an agency-wide inventory of NASA's
 6 total software licenses and spending, including costs,
 7 benefits, usage, and trending data.

8 **SEC. 616. SECURITY MANAGEMENT OF FOREIGN NATIONAL**
 9 **ACCESS.**

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

16 **SEC. 617. CYBERSECURITY OF WEB APPLICATIONS.**

17 Not later than 180 days after the date of enactment
 18 of this Act, the NASA Chief Information Officer shall—

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

23 (2) implement the recommendation from the
 24 NASA Inspector General in the audit report dated
 25 July 10, 2014, (IG-14-023) to remove from the

1 Internet or secure with a web application firewall all
 2 NASA web applications in development or testing
 3 mode.

4 **Subtitle B—Collaboration Among** 5 **Mission Directorates and Other** 6 **Matters**

7 **SEC. 621. COLLABORATION AMONG MISSION DIREC-** 8 **TORATES.**

9 The Administrator shall encourage an interdiscipli-
 10 nary approach among all NASA mission directorates and
 11 divisions, whenever appropriate, for projects or missions—

12 (1) to improve coordination, and encourage col-
 13 laboration and early planning on scope;

14 (2) to determine areas of overlap or alignment;

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

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

19 **SEC. 622. NASA LAUNCH CAPABILITIES COLLABORATION.**

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

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

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

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

9 (4) The Launch Services Program has a long
 10 history of oversight of 12 different launch vehicles
 11 and over 80 launches.

12 (5) Co-location of the Launch Services Program
 13 and Commercial Crew Program has enabled the
 14 Commercial Crew Program to efficiently obtain the
 15 launch vehicle technical expertise of and provide en-
 16 gineering and analytical support to the Commercial
 17 Crew Program.

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

20 (1) the Launch Services Program and Commer-
 21 cial Crew Program each benefit from communication
 22 and coordination of launch manifests, technical in-
 23 formation, and common launch vehicle insight be-
 24 tween the programs; and

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

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

9 **SEC. 623. COMMERCIAL SPACE LAUNCH COOPERATION.**

10 (a) ~~FINDING.~~—Congress recognized the benefit of
11 commercial space launch cooperation between the Federal
12 Government and the private sector when it granted the
13 Secretary of Defense authority to foster cooperation be-
14 tween the Department of Defense and certain covered en-
15 tities relating to space transportation infrastructure under
16 section 2276 of title 10, United States Code.

17 (b) ~~IN GENERAL.~~—Chapter 505 of title 51, United
18 States Code, is amended by adding at the end the fol-
19 lowing:

20 **“§ 50507. Commercial launch cooperation**

21 “(a) ~~AUTHORITY FOR AGREEMENTS RELATING TO~~
22 ~~SPACE TRANSPORTATION INFRASTRUCTURE.~~—Notwith-
23 standing section 50504, the Administrator—

24 “(1) may enter into an agreement with a cov-
25 ered entity to provide the covered entity with sup-

1 port and services related to the space transportation
2 infrastructure of the Administration—

3 “(A) to maximize the use of the space
4 transportation infrastructure of the Administra-
5 tion by the private sector in the United States;
6 and

7 “(B) to encourage commercial space activi-
8 ties by enabling investment by covered entities
9 in the space transportation infrastructure of the
10 Administration; and

11 “(2) at the request of the covered entity, may
12 include that support and services in the contracted
13 space launch and reentry range support require-
14 ments of the Administration if—

15 “(A) the Administrator determines that in-
16 cluding that support and services in the re-
17 quirements—

18 “(i) is in the best interest of the Fed-
19 eral Government;

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

22 “(iii) does not compete with the com-
23 mercial space activities of other covered en-
24 tities; and

1 ~~“(B) any commercial requirement included~~
 2 ~~in the agreement has full non-Federal funding~~
 3 ~~before the execution of the agreement.~~

4 ~~“(b) CONTRIBUTIONS.—~~

5 ~~“(1) IN GENERAL.—The Administrator may~~
 6 ~~enter into an agreement with a covered entity on a~~
 7 ~~cooperative and voluntary basis to accept funds,~~
 8 ~~services, and equipment to carry out the purposes in~~
 9 ~~subsection (a)(1).~~

10 ~~“(2) USE OF CONTRIBUTIONS.—Any funds,~~
 11 ~~services, or equipment accepted by the Administrator~~
 12 ~~under this subsection—~~

13 ~~“(A) may be used only for the objectives~~
 14 ~~specified in this section in accordance with~~
 15 ~~terms of use set forth in the agreement entered~~
 16 ~~into under this subsection; and~~

17 ~~“(B) shall be managed by the Adminis-~~
 18 ~~trator in accordance with regulations promul-~~
 19 ~~gated under subsection (d).~~

20 ~~“(3) REQUIREMENTS WITH RESPECT TO~~
 21 ~~AGREEMENTS.—An agreement entered into with a~~
 22 ~~covered entity under this subsection shall—~~

23 ~~“(A) address the terms of use, ownership,~~
 24 ~~and disposition of the funds, services, or equip-~~
 25 ~~ment contributed under the agreement; and~~

1 “(B) include a provision that the covered
 2 entity will not recover the costs of its contribu-
 3 tion through any other agreement with the
 4 United States.

5 “(c) ANNUAL REPORT.—Not later than January 31
 6 of each year, the Administrator shall submit to the appro-
 7 priate committees of Congress a report on the process
 8 used to establish agreements under subsections (a) and
 9 (b), including noticing announcements of opportunities
 10 and criteria for selecting a covered entity, and the funds,
 11 services, and equipment accepted and used by the Admin-
 12 istrator under this section during the preceding fiscal
 13 year.

14 “(d) REGULATIONS.—The Administrator shall pro-
 15 mulgate regulations to carry out this section.

16 “(e) DEFINITIONS.—In this section:

17 “(1) COVERED ENTITY.—In this section, the
 18 term ‘covered entity’ means—

19 “(A) a non-Federal entity that—

20 “(i) is organized under the laws of the
 21 United States or of any jurisdiction within
 22 the United States; and

23 “(ii) is engaged in commercial space
 24 activities; or

1 “(B) an entity that controls, is controlled
2 by, or is under common control with, a non-
3 Federal entity described in subparagraph (A).
4

5 “(2) LAUNCH SUPPORT FACILITIES.—The term
6 ‘launch support facilities’ has the meaning given the
7 term in section 50501.
8

9 “(3) SPACE RECOVERY SUPPORT FACILITIES.—
10 The term ‘space recovery support facilities’ has the
11 meaning given the term in section 50501.
12

13 “(4) SPACE TRANSPORTATION INFRASTRUC-
14 TURE.—The term ‘space transportation infrastruc-
15 ture’ has the meaning given that term in section
16 50501.”
17

18 “(e) TABLE OF CONTENTS.—The table of contents for
19 chapter 505 of title 51, United States Code, is amended
20 by adding after the item relating to section 50506 the fol-
21 lowing:
22

23 “50507. Commercial space launch cooperation.”
24

25 **SEC. 624. DETECTION AND AVOIDANCE OF COUNTERFEIT
26 PARTS.**

27 “(a) FINDINGS.—Congress finds the following:
28

29 (1) A 2012 investigation by the Committee on
30 Armed Services of the Senate of counterfeit elec-
31 tronic parts in the Department of Defense supply
32 chain from 2009 through 2010 uncovered 1,800
33 cases and over one million counterfeit parts and ex-
34

1 posed the threat such counterfeit parts pose to serv-
 2 ice members and national security.

3 ~~(2) Since 2010, the Comptroller General of the~~
 4 ~~United States has identified in 3 separate reports~~
 5 ~~the risks and challenges associated with counterfeit~~
 6 ~~parts and counterfeit prevention at both the Depart-~~
 7 ~~ment of Defense and NASA, including inconsistent~~
 8 ~~definitions of counterfeit parts, poorly targeted qual-~~
 9 ~~ity control practices, and potential barriers to im-~~
 10 ~~provements to these practices.~~

11 ~~(b) SENSE OF CONGRESS.—It is the sense of Con-~~
 12 ~~gress that the presence of counterfeit electronic parts in~~
 13 ~~the NASA supply chain poses a danger to United States~~
 14 ~~government astronauts, crew, and other personnel and a~~
 15 ~~risk to the agency overall.~~

16 ~~(c) REGULATIONS.—~~

17 ~~(1) IN GENERAL.—Not later than 270 days~~
 18 ~~after the date of enactment of this Act, the Adminis-~~
 19 ~~trator shall revise the NASA Supplement to the~~
 20 ~~Federal Acquisition Regulation to improve the detec-~~
 21 ~~tion and avoidance of counterfeit electronic parts in~~
 22 ~~the supply chain.~~

23 ~~(2) CONTRACTOR RESPONSIBILITIES.—In revis-~~
 24 ~~ing the regulations under paragraph (1), the Admin-~~
 25 ~~istrator shall—~~

1 ~~(A) require each covered contractor—~~

2 ~~(i) to detect and avoid the use or in-~~
3 ~~clusion of any counterfeit parts in elec-~~
4 ~~tronic parts or products that contain elec-~~
5 ~~tronic parts; and~~

6 ~~(ii) to take such corrective actions as~~
7 ~~the Administrator considers necessary to~~
8 ~~remedy the use or inclusion described in~~
9 ~~clause (i);~~

10 ~~(iii) including a subcontractor, to no-~~
11 ~~tify the applicable NASA contracting offi-~~
12 ~~cer not later than 30 calendar days after~~
13 ~~the date the covered contractor becomes~~
14 ~~aware, or has reason to suspect, that any~~
15 ~~end item, component, part or material con-~~
16 ~~tained in supplies purchased by NASA, or~~
17 ~~purchased by a covered contractor or sub-~~
18 ~~contractor for delivery to, or on behalf of,~~
19 ~~NASA, contains a counterfeit electronic~~
20 ~~part or suspect counterfeit electronic part;~~

21 ~~(B) prohibit the cost of counterfeit elec-~~
22 ~~tronic parts, suspect counterfeit electronic~~
23 ~~parts, and any corrective action described under~~
24 ~~subparagraph (A)(ii) from being included as al-~~
25 ~~lowable costs under agency contracts, unless—~~

(i) the covered contractor has an operational system to detect and avoid counterfeit electronic parts and suspect counterfeit electronic parts that has been reviewed and approved by NASA or the Department of Defense; and

(ii) the covered contractor has provided the notice under subparagraph (A)(iii); or

(iii) the counterfeit electronic parts or suspect counterfeit electronic parts were provided to the covered contractor as Government property in accordance with part 45 of the Federal Acquisition Regulation.

~~(3)~~ SUPPLIERS OF ELECTRONIC PARTS.—In revising the regulations under paragraph (1), the Administrator shall—

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

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

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

1 (HI) suppliers who obtain such
2 parts exclusively from the original
3 manufacturers of the parts or their
4 authorized dealers; and

5 (ii) to obtain electronic parts that are
6 not in production or currently available in
7 stock from suppliers that meet qualifica-
8 tion requirements established under sub-
9 paragraph (C);

10 (B) establish documented requirements
11 consistent with published industry standards or
12 Government contract requirements for—

13 (i) notification of the agency; and

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

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

parts and suspect counterfeit electronic parts;
and

~~(D)~~ authorize a covered contractor, including a subcontractor, to identify and use additional suppliers beyond those identified under subparagraph (C) if—

(i) the standards and processes for identifying such suppliers comply with established industry standards;

(ii) the covered contractor assumes responsibility for the authenticity of parts provided by such suppliers under paragraph (2); and

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

(d) DEFINITIONS.—In this section:

(1) COVERED CONTRACTOR.—The term “covered contractor” means a contractor that supplies an electronic part, or a product that contains an electronic part, to NASA.

(2) ELECTRONIC PART.—The term “electronic part” means a discrete electronic component, including a microcircuit, transistor, capacitor, resistor, or diode, that is intended for use in a safety or mission critical application.

1 **SEC. 625. EDUCATION AND OUTREACH.**

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

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

8 (2) the Administration is uniquely positioned to
9 educate and inspire students and the broader public
10 on STEM subjects and careers;

11 (3) the Administration’s Education Mission Di-
12 rectorates, along with the other mission directorates,
13 have been effective in delivering educational content
14 because of the strong engagement of Administration
15 scientists and engineers in the Administration’s edu-
16 cation and outreach activities; and

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

24 (b) CONTINUATION OF EDUCATION AND OUTREACH
25 ACTIVITIES AND PROGRAMS.—

1 (1) ~~IN GENERAL.~~—The Administrator shall con-
 2 tinue engagement with the public and education op-
 3 portunities for students via all the Administration’s
 4 mission directorates to the maximum extent prac-
 5 ticable.

6 (2) ~~REPORT.~~—Not later than 60 days after the
 7 date of enactment of this Act, the Administrator
 8 shall submit to the appropriate committees of Con-
 9 gress a report on the Administration’s near-term
 10 outreach plans for advancing space law education.

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

12 (a) *SHORT TITLE.*—*This Act may be cited as the “Na-*
 13 *tional Aeronautics and Space Administration Transition*
 14 *Authorization Act of 2016”.*

15 (b) *TABLE OF CONTENTS.*—*The table of contents of this*
 16 *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. Indemnification; NASA launch services and reentry services.

TITLE IV—ADVANCING HUMAN DEEP SPACE EXPLORATION

Subtitle A—Human Exploration Goals and Objectives

- Sec. 411. Human exploration long-term goals.*
- Sec. 412. Goals and objectives.*
- Sec. 413. Vision for space exploration.*
- Sec. 414. Exploration plan and programs.*
- Sec. 415. Stepping stone approach to exploration.*

Subtitle B—Assuring Core Capabilities for Exploration

- Sec. 421. Space Launch System and Orion.*

Subtitle C—Journey to Mars

- Sec. 431. Space technology infusion.*
- Sec. 432. Findings on human space exploration.*
- Sec. 433. Strategic framework for human spaceflight and exploration.*
- Sec. 434. Advanced space suit capability.*
- Sec. 435. Asteroid robotic redirect mission.*

Subtitle D—Scott Kelly Human Spaceflight and Exploration 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. Sense of Congress on Wide-Field Infrared Survey Telescope.*
- Sec. 505. Sense of Congress on Mars 2020 rover.*
- Sec. 506. Europa.*

TITLE VI—MAXIMIZING EFFICIENCY

Subtitle A—Agency Information Technology and Cybersecurity

- Sec. 611. Information technology governance.*
- Sec. 612. Information technology strategic plan.*
- Sec. 613. Cybersecurity.*
- Sec. 614. Oversight implementation progress.*
- Sec. 615. Software oversight.*
- Sec. 616. Security management of foreign national access.*
- Sec. 617. Cybersecurity of web applications.*

Subtitle B—Collaboration Among Mission Directorates and Other Matters

- Sec. 621. Collaboration among mission directorates.*
- Sec. 622. NASA launch capabilities collaboration.*
- Sec. 623. Commercial space launch cooperation.*
- Sec. 624. Detection and avoidance of counterfeit parts.*
- Sec. 625. Education and outreach.*
- Sec. 626. Leveraging commercial satellite servicing capabilities across mission directorates.*

Sec. 627. Flight opportunities.

Sec. 628. Sense of Congress on small class launch missions.

1 **SEC. 2. DEFINITIONS.**

2 *In this Act:*

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

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

9 (3) *APPROPRIATE COMMITTEES OF CONGRESS.*—
 10 *The term “appropriate committees of Congress”*
 11 *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 out*
 18 *to and including the region around the surface of the*
 19 *Moon.*

20 (5) *DEEP SPACE.*—*The term “deep space” means*
 21 *the region of space beyond low-Earth orbit, to include*
 22 *cis-lunar space.*

1 (6) *GOVERNMENT ASTRONAUT.*—*The term “gov-*
2 *ernment astronaut” has the meaning given the term*
3 *in section 50902 of title 51, United States Code.*

4 (7) *ISS.*—*The term “ISS” means the Inter-*
5 *national Space Station.*

6 (8) *ISS MANAGEMENT ENTITY.*—*The term “ISS*
7 *management entity” means the organization with*
8 *which the Administrator has a cooperative agreement*
9 *under section 504(a) of the National Aeronautics and*
10 *Space Administration Authorization Act of 2010 (42*
11 *U.S.C. 18354(a)).*

12 (9) *NASA.*—*The term “NASA” means the Na-*
13 *tional Aeronautics and Space Administration.*

14 (10) *ORION.*—*The term “Orion” means the mul-*
15 *tipurpose crew vehicle described under section 303 of*
16 *the National Aeronautics and Space Administration*
17 *Authorization Act of 2010 (42 U.S.C. 18323).*

18 (11) *SPACE LAUNCH SYSTEM.*—*The term “Space*
19 *Launch System” has the meaning given the term in*
20 *section 3 of the National Aeronautics and Space Ad-*
21 *ministration Authorization Act of 2010 (42 U.S.C.*
22 *18302).*

1 **TITLE I—AUTHORIZATION OF**
 2 **APPROPRIATIONS**

3 **SEC. 101. FISCAL YEAR 2017.**

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

6 (1) *For Exploration, \$4,532,000,000.*

7 (2) *For Space Operations, \$4,950,700,000.*

8 (3) *For Science, \$5,395,000,000.*

9 (4) *For Aeronautics, \$601,000,000.*

10 (5) *For Space Technology, \$686,500,000.*

11 (6) *For Education, \$108,000,000.*

12 (7) *For Safety, Security, and Mission Services,*
 13 *\$2,796,700,000.*

14 (8) *For Construction and Environmental Com-*
 15 *pliance and Restoration, \$400,000,000.*

16 (9) *For Inspector General, \$38,100,000.*

17 **TITLE II—SUSTAINING NA-**
 18 **TIONAL SPACE COMMIT-**
 19 **MENTS**

20 **SEC. 201. SENSE OF CONGRESS ON SUSTAINING NATIONAL**
 21 **SPACE COMMITMENTS.**

22 *It is the sense of Congress that—*

23 (1) *the United States, in collaboration with its*
 24 *international, academic, and industry partners,*
 25 *should sustain and build upon our national space*

1 *commitments and investments across Administrations*
2 *with a continuity of purpose to advance recent*
3 *achievements of space exploration and space science to*
4 *extend humanity's reach into deep space, including*
5 *cis-lunar space, the Moon, the surface and moons of*
6 *Mars, and beyond;*

7 (2) *NASA leaders can best leverage investments*
8 *in the United States space program by continuing to*
9 *develop a balanced portfolio for space exploration and*
10 *space science, including continued development of the*
11 *Space Launch System, Orion, Commercial Crew Pro-*
12 *gram, Commercial Resupply Services Program, the*
13 *James Webb Space Telescope, and the ongoing oper-*
14 *ations of the ISS;*

15 (3) *a national, government-led space program*
16 *that builds on current science and exploration pro-*
17 *grams, advances human knowledge and capabilities,*
18 *and opens the frontier beyond Earth for ourselves, our*
19 *international partners, commercial enterprise, and*
20 *science is of critical importance to our national des-*
21 *tiny and to a future guided by United States values*
22 *and freedoms;*

23 (4) *continuity of purpose and effective execution*
24 *of core NASA programs are essential for efficient use*

1 of resources in pursuit of timely and tangible accom-
2 plishments;

3 (5) NASA could improve its efficiency and effec-
4 tiveness by working with industry to streamline exist-
5 ing programs and requirements, procurement prac-
6 tices, institutional footprint, and bureaucracy while
7 preserving effective program oversight, accountability,
8 and safety;

9 (6) United States government astronauts
10 changed the trajectory of human history toward the
11 promise of the stars, and it is imperative that the
12 United States maintain and enhance its leadership in
13 space exploration and continue to expand freedom
14 and opportunities in space for all Americans that are
15 consistent with the Constitution of the United States;
16 and

17 (7) NASA is and should remain a multimission
18 agency with a balanced and robust set of core mis-
19 sions in science, space technology, aeronautics, human
20 space flight and exploration, and education.

21 **SEC. 202. FINDINGS.**

22 Congress makes the following findings:

23 (1) Challenges of the past, such as the cancella-
24 tion of major programs, have disrupted completion of
25 major space systems thereby—

1 (A) impeding planning and pursuit of na-
2 tional objectives in human space exploration;

3 (B) placing the Nation's investment in
4 space exploration at risk; and

5 (C) degrading the aerospace industrial base.

6 (2) *The National Aeronautics and Space Admin-*
7 *istration Authorization Act of 2010 (42 U.S.C. 18301*
8 *et seq.) reflects a broad, bipartisan agreement on the*
9 *path forward for NASA's core missions in science,*
10 *space technology, aeronautics, human space flight and*
11 *exploration, and education, which serves as the foun-*
12 *ation for the policy updates by this Act.*

13 (3) *Sustaining the investment and maximizing*
14 *utilization of the ISS and ISS National Laboratory*
15 *with our international and industry partners is—*

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

18 (B) *imperative to continuing United States*
19 *global leadership in human space exploration,*
20 *science, research, technology development, and*
21 *education opportunities that contribute to devel-*
22 *opment of the next generation of American sci-*
23 *entists, engineers, and leaders, and to creating*
24 *the opportunity for economic development of low-*
25 *Earth orbit.*

1 (4) *NASA has made measurable progress in de-*
 2 *velopment and testing of the Space Launch System*
 3 *and Orion exploration systems with the near-term ob-*
 4 *jectives of the initial integrated test flight and launch*
 5 *in 2018, a human mission in 2021, and continued*
 6 *missions with an annual cadence in cis-lunar space*
 7 *and eventually to the surface of Mars.*

8 (5) *The Commercial Crew Program is on sched-*
 9 *ule to reestablish the capability to launch United*
 10 *States government astronauts from United States soil*
 11 *into low-Earth orbit by the end of 2018.*

12 (6) *The Aerospace Safety Advisory Panel, in its*
 13 *2015 Annual Report, urged continuity of purpose not-*
 14 *ing concerns over the potential for cost overruns and*
 15 *schedule slips that could accompany significant*
 16 *changes to core NASA programs.*

17 ***TITLE III—MAXIMIZING UTILIZA-***
 18 ***TION OF THE ISS AND LOW-***
 19 ***EARTH ORBIT***

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

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

23 (1) *after 15 years of continuous human presence*
 24 *in low-Earth orbit, the ISS continues to overcome*
 25 *challenges and operate safely;*

1 (2) *expansion of partnerships, scientific research,*
 2 *commercial applications, and exploration testbed ca-*
 3 *pabilities of the ISS is essential to ensuring the great-*
 4 *est return on investments made by the United States*
 5 *and its international space partners in the develop-*
 6 *ment, assembly, and operations of that unique facil-*
 7 *ity;*

8 (3) *a stable and successful Commercial Resupply*
 9 *Services Program and Commercial Crew Program are*
 10 *critical to ensuring timely provisioning of the ISS*
 11 *and to reestablishing the capability to launch United*
 12 *States government astronauts from United States soil*
 13 *into low-Earth orbit;*

14 (4) *sustaining United States leadership and*
 15 *progress in human space exploration is enabled in*
 16 *part by continuing utilization of the ISS—*

17 (A) *to facilitate the commercialization and*
 18 *economic development of low-Earth orbit;*

19 (B) *to serve as a testbed for technologies,*
 20 *and to conduct scientific research and develop-*
 21 *ment; and*

22 (C) *as an orbital facility enabling research*
 23 *upon—*

24 (i) *the health, well-being, and perform-*
 25 *ance 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;

4 (5) the Administrator should continue to support
5 the development of the Commercial Crew Program as
6 planned to end reliance upon Russian transport of
7 United States government astronauts to the ISS
8 which has not been possible since the retirement of the
9 Space Shuttle program in 2011; and

10 (6) the ISS should continue to provide a plat-
11 form for fundamental, microgravity, discovery-based
12 space life and physical sciences research that is crit-
13 ical for enabling space exploration, protecting hu-
14 mans in space, increasing pathways for commercial
15 space development that depend on advances in basic
16 research, and contribute to advancing science, tech-
17 nology, engineering, and mathematics research.

18 (b) CONTINUATION OF THE ISS.—Congress reaffirms
19 the policy set forth in section 501 of the National Aero-
20 nautics and Space Administration Authorization Act of
21 2010 (42 U.S.C. 18351) that it shall be the policy of the
22 United States, in consultation with its international part-
23 ners in the ISS program, to support full and complete utili-
24 zation of the ISS through at least 2024.

1 **SEC. 302. TRANSPORTATION TO ISS.**

2 (a) *SENSE OF CONGRESS ON COMMERCIAL CREW PRO-*
3 *GRAM AND COMMERCIAL RESUPPLY SERVICES PROGRAM.—*

4 *It is the sense of Congress that—*

5 (1) *NASA should build upon the success of the*
6 *Commercial Orbital Transportation Services and*
7 *Commercial Resupply Services programs that have*
8 *allowed private sector companies to partner with*
9 *NASA to deliver cargo and scientific experiments to*
10 *the ISS since 2012;*

11 (2) *once certified to meet NASA’s safety and reli-*
12 *ability requirements and fully operational to meet*
13 *ISS crew transfer needs, the Commercial Crew Pro-*
14 *gram transportation systems should serve as the pri-*
15 *mary means of transporting United States govern-*
16 *ment astronauts and international partner astronauts*
17 *from United States soil to and from the ISS;*

18 (3) *Commercial Crew Program transportation*
19 *systems should have the capability of serving as ISS*
20 *emergency crew rescue vehicles;*

21 (4) *the 21st Century Launch Complex Program*
22 *has enabled significant modernization and infrastruc-*
23 *ture improvements at launch sites across the United*
24 *States to support NASA’s Commercial Resupply Serv-*
25 *ices Program and other civil and commercial space*
26 *flight missions; and*

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

5 (b) *UNITED STATES POLICY.—It is the policy of the*
 6 *United States that, to foster the competitive development,*
 7 *operation, improvement and commercial availability of*
 8 *space transportation services, services for Federal Govern-*
 9 *ment access to and return from the ISS, whenever prac-*
 10 *ticable, shall be procured via fair and open competition for*
 11 *well-defined, milestone-based, Federal Acquisition Regula-*
 12 *tion-based contracts under section 201(a) of the National*
 13 *Aeronautics and Space Administration Authorization Act*
 14 *of 2010 (42 U.S.C. 18311(a)).*

15 (c) *COMMERCIAL CARGO PROGRAM.—Section 401 of*
 16 *the National Aeronautics and Space Administration Au-*
 17 *thorization Act of 2010 (42 U.S.C. 18341) is amended by*
 18 *striking “Commercial Orbital Transportation Services”*
 19 *and inserting “Commercial Resupply Services”.*

20 (d) *CREW SAFETY.—The Administrator shall protect*
 21 *the safety of United States crews by ensuring commercial*
 22 *crew systems meet all applicable human rating require-*
 23 *ments in accordance with section 403(b)(1) of the National*
 24 *Aeronautics and Space Administration Authorization Act*
 25 *of 2010 (42 U.S.C. 18342(b)(1)).*

1 **SEC. 303. ISS TRANSITION PLAN.**

2 (a) *FINDINGS.*—Congress finds that NASA has been
3 both the primary supplier and consumer of human space
4 flight capabilities and services of the ISS and in low-Earth
5 orbit.

6 (b) *SENSE OF CONGRESS.*—It is the sense of Congress
7 that an orderly transition is needed for United States
8 human space flight activities in low-Earth orbit from the
9 current regime, that relies heavily on NASA sponsorship,
10 to a regime where NASA is one of many customers of a
11 low-Earth orbit commercial human space flight enterprise.

12 (c) *REPORTS.*—Section 50111 of title 51, United
13 States Code, is amended by adding at the end the following:

14 “(c) *ISS TRANSITION PLAN.*—

15 “(1) *IN GENERAL.*—The Administrator, in co-
16 ordination with the ISS management entity, ISS
17 partners, the scientific user community, and the com-
18 mercial space sector, shall develop a plan to transi-
19 tion in a step-wise approach from the current regime
20 that relies heavily on NASA sponsorship to a regime
21 where NASA is one of many customers of a low-Earth
22 orbit commercial human space flight enterprise.

23 “(2) *REPORTS.*—Not later than December 1,
24 2017, and triennially thereafter until 2023, the Ad-
25 ministrator shall submit to the appropriate commit-
26 tees of Congress a report that includes—

1 “(A) an identification of low-Earth orbit
2 capabilities necessary to meet the Administra-
3 tion’s deep space human space flight exploration
4 objectives and mission requirements beyond the
5 period of operation and utilization of the ISS
6 described in section 503 of the National Aero-
7 nautics and Space Administration Authorization
8 Act of 2010 (42 U.S.C. 18353), if any;

9 “(B) steps NASA is taking and will take,
10 including demonstrations that could be con-
11 ducted on the ISS, to stimulate and facilitate
12 commercial demand and supply of products and
13 services in low-Earth orbit;

14 “(C) an assessment of current and projected
15 commercial activities in low-Earth orbit, includ-
16 ing on the ISS, and their potential for meeting
17 the capabilities identified in subparagraph (A);

18 “(D) an identification of barriers pre-
19 venting the commercialization of low-Earth
20 orbit, including issues relating to policy, regula-
21 tions, commercial intellectual property, data,
22 and confidentiality, that could inhibit the use of
23 the ISS as a commercial incubator;

24 “(E) an evaluation of the feasible and pre-
25 ferred service life of the ISS beyond the period

1 *described in section 503 of the National Aero-*
2 *nautics and Space Administration Authorization*
3 *Act of 2010 (42 U.S.C. 18353), through at least*
4 *2028, as a unique scientific, commercial, and ex-*
5 *ploration-related facility, including—*

6 “(i) a general discussion of inter-
7 national partner capabilities and prospects
8 for extending the partnership, to include the
9 potential for participation by additional
10 countries, for the purposes of the human de-
11 velopment and exploration of deep space;

12 “(ii) a review of essential systems,
13 equipment upgrades, or potential mainte-
14 nance that would be necessary to extend
15 ISS operations and utilization;

16 “(iii) an evaluation of the cost and
17 schedule requirements associated with the
18 development and delivery of essential sys-
19 tems, equipment upgrades, or potential
20 maintenance identified under clause (ii);

21 “(iv) an identification of possible
22 international, academic, or industry part-
23 ner contributions, cost-share, and program
24 transitions to provide the upgrades identi-
25 fied under clause (ii);

1 “(v) impacts on the goals and objec-
2 tives of the ISS National Laboratory and
3 the management entity responsible for oper-
4 ation of the ISS National Laboratory;

5 “(vi) impacts on services provided by
6 the Commercial Resupply Services Program
7 and Commercial Crew Program to the ISS;

8 “(vii) impacts on the use of the ISS as
9 a testbed to transition functions of the ISS
10 to the commercial space sector and enhance
11 economic development of low-Earth orbit,
12 including the evolution of self-sustaining
13 commercial activities;

14 “(viii) an assessment on the technical
15 limiting factors of the ISS lifetime, includ-
16 ing a list of critical components and their
17 expected lifetime and availability;

18 “(ix) an evaluation of the potential for
19 expanding the use of ISS facilities to ac-
20 commodate the needs of researchers and
21 other users, including changes to policies,
22 regulations, and laws that would stimulate
23 greater private and public involvement on
24 the ISS; and

1 “(x) such other information as may be
 2 necessary to fully describe the justification
 3 for and feasibility of extending the service
 4 life of the ISS, including the potential sci-
 5 entific or technological benefits to the Fed-
 6 eral Government, public, or to academic or
 7 commercial entities;

8 “(F) an evaluation of the functions, roles,
 9 and responsibilities for management and oper-
 10 ation of the ISS and a determination of—

11 “(i) those functions, roles, and respon-
 12 sibilities the Federal Government should re-
 13 tain during the lifecycle of the ISS;

14 “(ii) those functions, roles, and respon-
 15 sibilities that could be transferred to the
 16 commercial space sector;

17 “(iii) the metrics that would indicate
 18 the commercial space sector’s readiness and
 19 ability to assume the functions, roles, and
 20 responsibilities described in clause (ii); and

21 “(iv) any necessary changes to any
 22 agreements or other documents and the law
 23 to enable the activities described in sub-
 24 paragraphs (B) and (C); and

1 “(G) a description of the progress on meet-
 2 ing human exploration research objectives on
 3 ISS and prospects for accomplishing future ex-
 4 ploration and other research objectives on future
 5 commercially supplied low-Earth orbit platforms
 6 or migration of those objectives to cis-lunar
 7 space.

8 “(3) DEMONSTRATIONS.—Demonstrations identi-
 9 fied under paragraph (2) may—

10 “(A) test the capabilities described in para-
 11 graph (2)(A); and

12 “(B) demonstrate or test capabilities, in-
 13 cluding commercial modules or deep space habi-
 14 tats, Environmental Control and Life Support
 15 Systems, orbital satellite assembly, exploration
 16 space suits, a node that enables a wide variety
 17 of activity, including multiple commercial mod-
 18 ules and airlocks, additional docking or berthing
 19 ports for commercial crew and cargo, opportuni-
 20 ties for the commercial space sector to cost share
 21 for transportation and other services on the ISS,
 22 and other commercial activities.”.

1 **SEC. 304. 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 serv-
 17 ices carried out under the contract that the contract defines
 18 as unusually hazardous or nuclear in nature, but only to
 19 the extent the total amount of successful claims related to
 20 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 made
 2 under subsection (a) that provides indemnification shall
 3 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 the
 8 United States, at its election, of that claim or suit
 9 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 resulting
 22 from a launch service or reentry service carried
 23 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 the*
 5 *provider requests such a determination and sub-*
 6 *mits all information the Administrator requires.*

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

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

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

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

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

22 “(4) *COVERAGE.*—*An insurance policy or dem-*
 23 *onstration of financial responsibility under this sub-*
 24 *section shall protect the following, to the extent of*

1 *their potential liability for involvement in launch*
 2 *services or reentry services:*

3 *“(A) The Government.*

4 *“(B) Personnel of the Government.*

5 *“(C) Related entities of the Government.*

6 *“(D) Related entities of the provider.*

7 *“(E) Government astronauts.*

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

13 *“(e) CROSS-WAIVERS.—*

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

24 *“(2) LIMITATION.—The waiver made by the Gov-*
 25 *ernment under paragraph (1) shall apply only to the*

1 *extent that the claims are more than the amount of*
 2 *insurance or demonstration of financial responsibility*
 3 *required under subsection (c)(1)(B).*

4 “(f) *WILLFUL MISCONDUCT.—Indemnification under*
 5 *subsection (a) may exclude claims resulting from the willful*
 6 *misconduct of the provider or its related entities.*

7 “(g) *CERTIFICATION OF JUST AND REASONABLE*
 8 *AMOUNT.—No payment may be made under subsection (a)*
 9 *unless the Administrator or the Administrator’s designee*
 10 *certifies that the amount is just and reasonable.*

11 “(h) *PAYMENTS.—*

12 “(1) *IN GENERAL.—Upon the approval by the*
 13 *Administrator, payments under subsection (a) may be*
 14 *made from funds appropriated for such payments.*

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

20 “(3) *ADDITIONAL APPROPRIATIONS.—If the Ad-*
 21 *ministrator requests additional appropriations to*
 22 *make payments under this subsection, then the request*
 23 *for those appropriations shall be made in accordance*
 24 *with the procedures established under section 50915.*

25 “(i) *RULES OF CONSTRUCTION.—*

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

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

9 “(3) *ANTI-DEFICIENCY ACT.*—*Notwithstanding*
 10 *any other provision of this section—*

11 “(A) *all obligations under this section are*
 12 *subject to the availability of funds; and*

13 “(B) *nothing in this section may be con-*
 14 *strued to require obligation or payment of funds*
 15 *in violation of sections 1341, 1342, 1349 through*
 16 *1351, and 1511 through 1519 of title 31, United*
 17 *States Code (commonly referred to as the ‘Anti-*
 18 *Deficiency Act’).*

19 “(j) *RELATIONSHIP TO OTHER LAWS.*—*The Adminis-*
 20 *trator may not provide indemnification under this section*
 21 *for an activity that requires a license or permit under chap-*
 22 *ter 509.*

23 “(k) *DEFINITIONS.*—*In this section:*

1 “(1) *GOVERNMENT ASTRONAUT.*—*The term ‘gov-*
 2 *ernment astronaut’ has the meaning given the term in*
 3 *section 50902.*

4 “(2) *LAUNCH SERVICES.*—*The term ‘launch serv-*
 5 *ices’ has the meaning given the term in section 50902.*

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

9 “(4) *REENTRY SERVICES.*—*The term ‘reentry*
 10 *services’ has the meaning given the term in section*
 11 *50902.*

12 “(5) *RELATED ENTITY.*—*The term ‘related enti-*
 13 *ty’ means a contractor or subcontractor.*

14 “(6) *THIRD PARTY.*—*The term ‘third party’*
 15 *means a person except—*

16 “(A) *the United States Government;*

17 “(B) *related entities of the Government in-*
 18 *involved in launch services or reentry services;*

19 “(C) *a provider;*

20 “(D) *related entities of the provider in-*
 21 *involved in launch services or reentry services; or*

22 “(E) *a government astronaut.”.*

23 (b) *CONFORMING AMENDMENT.*—*The table of contents*
 24 *for subchapter III of chapter 201 of title 51, United States*

1 *Code, is amended by inserting after the item relating to*
 2 *section 20147 the following:*

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

3 ***TITLE IV—ADVANCING HUMAN***
 4 ***DEEP SPACE EXPLORATION***
 5 ***Subtitle A—Human Exploration***
 6 ***Goals and Objectives***

7 ***SEC. 411. HUMAN EXPLORATION LONG-TERM GOALS.***

8 *Section 202(a) of the National Aeronautics and Space*
 9 *Administration Authorization Act of 2010 (42 U.S.C.*
 10 *18312(a)) is amended to read as follows:*

11 *“(a) LONG-TERM GOALS.—The long-term goals of the*
 12 *human space flight and exploration efforts of NASA shall*
 13 *be—*

14 *“(1) to expand permanent human presence be-*
 15 *yond low-Earth orbit and to do so, where practical,*
 16 *in a manner involving international, academic, and*
 17 *industry partners; and*

18 *“(2) the peaceful settlement of a location in*
 19 *space or on another celestial body and a thriving*
 20 *space economy in the 21st century.”.*

21 ***SEC. 412. GOALS AND OBJECTIVES.***

22 *Section 202(b) of the National Aeronautics and Space*
 23 *Administration Authorization Act of 2010 (42 U.S.C.*
 24 *18312(b)) is amended—*

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

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

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

6 “(5) to achieve human exploration of Mars, in-
7 cluding the establishment of a capability to extend
8 human presence, including potential human habi-
9 tation, on the surface of Mars.”.

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

11 Section 20302 of title 51, United States Code, is
12 amended—

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

15 (2) by amending subsection (b) to read as fol-
16 lows:

17 “(b) *FUTURE EXPLORATION OF MARS.*—The Adminis-
18 trator shall manage human space flight programs, includ-
19 ing the Space Launch System and Orion, to enable humans
20 to explore Mars and other destinations by defining a series
21 of sustainable steps and conducting mission planning, re-
22 search, and technology development on a timetable that is
23 technically and fiscally possible, consistent with section
24 70504.”.

1 **SEC. 414. EXPLORATION PLAN AND PROGRAMS.**

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

4 *“(2) implement an exploration research and*
 5 *technology development program to enable human*
 6 *and robotic operations consistent with section*
 7 *20302(b) of this title;”.*

8 **SEC. 415. STEPPING STONE APPROACH TO EXPLORATION.**

9 *Section 70504 of title 51, United States Code, is*
 10 *amended to read as follows:*

11 **“§ 70504. Stepping stone approach to exploration**

12 *“(a) IN GENERAL.—In order to maximize the cost-ef-*
 13 *fectiveness of the long-term exploration and utilization ac-*
 14 *tivities of the United States, the Administrator shall take*
 15 *all necessary steps, including engaging international, aca-*
 16 *demic, and industry partners, to ensure that activities in*
 17 *the Administration’s human exploration program balance*
 18 *how those activities might also help meet the requirements*
 19 *of future exploration and utilization activities leading to*
 20 *human habitation on the surface of Mars.*

21 *“(b) COMPLETION.—Within budgetary considerations,*
 22 *once an exploration-related project enters its development*
 23 *phase, the Administrator shall seek, to the maximum extent*
 24 *practicable, to complete that project without undue delays.”.*

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

SEC. 421. SPACE LAUNCH SYSTEM AND ORION.

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

(2) Through the 21st Century Launch Complex program and Exploration Ground Systems programs, NASA has made significant progress in transforming exploration ground systems infrastructure to meet NASA’s mission requirements for the Space Launch System and Orion and to modernize NASA’s launch complexes to the benefit of the civil, defense, and commercial space sectors.

(b) SENSE OF CONGRESS ON SPACE LAUNCH SYSTEM, ORION, AND EXPLORATION GROUND SYSTEMS.—It is the sense of Congress that—

(1) as the United States works to send humans on a series of missions on or near Mars in the 2030s,

1 *the United States national space program should con-*
 2 *tinue to make progress on its commitment by fully de-*
 3 *veloping the Space Launch System, Orion, and re-*
 4 *lated Exploration Ground Systems;*

5 *(2) using the Space Launch System and Orion*
 6 *for a wide range of contemplated missions will facili-*
 7 *tate the national defense, science, and exploration ob-*
 8 *jectives of the United States; and*

9 *(3) the United States should have continuity of*
 10 *purpose for Space Launch System and Orion in deep*
 11 *space exploration missions, using them beginning*
 12 *with the uncrewed mission, EM-1, planned for 2018,*
 13 *followed by the crewed mission, EM-2, in cis-lunar*
 14 *space planned for 2021, and for subsequent missions*
 15 *beginning with EM-3 extending into cis-lunar space*
 16 *and eventually to Mars.*

17 *(c) IN GENERAL.—*

18 *(1) EXPLORATION MISSIONS.—The Adminis-*
 19 *trator shall continue development of—*

20 *(A) an uncrewed exploration mission to*
 21 *demonstrate the capability of both the Space*
 22 *Launch System and Orion as an integrated sys-*
 23 *tem by 2018;*

24 *(B) a crewed exploration mission to dem-*
 25 *onstrate the Space Launch System, including the*

1 *Core Stage and Exploration Upper Stages, and*
 2 *the crewed Orion mission by 2021;*

3 (C) *subsequent missions beginning with*
 4 *EM-3 using the Space Launch System and*
 5 *Orion to extend into cis-lunar space and eventu-*
 6 *ally to Mars; and*

7 (D) *a deep space habitat as the next element*
 8 *in a deep space exploration architecture along*
 9 *with the Space Launch System and Orion.*

10 (2) *OTHER USES.—The Administrator shall as-*
 11 *sess the utility of the Space Launch System for use*
 12 *by the science community and for other Federal Gov-*
 13 *ernment launch needs, including consideration of*
 14 *overall cost and schedule savings from reduced transit*
 15 *times and increased science returns enabled by the*
 16 *unique capabilities of the Space Launch System.*

17 ***Subtitle C—Journey to Mars***

18 ***SEC. 431. SPACE TECHNOLOGY INFUSION.***

19 (a) *SENSE OF CONGRESS.—It is the sense of Congress*
 20 *that advancing propulsion technology would improve the ef-*
 21 *iciency of trips to Mars and could shorten travel time to*
 22 *Mars, reduce astronaut health risks, and reduce radiation*
 23 *exposure, consumables, and mass of materials required for*
 24 *the journey.*

1 (b) *POLICY.*—*It is the policy of the United States that*
 2 *the Administrator shall develop technologies to support the*
 3 *Administration’s core missions, as described in section 2(3)*
 4 *of the National Aeronautics and Space Administration Au-*
 5 *thorization Act of 2010 (42 U.S.C. 18301(3)), and support*
 6 *sustained investments in early stage innovation, funda-*
 7 *mental research, and technologies to expand the boundaries*
 8 *of the national aerospace enterprise.*

9 (c) *PROPULSION TECHNOLOGIES.*—*A goal of propul-*
 10 *sion technologies developed under subsection (b) shall be to*
 11 *significantly reduce human travel time to Mars.*

12 **SEC. 432. FINDINGS ON HUMAN SPACE EXPLORATION.**

13 *Congress makes the following findings:*

14 (1) *In accordance with section 204 of the Na-*
 15 *tional Aeronautics and Space Administration Author-*
 16 *ization Act of 2010 (124 Stat. 2813), the National*
 17 *Academies of Sciences, Engineering, and Medicine,*
 18 *through its Committee on Human Spaceflight, con-*
 19 *ducted a review of the goals, core capabilities, and di-*
 20 *rection of human space flight, and published the find-*
 21 *ings and recommendations in a 2014 report entitled,*
 22 *“Pathways to Exploration: Rationales and Ap-*
 23 *proaches for a U.S. Program of Human Space Explo-*
 24 *ration”.*

1 (2) *The Committee on Human Spaceflight in-*
2 *cluded leaders from the aerospace, scientific, security,*
3 *and policy communities.*

4 (3) *With input from the public, the Committee*
5 *on Human Spaceflight concluded that many practical*
6 *and aspirational rationales for human space flight to-*
7 *gether constitute a compelling case for continued na-*
8 *tional investment and pursuit of human space explo-*
9 *ration toward the horizon goal of Mars.*

10 (4) *According to the Committee on Human*
11 *Spaceflight, the rationales include economic benefits,*
12 *national security, national prestige, inspiring stu-*
13 *dents and other citizens, scientific discovery, human*
14 *survival, and a sense of shared destiny.*

15 (5) *The Committee on Human Spaceflight af-*
16 *firmed that Mars is the appropriate long-term goal*
17 *for the human space flight program.*

18 (6) *The Committee on Human Spaceflight rec-*
19 *ommended that NASA define a series of sustainable*
20 *steps and conduct mission planning and technology*
21 *development as needed to achieve the long-term goal*
22 *of placing humans on the surface of Mars.*

23 (7) *Expanding human presence beyond low-*
24 *Earth orbit and advancing toward human missions*
25 *to Mars requires early planning and timely decisions*

1 to be made in the near-term on the necessary courses
 2 of action for commitments to achieve short-term and
 3 long-term goals and objectives.

4 (8) In addition to the 2014 report described in
 5 paragraph (1), there are several independently devel-
 6 oped reports or concepts that describe potential Mars
 7 architectures or concepts and identify Mars as the
 8 long-term goal for human space exploration, includ-
 9 ing NASA’s “The Global Exploration Roadmap” of
 10 2013, “NASA’s Journey to Mars—Pioneering Next
 11 Steps in Space Exploration” of 2015, NASA Jet Pro-
 12 pulsion Laboratory’s “Minimal Architecture for
 13 Human Journeys to Mars” of 2015, and Explore
 14 Mars’ “The Humans to Mars Report 2016”.

15 **SEC. 433. STRATEGIC FRAMEWORK FOR HUMAN**
 16 **SPACEFLIGHT AND EXPLORATION.**

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

19 (1) expanding human presence beyond low-Earth
 20 orbit and advancing toward human missions to Mars
 21 in the 2030s requires early planning and timely deci-
 22 sions to be made in the near-term on the necessary
 23 courses of action for commitments to achieve short-
 24 term and long-term goals and objectives;

1 (2) *for strong and sustained United States lead-*
 2 *ership, a need exists to advance a strategic frame-*
 3 *work, addressing exploration objectives in collabora-*
 4 *tion with international, academic, and industry part-*
 5 *ners;*

6 (3) *an approach that incrementally advances to-*
 7 *ward a long-term goal is one in which nearer-term*
 8 *developments and implementation would influence fu-*
 9 *ture development and implementation; and*

10 (4) *a strategic framework should begin with low-*
 11 *Earth orbit, then address progress beyond low-Earth*
 12 *orbit to cis-lunar space in greater detail, and then*
 13 *address future missions ultimately aimed at human*
 14 *arrival and activities on or near Mars.*

15 (b) *STRATEGIC FRAMEWORK.—*

16 (1) *IN GENERAL.—The Administrator shall de-*
 17 *velop a strategic framework, including a critical deci-*
 18 *sion plan, to expand human presence beyond low-*
 19 *Earth orbit, including to cis-lunar space, the moons*
 20 *of Mars, the surface of Mars, and beyond.*

21 (2) *SCOPE.—The strategic framework shall in-*
 22 *clude—*

23 (A) *an integrated set of exploration, science,*
 24 *and other goals and objectives of a United States*
 25 *human space exploration program with the long-*

1 *term goal of human missions near to or on the*
2 *surface of Mars in the 2030s;*

3 *(B) opportunities for international, aca-*
4 *demic, and industry partnerships for explo-*
5 *ration-related systems, services, research, and*
6 *technology if those opportunities provide cost-*
7 *savings, accelerate program schedules, or other-*
8 *wise benefit the exploration objectives developed*
9 *under subparagraph (A);*

10 *(C) precursor missions in cis-lunar space*
11 *and other missions or activities necessary to*
12 *meet the exploration objectives developed under*
13 *subparagraph (A), including anticipated*
14 *timelines and missions for the Space Launch*
15 *System and Orion;*

16 *(D) capabilities and technologies, including*
17 *the Space Launch System, Orion, a deep space*
18 *habitat, and other capabilities, that enable the*
19 *exploration objectives developed under subpara-*
20 *graph (A);*

21 *(E) a description of how cis-lunar elements,*
22 *objectives, and activities advance the human ex-*
23 *ploration of Mars;*

1 (F) an assessment of potential human
2 health and other risks, including radiation expo-
3 sure; and

4 (G) mitigation plans, whenever possible, to
5 address the risks identified in subparagraph (F).

6 (3) CONSIDERATIONS.—In developing the stra-
7 tegic framework, the Administrator shall consider—

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

10 (B) using existing commercially available
11 technologies and capabilities or those technologies
12 and capabilities being developed by industry for
13 commercial purposes;

14 (C) an organizational approach to ensure
15 collaboration and coordination among NASA's
16 Mission Directorates under section 621, when
17 appropriate, including to collect and return to
18 Earth a sample from the Martian surface;

19 (D) building upon the initial uncrewed
20 mission, EM-1, and first crewed mission, EM-
21 2, of the Space Launch System and Orion to es-
22 tablish a sustainable cadence of missions extend-
23 ing human exploration missions into cis-lunar
24 space, including anticipated timelines and mile-
25 stones;

1 (E) developing the precursor missions and
2 activities that will demonstrate, test, and develop
3 key technologies and capabilities essential for
4 achieving human missions to Mars, including
5 long-duration human operations beyond low-
6 Earth orbit, space suits, solar electric propul-
7 sion, deep space habitats, environmental control
8 life support systems, Mars lander and ascent ve-
9 hicle, entry, descent, landing, ascent, Mars sur-
10 face systems, and in-situ resource utilization;

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

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

16 (H) collaborating with international, aca-
17 demic, and industry partners, when appropriate;

18 (I) risks to human health and sensitive on-
19 board technologies, including radiation exposure;

20 (J) evaluating the risks identified through
21 research outcomes under the NASA Human Re-
22 search Program's Behavioral Health Element;
23 and

24 (K) the recommendations and ideas of sev-
25 eral 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 432(8).

(4) *CRITICAL DECISION PLAN ON HUMAN SPACE EXPLORATION.*—As part of the strategic framework, 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.*—The Administrator shall submit an initial strategic framework, including a critical

1 *decision plan, to the appropriate committees of Con-*
 2 *gress before December 1, 2017, and an updated stra-*
 3 *tegic framework biennially thereafter.*

4 **SEC. 434. ADVANCED SPACE SUIT CAPABILITY.**

5 *Not later than 90 days after the date of enactment of*
 6 *this Act, the Administrator shall submit to the appropriate*
 7 *committees of Congress a detailed plan for achieving an ad-*
 8 *vanced space suit capability that aligns with the crew needs*
 9 *for exploration enabled by the Space Launch System and*
 10 *Orion, including an evaluation of the merit of delivering*
 11 *the planned suit system for use on the ISS.*

12 **SEC. 435. ASTEROID ROBOTIC REDIRECT MISSION.**

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

14 *(1) NASA initially estimated that the Asteroid*
 15 *Robotic Redirect Mission would launch in December*
 16 *2020 and cost no more than \$1,250,000,000, exclud-*
 17 *ing launch and operations.*

18 *(2) On July 15, 2016, NASA conducted its Key*
 19 *Decision Point–B review of the Asteroid Robotic Re-*
 20 *direct Mission or approval for Phase B in mission*
 21 *formulation.*

22 *(3) During the Key Decision Point–B review,*
 23 *NASA estimated that costs have grown to*
 24 *\$1,400,000,000 excluding launch and operations for a*
 25 *launch in December 2021 and the agency must evalu-*

1 *ate whether to accept the increase or reduce the Aster-*
 2 *oid Robotic Redirect Mission's scope to stay within*
 3 *the cost cap set by the Administrator.*

4 *(4) In April 2015, the NASA Advisory Coun-*
 5 *cil—*

6 *(A) issued a finding that—*

7 *(i) high-performance solar electric pro-*
 8 *pulsion will likely be an important part of*
 9 *an architecture to send humans to Mars;*
 10 *and*

11 *(ii) maneuvering a large test mass is*
 12 *not necessary to provide a valid in-space*
 13 *test of a new solar electric propulsion stage;*

14 *(B) determined that a solar electric propul-*
 15 *sion mission will contribute more directly to the*
 16 *goal of sending humans to Mars if the mission*
 17 *is focused entirely on development and valida-*
 18 *tion of the solar electric propulsion stage; and*

19 *(C) determined that other possible motiva-*
 20 *tions for acquiring and maneuvering a boulder,*
 21 *such as asteroid science and planetary defense,*
 22 *do not have value commensurate with their prob-*
 23 *able cost.*

24 *(5) The Asteroid Robotic Redirect Mission is*
 25 *competing for resources with other critical exploration*

1 *development programs, including the Space Launch*
 2 *System, Orion, commercial crew, and a habitation*
 3 *module.*

4 (6) *In 2014, the NASA Advisory Council rec-*
 5 *ommended that NASA conduct an independent cost*
 6 *and technical assessment of the Asteroid Robotic Redi-*
 7 *rect Mission.*

8 (7) *NASA completed the assessment under para-*
 9 *graph (6) and reviewed it as part of the agency's Key*
 10 *Decision Point–B review.*

11 (8) *In 2015, the NASA Advisory Council rec-*
 12 *ommended that NASA preserve the following key ob-*
 13 *jectives if the program needed to be descoped:*

14 (A) *Development of high power solar electric*
 15 *propulsion.*

16 (B) *Ability to maneuver in a low gravity*
 17 *environment in deep space.*

18 (9) *In January 2015 and July 2015, the NASA*
 19 *Advisory Council expressed its concern to NASA*
 20 *about the potential for growing costs for the program*
 21 *and highlighted that choices would need to be made*
 22 *about the program's content.*

23 (b) *SENSE OF CONGRESS.—It is the sense of Congress*
 24 *that—*

1 (1) *the technological and scientific goals of the*
 2 *Asteroid Robotic Redirect Mission may not be com-*
 3 *mensurate with the cost; and*

4 (2) *alternative missions may provide a more cost*
 5 *effective and scientifically beneficial means to dem-*
 6 *onstrate the technologies needed for a human mission*
 7 *to Mars that would otherwise be demonstrated by the*
 8 *Asteroid Robotic Redirect Mission.*

9 (c) *EVALUATION AND REPORT.*—*Not later than 180*
 10 *days after the date of enactment of this Act, the Adminis-*
 11 *trator shall—*

12 (1) *conduct an evaluation of—*

13 (A) *alternative approaches to the Asteroid*
 14 *Robotic Redirect Mission for demonstrating the*
 15 *technologies and capabilities needed for a human*
 16 *mission to Mars that would otherwise be dem-*
 17 *onstrated by the Asteroid Robotic Redirect Mis-*
 18 *sion;*

19 (B) *the scientific and technical benefits of*
 20 *the alternatives approaches identified in sub-*
 21 *paragraph (A) compared to the Asteroid Redirect*
 22 *Robotic Mission to future human exploration;*

23 (C) *the commercial benefits of the alter-*
 24 *native approaches identified in subparagraph*
 25 *(A), including the impact on the development of*

1 *domestic solar electric propulsion technology to*
 2 *bolster United States competitiveness in the glob-*
 3 *al marketplace; and*

4 *(D) a comparison of the estimated costs of*
 5 *the alternative approaches identified in subpara-*
 6 *graph (A); and*

7 *(2) submit to the appropriate committees of Con-*
 8 *gress a report on the evaluation under paragraph (1),*
 9 *including any recommendations.*

10 ***Subtitle D—Scott Kelly Human***
 11 ***Spaceflight and Exploration Act***

12 ***SEC. 441. SHORT TITLE.***

13 *This subtitle may be cited as the “Scott Kelly Human*
 14 *Spaceflight and Exploration Act”.*

15 ***SEC. 442. FINDINGS; SENSE OF CONGRESS.***

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

17 *(1) Human space exploration can pose signifi-*
 18 *cant challenges and is full of substantial risk, which*
 19 *has ultimately claimed the lives of 24 National Aero-*
 20 *navics and Space Administration astronauts serving*
 21 *in the line of duty.*

22 *(2) As United States government astronauts par-*
 23 *ticipate in long-duration and exploration spaceflight*
 24 *missions they may experience increased health risks,*
 25 *such as vision impairment, bone demineralization,*

1 *and behavioral health and performance risks, and*
2 *may be exposed to galactic cosmic radiation. Expo-*
3 *sure to high levels of radiation and microgravity can*
4 *result in acute and long-term health consequences that*
5 *can increase the risk of cancer and tissue degenera-*
6 *tion and have potential effects on the musculoskeletal*
7 *system, central nervous system, cardiovascular sys-*
8 *tem, immune function, and vision.*

9 *(3) To advance the goal of long-duration and ex-*
10 *ploration spaceflight missions, United States govern-*
11 *ment astronaut Scott Kelly participated in a 1-year*
12 *twins study in space while his identical twin brother,*
13 *former United States government astronaut Mark*
14 *Kelly, acted as a human control specimen on Earth,*
15 *providing an understanding of the physical, behav-*
16 *ioral, microbiological, and molecular reaction of the*
17 *human body to an extended period of time in space.*

18 *(4) Since the Administration currently provides*
19 *medical monitoring, diagnosis, and treatment for*
20 *United States government astronauts during their ac-*
21 *tive employment, given the unknown long-term health*
22 *consequences of long-duration space exploration, the*
23 *Administration has requested statutory authority*
24 *from Congress to provide medical monitoring, diag-*
25 *nosis, and treatment to former United States govern-*

1 *ment astronauts for psychological and medical condi-*
2 *tions associated with human space flight.*

3 *(b) SENSE OF CONGRESS.—It is the sense of Congress*
4 *that—*

5 *(1) the United States should continue to seek the*
6 *unknown and lead the world in space exploration and*
7 *scientific discovery as the Administration prepares*
8 *for long-duration and exploration spaceflight in deep*
9 *space and an eventual mission to Mars;*

10 *(2) data relating to the health of astronauts will*
11 *become increasingly valuable to improving our under-*
12 *standing of many diseases humans face on Earth;*

13 *(3) the Administration should provide the type of*
14 *monitoring, diagnosis, and treatment described in*
15 *subsection (a) only for conditions the Administration*
16 *considers unique to the training or exposure to the*
17 *spaceflight environment of United States government*
18 *astronauts and should not require any former United*
19 *States Government astronauts to participate in the*
20 *Administration’s monitoring;*

21 *(4) such monitoring, diagnosis, and treatment*
22 *should not replace a former United States government*
23 *astronaut’s private health insurance;*

24 *(5) expanded data acquired from such moni-*
25 *toring, diagnosis, and treatment should be used to tai-*

1 *lor treatment, inform the requirements for new*
2 *spaceflight medical hardware, and develop controls in*
3 *order to prevent disease occurrence in the astronaut*
4 *corps;*

5 *(6) the Administration's existing radiation expo-*
6 *sure standards, which have been used for missions*
7 *pertaining to the Space Shuttle and the ISS, would*
8 *limit missions to durations of 150 to 250 days and*
9 *would pose significant challenges to long-duration or*
10 *exploration spaceflight or a multiyear mission to*
11 *Mars; and*

12 *(7) the 340-day space mission of Scott Kelly*
13 *aboard the ISS—*

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

20 *(B) will help support the physical and men-*
21 *tal well-being of astronauts during longer space*
22 *exploration missions in the future.*

1 **SEC. 443. MEDICAL MONITORING AND RESEARCH RELATING**
 2 **TO HUMAN SPACE FLIGHT.**

3 (a) *IN GENERAL.*—Subchapter III of chapter 201 of
 4 title 51, United States Code, as amended by section 304
 5 of this Act, is further amended by adding at the end the
 6 following:

7 **“§ 20149. Medical monitoring and research relating to**
 8 **human space flight**

9 “(a) *IN GENERAL.*—Notwithstanding any other provi-
 10 sion of law, the Administrator may provide for the medical
 11 monitoring, diagnosis, and treatment of a United States
 12 government astronaut, or a former United States govern-
 13 ment astronaut or payload specialist, for conditions that
 14 the Administrator considers associated with human space
 15 flight, including scientific and medical tests for psycho-
 16 logical and medical conditions.

17 “(b) *EXCLUSIONS.*—The Administrator may not—

18 “(1) provide for medical monitoring, diagnosis,
 19 or treatment of a United States government astro-
 20 naut, or a former United States government astro-
 21 naut or payload specialist, under subsection (a) for
 22 any psychological or medical condition that is not as-
 23 sociated with human space flight; or

24 “(2) require a former United States government
 25 astronaut or payload specialist to participate in the
 26 monitoring authorized under subsection (a).

1 “(c) *PRIVACY.*—Consistent with applicable provisions
 2 of law relating to privacy, the Administrator shall protect
 3 the privacy of all medical records generated under sub-
 4 section (a) and accessible to the Administration.

5 “(d) *REGULATIONS.*—The Administrator shall pro-
 6 mulgate such regulations as are necessary to carry out this
 7 section.”.

8 (b) *TABLE OF CONTENTS.*—The table of contents for
 9 chapter 201 of title 51, United States Code, as amended
 10 by section 304 of this Act, is further amended by inserting
 11 after the item relating to section 20148 the following:

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

12 ***TITLE V—ADVANCING SPACE*** 13 ***SCIENCE***

14 ***SEC. 501. MAINTAINING A BALANCED SPACE SCIENCE PORT-*** 15 ***FOLIO.***

16 (a) *SCIENCE PORTFOLIO.*—Section 803 of the National
 17 Aeronautics and Space Administration Authorization Act
 18 of 2010 (Public Law 111–267; 124 Stat. 2832) is amended
 19 to read as follows:

20 ***“SEC. 803. OVERALL SCIENCE PORTFOLIO.***

21 “Congress restates its sense that—

22 “(1) a balanced and adequately funded set of ac-
 23 tivities, consisting of research and analysis grant pro-
 24 grams, technology development, suborbital research
 25 activities, and small, medium, and large space mis-

1 *sions, contributes to a robust and productive science*
 2 *program and serves as a catalyst for innovation and*
 3 *discovery; and*

4 *“(2) the Administrator should set science prior-*
 5 *ities by following the guidance provided by the sci-*
 6 *entific community through the National Academies of*
 7 *Sciences, Engineering, and Medicine’s decadal sur-*
 8 *veys.”.*

9 *(b) CONFORMING AMENDMENT.—The item relating to*
 10 *section 803 in the table of contents in section 1(b) of the*
 11 *National Aeronautics and Space Administration Author-*
 12 *ization Act of 2010 (Public Law 111–267; 124 Stat. 2806)*
 13 *is amended by striking “Overall science portfolio-sense of*
 14 *the Congress” and inserting “Overall science portfolio”.*

15 **SEC. 502. PLANETARY SCIENCE.**

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

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

20 *(2) the United States leads the world in plan-*
 21 *etary science and can augment its success in that*
 22 *area with appropriate international, academic, and*
 23 *industry partnerships;*

1 (3) *a mix of small, medium, and large planetary*
 2 *science missions is required to sustain a steady ca-*
 3 *dence of planetary exploration; and*

4 (4) *robotic planetary exploration is a key compo-*
 5 *nent of preparing for future human exploration.*

6 **(b) MISSION PRIORITIES.—**

7 (1) *IN GENERAL.—In accordance with the prior-*
 8 *ities established in the most recent decadal survey for*
 9 *planetary science, the Administrator shall ensure, to*
 10 *the greatest extent practicable, the completion of a*
 11 *balanced set of Discovery, New Frontiers, and flag-*
 12 *ship missions.*

13 (2) *MISSION PRIORITY ADJUSTMENTS.—Con-*
 14 *sistent with the set of missions described in para-*
 15 *graph (1), and while maintaining the continuity of*
 16 *scientific data and steady development of capabilities*
 17 *and technologies, the Administrator may seek, if nec-*
 18 *essary, adjustments to mission priorities, schedule,*
 19 *and scope in light of changing budget projections.*

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

21 *It is the sense of Congress that—*

22 (1) *the James Webb Space Telescope should sig-*
 23 *nificantly advance our understanding of star and*
 24 *planet formation, improve our knowledge of the early*

1 *universe, and support United States leadership in as-*
 2 *trophysics; and*

3 *(2) consistent with annual Government Account-*
 4 *ability Office reviews of the James Webb Space Tele-*
 5 *scope program, the Administrator should continue ro-*
 6 *bust surveillance of the performance of the James*
 7 *Webb Space Telescope project and continue to im-*
 8 *prove the reliability of cost estimates and contractor*
 9 *performance data and other major spaceflight projects*
 10 *in order to enhance NASA’s ability to successfully de-*
 11 *liver the James Webb Space Telescope on-time and*
 12 *within budget.*

13 **SEC. 504. SENSE OF CONGRESS ON WIDE-FIELD INFRARED**
 14 **SURVEY TELESCOPE.**

15 *It is the sense of Congress that—*

16 *(1) the Wide-Field Infrared Survey Telescope*
 17 *(commonly known as “WFIRST”) mission has the*
 18 *potential to enable scientific discoveries that will*
 19 *transform our understanding of the universe; and*

20 *(2) the Administrator, to the extent practicable,*
 21 *should make progress on the technologies and capa-*
 22 *bilities needed to position the Administration to meet*
 23 *the objectives, as outlined in the 2010 National Acad-*
 24 *emies’ Astronomy and Astrophysics Decadal Survey,*

1 *in a way that maximizes the scientific productivity*
 2 *of meeting those objectives for the resources invested.*

3 **SEC. 505. SENSE OF CONGRESS ON MARS 2020 ROVER.**

4 *It is the sense of Congress that—*

5 *(1) the Mars 2020 mission, to develop a Mars*
 6 *rover and to enable the return of samples to Earth,*
 7 *should remain a priority for NASA; and*

8 *(2) the Mars 2020 mission—*

9 *(A) should significantly increase our under-*
 10 *standing of Mars;*

11 *(B) should help determine whether life pre-*
 12 *viously existed on that planet; and*

13 *(C) should provide opportunities to gather*
 14 *knowledge and demonstrate technologies that ad-*
 15 *dress the challenges of future human expeditions*
 16 *to Mars.*

17 **SEC. 506. EUROPA.**

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

19 *(1) Studies of Europa, Jupiter’s moon, indicate*
 20 *that Europa may provide a habitable environment, as*
 21 *it contains key ingredients known to support life on*
 22 *Earth, including liquid water, heat, chemistry, and*
 23 *time.*

24 *(2) In 2012, using the Hubble Space Telescope,*
 25 *NASA scientists observed water vapor around the*

1 *south polar region of Europa, which provides poten-*
2 *tial evidence of water plumes in that region.*

3 *(3) For decades, the Europa mission has consist-*
4 *ently ranked as a high priority mission for the sci-*
5 *entific community.*

6 *(4) The Europa mission was ranked as the top*
7 *priority mission in the previous Planetary Science*
8 *Decadal Survey and ranked as the second-highest pri-*
9 *ority in the current Planetary Science Decadal Sur-*
10 *vey.*

11 *(b) SENSE OF CONGRESS.—It is the sense of Congress*
12 *that—*

13 *(1) the Europa mission could provide another*
14 *avenue in which to capitalize on our Nation’s current*
15 *investment in the Space Launch System that would*
16 *significantly reduce the transit time for such a deep*
17 *space mission; and*

18 *(2) a scientific, robotic exploration mission to*
19 *Europa, as prioritized in both Planetary Science*
20 *Decadal Surveys, should be supported.*

1 ***TITLE VI—MAXIMIZING***
 2 ***EFFICIENCY***
 3 ***Subtitle A—Agency Information***
 4 ***Technology and Cybersecurity***

5 ***SEC. 611. INFORMATION TECHNOLOGY GOVERNANCE.***

6 *The Administrator, in consultation with the chief in-*
 7 *formation officer of NASA, shall—*

8 (1) *ensure the NASA Chief Information Officer*
 9 *has a significant role in the management, governance,*
 10 *and oversight processes related to information tech-*
 11 *nology operations and investments and information*
 12 *security programs for the protection of NASA sys-*
 13 *tems;*

14 (2) *establish the NASA Chief Information Officer*
 15 *as a direct report to the Administrator;*

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

20 (4) *provide an information technology program*
 21 *management framework to increase the efficiency and*
 22 *effectiveness of information technology investments,*
 23 *including relying on metrics for identifying and re-*
 24 *ducing potential duplication, waste, and cost;*

1 (5) *establish a monetary threshold for all agency*
2 *information technology investments and related con-*
3 *tracts, including non-highly and highly specialized*
4 *and specialized information technology, regardless of*
5 *the procurement instrument, over which the NASA*
6 *Chief Information Officer shall have final approval;*

7 (6) *improve the operational linkage between the*
8 *NASA Chief Information Officer and each NASA mis-*
9 *sion directorate, center, and mission support office to*
10 *ensure both agency and mission needs are considered*
11 *in agency-wide information technology and informa-*
12 *tion security management and oversight;*

13 (7) *review the portfolio of information technology*
14 *investments and spending, including information*
15 *technology-related investments included as part of ac-*
16 *tivities within NASA mission directorates that may*
17 *not be considered information technology, to ensure*
18 *investments are recognized and reported appro-*
19 *priately based on guidance from the Office of Manage-*
20 *ment and Budget;*

21 (8) *consider appropriate revisions to the charters*
22 *of information technology boards and councils that*
23 *inform information technology investment and oper-*
24 *ation decisions; and*

1 (9) *consider whether the NASA Chief Informa-*
 2 *tion Officer should have a seat on any boards or*
 3 *councils described in paragraph (8).*

4 **SEC. 612. INFORMATION TECHNOLOGY STRATEGIC PLAN.**

5 (a) *IN GENERAL.*—*Subject to subsection (b), the NASA*
 6 *Chief Information Officer, in consultation with the chief in-*
 7 *formation officer of each Administration center, shall de-*
 8 *velop an information technology strategic plan to guide*
 9 *NASA information technology management and strategic*
 10 *objectives.*

11 (b) *REQUIREMENTS.*—*In developing the strategic plan,*
 12 *the NASA Chief Information Officer shall ensure that the*
 13 *strategic plan is consistent with—*

14 (1) *the deadline under section 306(a) of title 5,*
 15 *United States Code; and*

16 (2) *the requirements under section 3506 of title*
 17 *44, United States Code.*

18 (c) *CONTENTS.*—*The strategic plan shall include—*

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

21 (2) *a plan for how the NASA Chief Information*
 22 *Officer will submit to Congress of a list of informa-*
 23 *tion technology projects, including completion dates*
 24 *and risk level in accordance with guidance from the*
 25 *Office of Management and Budget;*

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

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

9 (5) *a plan to increase the efficiency and effective-*
 10 *ness of information technology investments, including*
 11 *a description of how unnecessarily duplicative, waste-*
 12 *ful, legacy, or outdated information technology across*
 13 *NASA will be identified and eliminated, and a sched-*
 14 *ule for the identification and elimination of such in-*
 15 *formation 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 the NASA Chief Information*
 22 *Officer to Congress of information regarding high risk*
 23 *projects and cybersecurity risks.*

24 (d) *CONGRESSIONAL OVERSIGHT.—The NASA Chief*
 25 *Information Officer shall submit to the appropriate com-*

1 *mittees of Congress the strategic plan under subsection (a)*
 2 *and any updates thereto.*

3 **SEC. 613. CYBERSECURITY.**

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

7 *(b) INFORMATION SECURITY PLAN.—Section 1207 of*
 8 *the National Aeronautics and Space Administration Au-*
 9 *thorization Act of 2010 (42 U.S.C. 18445) is amended—*

10 *(1) by redesignating subsections (a) through (c)*
 11 *as subsections (b) through (d), respectively;*

12 *(2) by inserting before subsection (b), as redesign-*
 13 *ated, the following:*

14 *“(a) AGENCY-WIDE INFORMATION SECURITY PLAN.—*

15 *“(1) IN GENERAL.—Not later than 1 year after*
 16 *the date of enactment of the National Aeronautics and*
 17 *Space Administration Transition Authorization Act*
 18 *of 2016, the Administrator shall implement the infor-*
 19 *mation security plan developed under paragraph (2)*
 20 *and take such further actions as the Administrator*
 21 *considers necessary to improve the information secu-*
 22 *rity system in accordance with this section.*

23 *“(2) INFORMATION SECURITY PLAN.—Subject to*
 24 *paragraphs (3), (4), and (5), the chief information of-*
 25 *ficer of NASA, shall develop an agency-wide informa-*

1 *tion security plan to enhance information security for*
2 *NASA information and information infrastructure.*

3 “(3) *REQUIREMENTS.—In developing the plan*
4 *under paragraph (2), the chief information officer*
5 *shall ensure that the plan—*

6 “(A) *is consistent with policies, standards,*
7 *guidelines, and directives on information secu-*
8 *rity under subchapter II of chapter 35 of title*
9 *44, United States Code;*

10 “(B) *is consistent with the standards and*
11 *guidelines under section 11331 of title 40,*
12 *United States Code; and*

13 “(C) *meets applicable National Institute of*
14 *Standards and Technology information security*
15 *standards and guidelines.*

16 “(4) *APPROVAL.—The chief information officer*
17 *shall submit the plan to the Administrator for ap-*
18 *proval prior to its implementation.*

19 “(5) *CONTENTS.—The plan shall include—*

20 “(A) *an overview of the requirements of the*
21 *information security system;*

22 “(B) *an agency-wide risk management*
23 *framework for information security;*

24 “(C) *a description of the information secu-*
25 *rity system management controls and common*

controls that are necessary to ensure compliance
with information security-related requirements;

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

“(E) coordination among organizational en-
tities, including between each center, facility,
mission directorate, and mission support office,
and among agency entities responsible for dif-
ferent aspects of information security;

“(F) heightened consideration of the need to
protect the information security of mission-crit-
ical systems and activities and high-impact and
moderate-impact information systems; and

“(G) a schedule of frequent reviews and up-
dates, as necessary, of the plan.”; and

(3) in subsection (b), as redesignated—

(A) in paragraph (1)—

(i) in subparagraph (B), by striking “;
and” and inserting a semicolon;

(ii) in subparagraph (C), by striking
the period at the end and inserting “; and”;
and

(iii) by adding at the end the fol-
lowing:

1 “(D) an update on the agency’s efforts to
 2 apply additional information security protec-
 3 tions to secure high-impact and moderate-impact
 4 information systems and mission-critical systems
 5 and activities, including those systems that con-
 6 trol spacecraft and maintain critical data
 7 sources.”; and

8 (B) in paragraph (2), by striking “section
 9 3545” and inserting “section 3555”.

10 **SEC. 614. OVERSIGHT IMPLEMENTATION PROGRESS.**

11 Not later than 90 days after the date of enactment of
 12 this Act, and periodically thereafter until the information
 13 security plan under section 1207 of the National Aero-
 14 nautics and Space Administration Authorization Act of
 15 2010 (42 U.S.C. 18445), as amended, is developed and im-
 16 plemented agency-wide, the Administrator shall provide to
 17 the appropriate committees of Congress an update on the
 18 progress made toward implementation of or response to—

19 (1) the information security plan under that sec-
 20 tion; and

21 (2) the information security-related recommenda-
 22 tions made by the NASA Inspector General and the
 23 Comptroller General in the 5 years preceding the date
 24 of enactment of this Act.

1 **SEC. 615. SOFTWARE OVERSIGHT.**

2 *The Administrator shall—*

3 *(1) develop a strategic plan to transition NASA*
4 *from legacy software by adopting a service-based ac-*
5 *quisition model in line with industry best practices;*

6 *(2) develop and implement an agency-wide soft-*
7 *ware license management policy to improve cen-*
8 *tralization, lifecycle management, and procurement*
9 *education, including education on contract negotia-*
10 *tions, relevant laws and regulations, and agency-wide*
11 *contract terms and conditions; and*

12 *(3) direct an agency-wide inventory of NASA's*
13 *total software licenses and spending, including costs,*
14 *benefits, usage, and trending data.*

15 **SEC. 616. SECURITY MANAGEMENT OF FOREIGN NATIONAL**
16 **ACCESS.**

17 *The Administrator shall notify the appropriate com-*
18 *mittees of Congress when the agency has implemented the*
19 *information technology security recommendations from the*
20 *National Academy of Public Administration on foreign na-*
21 *tional access management, based on reports from January*
22 *2014 and March 2016.*

23 **SEC. 617. CYBERSECURITY OF WEB APPLICATIONS.**

24 *Not later than 180 days after the date of enactment*
25 *of this Act, the NASA Chief Information Officer shall—*

(1) develop a plan, including such actions and milestones as are necessary, to fully remediate security vulnerabilities of NASA web applications within a timely fashion after discovery; and

(2) 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 secure with a web application firewall all NASA web applications in development or testing mode.

Subtitle B—Collaboration Among Mission Directorates and Other Matters

SEC. 621. 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.

1 **SEC. 622. NASA LAUNCH CAPABILITIES COLLABORATION.**

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

3 (1) *The Launch Services Program is responsible*
4 *for the acquisition, management, and technical over-*
5 *sight of commercial launch services for NASA’s*
6 *science and robotic missions.*

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

10 (3) *The Launch Services Program and Commer-*
11 *cial Crew Program have worked together to gain ex-*
12 *ceptional technical insight into the contracted launch*
13 *service providers that are common to both programs.*

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

17 (5) *Co-location of the Launch Services Program*
18 *and Commercial Crew Program has enabled the Com-*
19 *mercial Crew Program to efficiently obtain the launch*
20 *vehicle technical expertise of and provide engineering*
21 *and analytical support to the Commercial Crew Pro-*
22 *gram.*

23 (b) *SENSE OF CONGRESS.*—*It is the sense of Congress*
24 *that—*

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

1 *and coordination of launch manifests, technical infor-*
 2 *mation, and common launch vehicle insight between*
 3 *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. 623. COMMERCIAL SPACE LAUNCH COOPERATION.**

13 *(a) FINDING.—Congress recognized the benefit of com-*
 14 *mercial space launch cooperation between the Federal Gov-*
 15 *ernment and the private sector when it granted the Sec-*
 16 *retary of Defense authority to foster cooperation between the*
 17 *Department of Defense and certain covered entities relating*
 18 *to space transportation infrastructure under section 2276*
 19 *of title 10, United States Code.*

20 *(b) SENSE OF CONGRESS.—It is the sense of Congress*
 21 *that—*

22 *(1) the Administrator should take into account*
 23 *the unique needs and obligations that multi-user,*
 24 *public State spaceports may have with the State gov-*
 25 *ernment as well as current and prospective contrac-*

1 *tual arrangements with commercial and government*
 2 *customers when developing and carrying out agree-*
 3 *ments under section 50507 of title 51, United States*
 4 *Code, with State spaceports operating on NASA fa-*
 5 *cilities; and*

6 *(2) the authority granted under section 50507 of*
 7 *title 51, United States Code, is not intended to super-*
 8 *sede or conflict with the congressional intent and pur-*
 9 *poses codified in chapter 509 of that title, the respon-*
 10 *sibilities of the Secretary of Transportation under sec-*
 11 *tion 50913 of that title, or with the intent of section*
 12 *50504 of that title.*

13 *(c) IN GENERAL.—Chapter 505 of title 51, United*
 14 *States Code, is amended by adding at the end the following:*

15 **“§ 50507. Commercial launch cooperation**

16 *“(a) AUTHORITY FOR AGREEMENTS RELATING TO*
 17 *SPACE TRANSPORTATION INFRASTRUCTURE.—The Admin-*
 18 *istrator—*

19 *“(1) may enter into an agreement with a covered*
 20 *entity to provide the covered entity with support and*
 21 *services related to the space transportation infrastruc-*
 22 *ture of the Administration—*

23 *“(A) to maximize the use of the space trans-*
 24 *portation infrastructure of the Administration*
 25 *by the private sector in the United States;*

1 “(B) to maximize the effectiveness and effi-
2 ciency of the space transportation infrastructure
3 of the Administration;

4 “(C) to reduce the cost of services provided
5 by the Administration related to space transpor-
6 tation infrastructure at launch support facilities
7 and space recovery support facilities; and

8 “(D) to encourage commercial space activi-
9 ties by enabling investment by covered entities in
10 the space transportation infrastructure of the
11 Administration; and

12 “(2) at the request of the covered entity, may in-
13 clude that support and services in the contracted
14 space launch and reentry range support requirements
15 of the Administration if—

16 “(A) the Administrator determines that in-
17 cluding that support and services in the require-
18 ments—

19 “(i) is in the best interest of the Fed-
20 eral Government;

21 “(ii) does not interfere with the re-
22 quirements of the Administration;

23 “(iii) does not compete with the com-
24 mercial space activities of other covered en-
25 tities; and

1 “(iv) does not result in the Adminis-
 2 tration retaining ownership of assets which
 3 are no longer needed to meet a pro-
 4 grammatic mission of the Administration;
 5 and

6 “(B) any commercial requirement included
 7 in the agreement has full non-Federal funding
 8 before the execution of the agreement.

9 “(b) CONTRIBUTIONS.—

10 “(1) IN GENERAL.—The Administrator may
 11 enter into an agreement with a covered entity on a
 12 cooperative and voluntary basis to accept funds, serv-
 13 ices, and equipment to carry out the purposes in sub-
 14 section (a)(1).

15 “(2) USE OF CONTRIBUTIONS.—Any funds, serv-
 16 ices, or equipment accepted by the Administrator
 17 under this subsection—

18 “(A) may be used only for the objectives
 19 specified in this section in accordance with terms
 20 of use set forth in the agreement entered into
 21 under this subsection; and

22 “(B) shall be managed by the Administrator
 23 in accordance with procedures prescribed under
 24 subsection (d).

1 “(3) *REQUIREMENTS WITH RESPECT TO AGREE-*
 2 *MENTS.—An agreement entered into with a covered*
 3 *entity under this subsection shall—*

4 “(A) *address the terms of use, ownership,*
 5 *and disposition of the funds, services, or equip-*
 6 *ment contributed under the agreement;*

7 “(B) *include a provision that the covered*
 8 *entity will not recover the costs of its contribu-*
 9 *tion through any other agreement with the*
 10 *United States; and*

11 “(C) *include a provision that the contribu-*
 12 *tion of a covered entity will not preclude access*
 13 *to or use by another covered entity.*

14 “(c) *ANNUAL REPORT.—Not later than January 31 of*
 15 *each year, the Administrator shall submit to the appro-*
 16 *priate committees of Congress a report on the process used*
 17 *to establish agreements under subsections (a) and (b), in-*
 18 *cluding noticing announcements of opportunities and cri-*
 19 *teria for selecting a covered entity, and the funds, services,*
 20 *and equipment accepted and used by the Administrator*
 21 *under this section during the preceding fiscal year.*

22 “(d) *PROCEDURES.—The Administrator shall pre-*
 23 *scribe procedures to carry out this section consistent with*
 24 *sections 50504 and 50913.*

25 “(e) *DEFINITIONS.—In this section:*

1 “(1) *COVERED ENTITY*.—In this section, the term
2 ‘covered entity’ means—

3 “(A) a non-Federal entity that—

4 “(i) is organized under the laws of the
5 United States or of any jurisdiction within
6 the United States; and

7 “(ii) is engaged in commercial space
8 activities; or

9 “(B) an entity that controls, is controlled
10 by, or is under common control with, a non-Fed-
11 eral entity described in subparagraph (A).

12 “(2) *LAUNCH SUPPORT FACILITIES*.—The term
13 ‘launch support facilities’ has the meaning given the
14 term in section 50501.

15 “(3) *SPACE RECOVERY SUPPORT FACILITIES*.—
16 The term ‘space recovery support facilities’ has the
17 meaning given the term in section 50501.

18 “(4) *SPACE TRANSPORTATION INFRASTRUC-*
19 *TURE*.—The term ‘space transportation infrastruc-

20 ture’ has the meaning given that term in section
21 50501.”.

22 “(d) *TABLE OF CONTENTS*.—The table of contents for
23 chapter 505 of title 51, United States Code, is amended by
24 adding after the item relating to section 50506 the fol-
25 lowing:

 “50507. Commercial space launch cooperation.”.

1 **SEC. 624. DETECTION AND AVOIDANCE OF COUNTERFEIT**

2 **PARTS.**

3 (a) *FINDINGS.*—Congress finds the following:

4 (1) *A 2012 investigation by the Committee on*
5 *Armed Services of the Senate of counterfeit electronic*
6 *parts in the Department of Defense supply chain*
7 *from 2009 through 2010 uncovered 1,800 cases and*
8 *over 1,000,000 counterfeit parts and exposed the*
9 *threat such counterfeit parts pose to service members*
10 *and national security.*

11 (2) *Since 2010, the Comptroller General of the*
12 *United States has identified in 3 separate reports the*
13 *risks and challenges associated with counterfeit parts*
14 *and counterfeit prevention at both the Department of*
15 *Defense and NASA, including inconsistent definitions*
16 *of counterfeit parts, poorly targeted quality control*
17 *practices, and potential barriers to improvements to*
18 *these practices.*

19 (b) *SENSE OF CONGRESS.*—*It is the sense of Congress*
20 *that the presence of counterfeit electronic parts in the NASA*
21 *supply chain poses a danger to United States government*
22 *astronauts, crew, and other personnel and a risk to the*
23 *agency overall.*

24 (c) *REGULATIONS.*—

25 (1) *IN GENERAL.*—*Not later than 270 days after*
26 *the date of enactment of this Act, the Administrator*

1 *shall revise the NASA Supplement to the Federal Ac-*
2 *quisition Regulation to improve the detection and*
3 *avoidance of counterfeit electronic parts in the supply*
4 *chain.*

5 (2) *CONTRACTOR RESPONSIBILITIES.—In revis-*
6 *ing the regulations under paragraph (1), the Admin-*
7 *istrator shall—*

8 (A) *require each covered contractor—*

9 (i) *to detect and avoid the use or inclu-*
10 *sion of any counterfeit parts in electronic*
11 *parts or products that contain electronic*
12 *parts;*

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

17 (iii) *including a subcontractor, to no-*
18 *tify the applicable NASA contracting officer*
19 *not later than 30 calendar days after the*
20 *date the covered contractor becomes aware,*
21 *or has reason to suspect, that any end item,*
22 *component, part or material contained in*
23 *supplies purchased by NASA, or purchased*
24 *by a covered contractor or subcontractor for*
25 *delivery to, or on behalf of, NASA, contains*

1 *a counterfeit electronic part or suspect*
2 *counterfeit electronic part; and*

3 *(B) prohibit the cost of counterfeit electronic*
4 *parts, suspect counterfeit electronic parts, and*
5 *any corrective action described under subpara-*
6 *graph (A)(ii) from being included as allowable*
7 *costs under agency contracts, unless—*

8 *(i)(I) the covered contractor has an*
9 *operational system to detect and avoid*
10 *counterfeit electronic parts and suspect*
11 *counterfeit electronic parts that has been re-*
12 *viewed and approved by NASA or the De-*
13 *partment of Defense; and*

14 *(II) the covered contractor has*
15 *provided the notice under subpara-*
16 *graph (A)(iii); or*

17 *(ii) the counterfeit electronic parts or*
18 *suspect counterfeit electronic parts were*
19 *provided to the covered contractor as Gov-*
20 *ernment property in accordance with part*
21 *45 of the Federal Acquisition Regulation.*

22 *(3) SUPPLIERS OF ELECTRONIC PARTS.—In re-*
23 *vising the regulations under paragraph (1), the Ad-*
24 *ministrator shall—*

1 (A) require NASA and covered contractors,
2 including subcontractors, at all tiers—

3 (i) to obtain electronic parts that are
4 in production or currently available in
5 stock from—

6 (I) the original manufacturers of
7 the parts or their authorized dealers; or

8 (II) suppliers who obtain such
9 parts exclusively from the original
10 manufacturers of the parts or their au-
11 thorized dealers; and

12 (ii) to obtain electronic parts that are
13 not in production or currently available in
14 stock from suppliers that meet qualification
15 requirements established under subpara-
16 graph (C);

17 (B) establish documented requirements con-
18 sistent with published industry standards or
19 Government contract requirements for—

20 (i) notification of the agency; and

21 (ii) inspection, testing, and authentica-
22 tion of electronic parts that NASA or a cov-
23 ered contractor, including a subcontractor,
24 obtains from any source other than a source
25 described in subparagraph (A);

1 (C) establish qualification requirements,
 2 consistent with the requirements of section 2319
 3 of title 10, United States Code, pursuant to
 4 which NASA may identify suppliers that have
 5 appropriate policies and procedures in place to
 6 detect and avoid counterfeit electronic parts and
 7 suspect counterfeit electronic parts; and

8 (D) authorize a covered contractor, includ-
 9 ing a subcontractor, to identify and use addi-
 10 tional suppliers beyond those identified under
 11 subparagraph (C) if—

12 (i) the standards and processes for
 13 identifying such suppliers comply with es-
 14 tablished industry standards;

15 (ii) the covered contractor assumes re-
 16 sponsibility for the authenticity of parts
 17 provided by such suppliers under para-
 18 graph (2); and

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

21 (d) *DEFINITIONS.*—In this section:

22 (1) *COVERED CONTRACTOR.*—The term “covered
 23 contractor” means a contractor that supplies an elec-
 24 tronic part, or a product that contains an electronic
 25 part, to NASA.

1 (2) *ELECTRONIC PART.*—*The term “electronic*
 2 *part” means a discrete electronic component, includ-*
 3 *ing a microcircuit, transistor, capacitor, resistor, or*
 4 *diode, that is intended for use in a safety or mission*
 5 *critical application.*

6 **SEC. 625. EDUCATION AND OUTREACH.**

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

9 (1) *United States competitiveness in the 21st*
 10 *century requires engaging the science, technology, en-*
 11 *gineering, and mathematics (referred to in this sec-*
 12 *tion as “STEM”) talent in all States;*

13 (2) *the Administration is uniquely positioned to*
 14 *educate and inspire students and the broader public*
 15 *on STEM subjects and careers;*

16 (3) *the Administration’s Education and Commu-*
 17 *nication Offices, Mission Directorates, and Centers*
 18 *have been effective in delivering educational content*
 19 *because of the strong engagement of Administration*
 20 *scientists and engineers in the Administration’s edu-*
 21 *cation and outreach activities; and*

22 (4) *the Administration’s education and outreach*
 23 *programs, including the Experimental Program to*
 24 *Stimulate Competitive Research (EPSCoR) and the*
 25 *Space Grant College and Fellowship Program, reflect*

1 *the Administration’s successful commitment to grow-*
 2 *ing and diversifying the national science and engi-*
 3 *neering workforce.*

4 *(b) CONTINUATION OF EDUCATION AND OUTREACH AC-*
 5 *TIVITIES 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 shall*
 13 *submit to the appropriate committees of Congress a*
 14 *report on the Administration’s near-term outreach*
 15 *plans for advancing space law education.*

16 **SEC. 626. LEVERAGING COMMERCIAL SATELLITE SERV-**
 17 **ICING CAPABILITIES ACROSS MISSION DIREC-**
 18 **TORATES.**

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

20 *(1) Refueling and relocating aging satellites to*
 21 *extend their operational lifetimes is a capacity that*
 22 *NASA will substantially benefit from and is impor-*
 23 *tant for lowering the costs of ongoing scientific, na-*
 24 *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 all*
4 *critical capabilities to support a human exploration*
5 *mission to Mars.*

6 (b) *SENSE OF CONGRESS.—It is the sense of Congress*
7 *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 across*
15 *mission directorates should be constructed in a man-*
16 *ner that allows for servicing in order to maximize*
17 *operational longevity and affordability.*

18 (c) *LEVERAGING OF CAPABILITIES.—The Adminis-*
19 *trator shall identify orbital assets in both the Science Mis-*
20 *sion Directorate and the Human Exploration and Oper-*
21 *ations Mission Directorate that could benefit from satellite*
22 *servicing-related technologies, and shall work across all*
23 *NASA mission directorates to evaluate opportunities for the*
24 *private sector to perform such services or advance technical*

1 *capabilities by leveraging the technologies and techniques*
 2 *developed by NASA programs and other industry programs.*

3 **SEC. 627. FLIGHT OPPORTUNITIES.**

4 *(a) DEVELOPMENT OF PAYLOADS.—*

5 *(1) IN GENERAL.—In order to conduct necessary*
 6 *research, the Administrator shall continue and, as the*
 7 *Administrator considers appropriate, expand the de-*
 8 *velopment of technology payloads for—*

9 *(A) scientific research; and*

10 *(B) investigating new or improved capabili-*
 11 *ties.*

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

15 *(A) flight testing;*

16 *(B) payload development; and*

17 *(C) hardware related to subparagraphs (A)*
 18 *and (B).*

19 *(b) REAFFIRMATION OF POLICY.—Congress reaffirms*
 20 *that the Administrator should provide flight opportunities*
 21 *for payloads to microgravity environments and suborbital*
 22 *altitudes as authorized by section 907 of the National Aero-*
 23 *nautics and Space Administration Authorization Act of*
 24 *2010 (42 U.S.C. 18405).*

1 **SEC. 628. SENSE OF CONGRESS ON SMALL CLASS LAUNCH**
2 **MISSIONS.**

3 *It is the sense of Congress that—*

4 *(1) Venture Class Launch Services contracts*
5 *awarded under the Launch Services Program will ex-*
6 *pand opportunities for future dedicated launches of*
7 *CubeSats and other small satellites and small orbital*
8 *science missions; and*

9 *(2) principal investigator-led small orbital*
10 *science missions, including CubeSat class, Small Ex-*
11 *plorer (SMEX) class, and Venture class, offer valuable*
12 *opportunities to advance science at low cost, train the*
13 *next generation of scientists and engineers, and enable*
14 *participants to acquire skills in systems engineering*
15 *and systems integration that are critical to maintain-*
16 *ing the Nation's leadership in space and to enhancing*
17 *United States innovation and competitiveness abroad.*

Calendar No. 696

114TH CONGRESS
2D Session

S. 3346

[Report No. 114-390]

A BILL

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

DECEMBER 5, 2016

Reported with an amendment