

114TH CONGRESS
2D SESSION

S. 3346

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, and Mr. UDALL) introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

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,*

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

4 (a) **SHORT TITLE.**—This Act may be cited as the
5 “National Aeronautics and Space Administration Transi-
6 tion Authorization Act of 2016”.

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

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

TITLE I—AUTHORIZATION OF APPROPRIATIONS

Sec. 101. 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

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

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

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

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

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

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

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

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

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

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

3 **TITLE I—AUTHORIZATION OF**
4 **APPROPRIATIONS**

5 **SEC. 101. FISCAL YEAR 2017.**

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

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

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

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

11 (4) For Aeronautics, \$601,000,000.

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

13 (6) For Education, \$108,000,000.

14 (7) For Safety, Security, and Mission Services,
15 \$2,796,700,000.

16 (8) For Construction and Environmental Com-
17 pliance and Restoration, \$400,000,000.

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

19 **TITLE II—SUSTAINING NA-**
20 **TIONAL SPACE COMMIT-**
21 **MENTS**

22 **SEC. 201. SENSE OF CONGRESS ON SUSTAINING NATIONAL**
23 **SPACE COMMITMENTS.**

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

1 (1) the United States, in collaboration with its
2 international, academic, and industry partners,
3 should sustain and build upon our national space
4 commitments and investments across Administra-
5 tions with a continuity of purpose to advance recent
6 achievements of space exploration and space science
7 to extend humanity’s reach into deep space, includ-
8 ing cis-lunar space, the Moon, the surface and
9 moons of Mars, and beyond;

10 (2) NASA leaders can best leverage investments
11 in the United States space program by continuing to
12 develop a balanced portfolio for space exploration
13 and space science, including continued development
14 of the Space Launch System, Orion, Commercial
15 Crew and Commercial Resupply Services, the James
16 Webb Space Telescope, and the ongoing operations
17 of the International Space Station;

18 (3) a national, government-led space program
19 that builds on current science and exploration pro-
20 grams and advances human knowledge and capabili-
21 ties and opens the frontier beyond Earth for our-
22 selves, our international partners, commercial enter-
23 prise, and science is of critical importance to our na-
24 tional destiny and to a future guided by United
25 States values and freedoms;

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

5 (5) NASA could improve its efficiency and ef-
6 fectiveness by working with industry to streamline
7 existing programs and requirements, procurement
8 practices, institutional footprint, and bureaucracy
9 while preserving effective program oversight, ac-
10 countability, and safety;

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

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

23 **SEC. 202. FINDINGS.**

24 (a) FINDINGS.—Congress makes the following find-
25 ings:

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

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

6 (B) placing the Nation’s investment in
7 space exploration at risk; and

8 (C) degrading the aerospace industrial
9 base.

10 (2) The National Aeronautics and Space Ad-
11 ministration Authorization Act of 2010 (42 U.S.C.
12 18301 et seq.) reflects a broad, bipartisan agree-
13 ment on the path forward for NASA’s core missions
14 in science, space technology, aeronautics, human
15 space flight and exploration, and education, which
16 serves as the foundation for the policy updates by
17 this Act.

18 (3) Sustaining the investment and maximizing
19 utilization of the ISS and ISS National Laboratory
20 with our international and industry partners is—

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

23 (B) imperative to continuing United States
24 global leadership in human space exploration,
25 science, research, technology development, and

1 education opportunities that contribute to devel-
2 opment of the next generation of American sci-
3 entists, engineers, and leaders, and to creating
4 the opportunity for economic development of
5 low-Earth orbit.

6 (4) NASA has made measurable progress in de-
7 velopment and testing of the Space Launch System
8 and Orion exploration systems with the near-term
9 objectives of the initial integrated test flight and
10 launch in 2018, a human mission in 2021, and con-
11 tinued missions in cis-lunar space and eventually to
12 the surface of Mars.

13 (5) The Commercial Crew Program is on sched-
14 ule to reestablish the capability to launch United
15 States government astronauts from United States
16 soil into orbit by the end of 2018.

17 (6) The Aerospace Safety Advisory Panel, in its
18 2015 Annual Report, urged continuity of purpose
19 noting concerns over the potential for cost overruns
20 and schedule slips that could accompany significant
21 changes to core NASA programs.

1 **TITLE III—MAXIMIZING UTILIZA-**
2 **TION OF THE ISS AND LOW-**
3 **EARTH ORBIT**

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

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

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

10 (2) expansion of partnerships, scientific re-
11 search, commercial applications, and exploration
12 testbed capabilities of the ISS is essential to ensur-
13 ing the greatest return on investments made by the
14 United States and its international space partners in
15 the development, assembly, and operations of that
16 unique facility;

17 (3) stable and successful Commercial Cargo and
18 Commercial Crew programs are critical to ensuring
19 timely provisioning of the ISS and to reestablishing
20 the capability to launch United States government
21 astronauts from United States soil into orbit;

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

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

3 (B) to serve as a testbed for technologies,
4 and to conduct scientific research and develop-
5 ment; and

6 (C) as an orbital facility enabling research
7 upon—

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

10 (ii) the development of in-space sys-
11 tems enabling human space exploration be-
12 yond low-Earth orbit;

13 (5) the Administrator should continue to sup-
14 port the development of the Commercial Crew Pro-
15 gram as planned to end reliance upon Russian
16 transport of United States government astronauts to
17 the ISS which has not been possible since the retire-
18 ment of the Space Shuttle program in 2011; and

19 (6) the ISS should continue to provide a plat-
20 form for fundamental, microgravity, discovery-based
21 space life and physical sciences research that is crit-
22 ical for enabling space exploration, protecting hu-
23 mans in space, increasing pathways for commercial
24 space development that depend on advances in basic

1 research, and contribute to advancing science, tech-
2 nology, engineering, and mathematics research.

3 (b) CONTINUATION OF THE ISS.—Congress reaffirms the policy set forth in section 501 of the National
4 Aeronautics and Space Administration Authorization Act
5 of 2010 (42 U.S.C. 18351) that it shall be the policy of
6 the United States, in consultation with its international
7 partners in the ISS program, to support full and complete
8 utilization of the ISS through at least 2024.

10 **SEC. 302. TRANSPORTATION TO ISS.**

11 (a) SENSE OF CONGRESS ON COMMERCIAL CREW
12 AND COMMERCIAL CARGO PROGRAMS.—It is the sense of
13 Congress that—

14 (1) NASA should build upon the success of the
15 Commercial Orbital Transportation Services and
16 Commercial Resupply Services programs that have
17 allowed private sector companies to partner with
18 NASA to deliver cargo and scientific experiments to
19 the ISS since 2012;

20 (2) once certified to meet NASA’s safety and
21 reliability requirements and fully operational to meet
22 ISS crew transfer needs, the Commercial Crew Pro-
23 gram transportation systems should serve as the pri-
24 mary means of transporting United States govern-

1 ment astronauts and international partner astro-
2 nauts from United States soil to and from the ISS;

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

6 (4) the 21st Century Launch Complex Program
7 has enabled significant modernization and infra-
8 structure improvements as launch sites across the
9 United States to support NASA's Commercial Re-
10 supply Services and other civil and commercial space
11 flight missions; and

12 (5) the 21st Century Launch Complex Program
13 should be continued in a manner that leverages
14 State and private investments to achieve the goals of
15 the program.

16 (b) UNITED STATES POLICY.—It is the policy of the
17 United States that, to foster the competitive development,
18 operation, improvement and commercial availability of
19 space transportation services, services for Federal Govern-
20 ment access to and return from the ISS, whenever prac-
21 ticable, shall be procured via fair and open competition
22 for well-defined, milestone-based, Federal Acquisition
23 Regulation-based contracts under section 201(a) of the
24 National Aeronautics and Space Administration Author-
25 ization Act of 2010 (42 U.S.C. 18311(a)).

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

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

12 **SEC. 303. ISS TRANSITION PLAN.**

13 (a) **FINDINGS.**—Congress finds that NASA has been
14 both the primary supplier and consumer of human space
15 flight capabilities and services of the ISS and in low-Earth
16 orbit.

17 (b) **SENSE OF CONGRESS.**—It is the sense of Con-
18 gress that an orderly transition is needed for United
19 States human space flight activities in low-Earth orbit
20 from the current regime, that relies heavily on NASA
21 sponsorship, to a regime where NASA is one of many cus-
22 tomers of a low-Earth orbit commercial human space
23 flight enterprise.

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

4 “(c) ISS TRANSITION PLAN.—

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

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

20 “(A) an identification of low-Earth orbit
21 capabilities necessary to meet the Administra-
22 tion’s deep space human space flight explo-
23 ration objectives and mission requirements be-
24 yond the period of operation and utilization of
25 the ISS described in section 503 of the Na-

1 tional Aeronautics and Space Administration
2 Authorization Act of 2010 (42 U.S.C. 18353),
3 if any;

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

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

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

20 “(E) an evaluation of the feasible and pre-
21 ferred service life of the ISS beyond the period
22 described in section 503 of the National Aero-
23 nautics and Space Administration Authorization
24 Act of 2010 (42 U.S.C. 18353), through at

1 least 2028, as a unique scientific, commercial,
2 and exploration-related facility, including—

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

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

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

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

23 “(v) impacts on the goals and objec-
24 tives of the ISS National Laboratory and

1 the management entity responsible for op-
2 eration of the ISS National Laboratory;

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

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

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

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

23 “(x) such other information as may be
24 necessary to fully describe the justification
25 for and feasibility of extending the service

1 life of the ISS, including the potential sci-
2 entific or technological benefits to the Fed-
3 eral Government or public, or to academic
4 or commercial entities;

5 “(F) an evaluation of the functions, roles,
6 and responsibilities for management and oper-
7 ation of the ISS and a determination of—

8 “(i) those functions, roles, and re-
9 sponsibilities the Federal Government
10 should retain during the lifecycle of the
11 ISS;

12 “(ii) those functions, roles, and re-
13 sponsibilities that could be transferred to
14 the commercial space sector;

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

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

24 “(G) progress on meeting human explo-
25 ration research objectives on ISS and prospects

1 for accomplishing future exploration and other
2 research objectives on future commercially sup-
3 plied low-Earth orbit platforms or migration of
4 those objectives to cis-lunar space.

5 “(3) DEMONSTRATIONS.—Demonstrations iden-
6 tified under paragraph (2) may—

7 “(A) test the capabilities described in para-
8 graph (2)(A); and

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

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

3 **SEC. 421. SPACE LAUNCH SYSTEM AND ORION.**

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

6 (1) NASA has made steady progress in devel-
7 oping and testing the Space Launch System and
8 Orion exploration systems with the successful Explo-
9 ration Flight Test of Orion in December of 2014,
10 the final qualification test firing of the 5-segment
11 Space Launch System boosters in June 2016, and a
12 full thrust, full duration test firing of the RS-25
13 Space Launch System core stage engine in August
14 2016.

15 (2) Through the 21st Century Launch Complex
16 program and Exploration Ground Systems (referred
17 to in this section as “EGS”) programs, NASA has
18 made significant progress in transforming explo-
19 ration ground systems infrastructure to meet
20 NASA’s mission requirements for the Space Launch
21 System and Orion and to modernize NASA’s launch
22 complexes to the benefit of the civil, defense, and
23 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 cis-lunar space planned for 2021, and for
19 subsequent missions beginning with EM-3 extending
20 into cis-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

1 Launch System and Orion as an integrated sys-
2 tem by 2018;

3 (B) a crewed exploration mission to dem-
4 onstrate the Space Launch System, including
5 the Core Stage and Exploration Upper Stages,
6 and the crewed Orion by 2021;

7 (C) subsequent missions beginning with
8 EM-3 using the Space Launch System and
9 Orion to extend into cis-lunar space and eventu-
10 ally to Mars; and

11 (D) development of a deep space habitat as
12 the next element in a deep space exploration ar-
13 chitecture along with the Space Launch System
14 and Orion.

15 (2) OTHER USES.—The Administrator shall as-
16 sess the utility of the Space Launch System for use
17 by the science community and for other Federal
18 Government launch needs, including consideration of
19 overall cost and schedule savings from reduced tran-
20 sit times and increased science returns enabled by
21 the unique capabilities of the Space Launch System.

22 **Subtitle C—Journey to Mars**

23 **SEC. 431. SPACE TECHNOLOGY INFUSION.**

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

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

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

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

20 **SEC. 433. STRATEGIC FRAMEWORK FOR HUMAN**
21 **SPACEFLIGHT AND EXPLORATION.**

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

24 (1) expanding human presence beyond low-
25 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);

1 (E) a description of how cis-lunar ele-
2 ments, objectives, and activities advance the
3 human exploration of Mars;

4 (F) an assessment of potential human
5 health and other risks, including radiation expo-
6 sure; and

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

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

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

14 (B) using existing commercially available
15 technologies and capabilities or those tech-
16 nologies and capabilities being developed by in-
17 dustry for commercial purposes;

18 (C) an organizational approach to ensure
19 collaboration and coordination among NASA’s
20 Mission Directorates under section 621, when
21 appropriate;

22 (D) building upon the initial uncrewed
23 mission, EM–1, and first crewed mission, EM–
24 2, of the Space Launch System and Orion to
25 establish a sustainable cadence of missions ex-

1 tending human exploration missions into cis-
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 cis-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;

1 (J) evaluating the risks identified through
2 research outcomes under the NASA Human Re-
3 search Program's Behavioral Health Element;
4 and

5 (K) the recommendations and ideas of sev-
6 eral independently developed reports or con-
7 cepts that describe potential Mars architectures
8 or concepts and identify Mars as the long-term
9 goal for human space exploration, including the
10 reports described under section 432(8).

11 (4) CRITICAL DECISION PLAN ON HUMAN SPACE
12 EXPLORATION.—As part of the strategic framework,
13 the Administrator shall include a critical decision
14 plan—

15 (A) identifying and defining key decisions
16 guiding human space exploration priorities and
17 plans that need to be made before June 30,
18 2020, including decisions that may guide
19 human space exploration capability develop-
20 ment, precursor missions, long-term missions,
21 and activities; and

22 (B) defining decisions needed to maximize
23 efficiencies and resources for reaching the near,
24 intermediate, and long-term goals and objec-
25 tives 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

1 demonstrated by the Asteroid Robotic Redirect
2 Mission;

3 (B) the scientific and technical benefits of
4 the alternatives approaches identified in sub-
5 paragraph (A) compared to the Asteroid Redi-
6 rect Robotic Mission to future human explo-
7 ration;

8 (C) the commercial benefits of the alter-
9 native approaches identified in subparagraph
10 (A), including the impact on the development of
11 domestic solar electric propulsion technology to
12 bolster United States competitiveness in the
13 global marketplace; and

14 (D) a comparison of the estimated costs of
15 the alternative approaches identified in sub-
16 paragraph (A); and

17 (2) submit to the appropriate Committees of
18 Congress a report on the evaluation under para-
19 graph (1), including any recommendations.

20 **Subtitle D—Scott Kelly Human**
21 **Spaceflight and Exploration Act**

22 **SEC. 441. SHORT TITLE.**

23 This subtitle may be cited as the “Scott Kelly Human
24 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.”.

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 ca-
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 sistentlly 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 (c) 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 redesi-
25 gnated, 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,

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

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

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

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

10 (A) in paragraph (1)—

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

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

16 (iii) by adding at the end the fol-
17 lowing:

18 “(D) an update on the agency’s efforts to
19 apply additional information security protec-
20 tions to secure high-impact and moderate-im-
21 pact information systems and mission-critical
22 systems and activities, including those systems
23 that control spacecraft and maintain critical
24 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 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—

1 (i) the covered contractor has an oper-
2 ational system to detect and avoid counter-
3 feit electronic parts and suspect counterfeit
4 electronic parts that has been reviewed and
5 approved by NASA or the Department of
6 Defense; and

7 (ii) the covered contractor has pro-
8 vided the notice under subparagraph
9 (A)(iii); or

10 (iii) the counterfeit electronic parts or
11 suspect counterfeit electronic parts were
12 provided to the covered contractor as Gov-
13 ernment property in accordance with part
14 45 of the Federal Acquisition Regulation.

15 (3) SUPPLIERS OF ELECTRONIC PARTS.—In re-
16 vising the regulations under paragraph (1), the Ad-
17 ministrator shall—

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

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

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

1 (II) 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

1 parts and suspect counterfeit electronic parts;
2 and

3 (D) authorize a covered contractor, includ-
4 ing a subcontractor, to identify and use addi-
5 tional suppliers beyond those identified under
6 subparagraph (C) if—

7 (i) the standards and processes for
8 identifying such suppliers comply with es-
9 tablished industry standards;

10 (ii) the covered contractor assumes re-
11 sponsibility for the authenticity of parts
12 provided by such suppliers under para-
13 graph (2); and

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

16 (d) DEFINITIONS.—In this section:

17 (1) COVERED CONTRACTOR.—The term “cov-
18 ered contractor” means a contractor that supplies
19 an electronic part, or a product that contains an
20 electronic part, to NASA.

21 (2) ELECTRONIC PART.—The term “electronic
22 part” means a discrete electronic component, includ-
23 ing a microcircuit, transistor, capacitor, resistor, or
24 diode, that is intended for use in a safety or mission
25 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.

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