

113TH CONGRESS
2^D SESSION

H. R. 4412

IN THE SENATE OF THE UNITED STATES

JUNE 10, 2014

Received; read twice and referred to the Committee on Commerce, Science,
and Transportation

AN ACT

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

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

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

2 (a) **SHORT TITLE.**—This Act may be cited as the
 3 “National Aeronautics and Space Administration Author-
 4 ization Act of 2014”.

5 (b) **TABLE OF CONTENTS.**—The table of contents for
 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 2014.

TITLE II—HUMAN SPACE FLIGHT

Subtitle A—Exploration

- Sec. 201. Space exploration policy.
- Sec. 202. Stepping stone approach to exploration.
- Sec. 203. Space Launch System.
- Sec. 204. Orion crew capsule.
- Sec. 205. Space radiation.
- Sec. 206. Planetary protection for human exploration missions.

Subtitle B—Space Operations

- Sec. 211. International Space Station.
- Sec. 212. Barriers impeding enhanced utilization of the ISS’s National Labora-
 tory by commercial companies.
- Sec. 213. Utilization of International Space Station for science missions.
- Sec. 214. International Space Station cargo resupply services lessons learned.
- Sec. 215. Commercial crew program.
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TITLE III—SCIENCE

Subtitle A—General

- Sec. 301. Science portfolio.
- Sec. 302. Radioisotope power systems.
- Sec. 303. Congressional declaration of policy and purpose.
- Sec. 304. University class science missions.
- Sec. 305. Assessment of science mission extensions.

Subtitle B—Astrophysics

- Sec. 311. Decadal cadence.
- Sec. 312. Extrasolar planet exploration strategy.
- Sec. 313. James Webb Space Telescope.
- Sec. 314. National Reconnaissance Office telescope donation.
- Sec. 315. Wide-Field Infrared Survey Telescope.

Sec. 316. Stratospheric Observatory for Infrared Astronomy.

Subtitle C—Planetary Science

- Sec. 321. Decadal cadence.
- Sec. 322. Near-Earth objects.
- Sec. 323. Near-Earth objects public-private partnerships.
- Sec. 324. Research on near-earth object tsunami effects.
- Sec. 325. Astrobiology strategy.
- Sec. 326. Astrobiology public-private partnerships.
- Sec. 327. Assessment of Mars architecture.

Subtitle D—Heliophysics

- Sec. 331. Decadal cadence.
- Sec. 332. Review of space weather.

Subtitle E—Earth Science

- Sec. 341. Goal.
- Sec. 342. Decadal cadence.
- Sec. 343. Venture class missions.
- Sec. 344. Assessment.

TITLE IV—AERONAUTICS

- Sec. 401. Sense of Congress.
- Sec. 402. Aeronautics research goals.
- Sec. 403. Unmanned aerial systems research and development.
- Sec. 404. Research program on composite materials used in aeronautics.
- Sec. 405. Hypersonic research.
- Sec. 406. Supersonic research.
- Sec. 407. Research on NextGen airspace management concepts and tools.
- Sec. 408. Rotorcraft research.
- Sec. 409. Transformative aeronautics research.
- Sec. 410. Study of United States leadership in aeronautics research.

TITLE V—SPACE TECHNOLOGY

- Sec. 501. Sense of Congress.
- Sec. 502. Space Technology Program.
- Sec. 503. Utilization of the International Space Station for technology demonstrations.

TITLE VI—EDUCATION

- Sec. 601. Education.
- Sec. 602. Independent review of the National Space Grant College and Fellowship Program.
- Sec. 603. Sense of Congress.

TITLE VII—POLICY PROVISIONS

- Sec. 701. Asteroid Retrieval Mission.
- Sec. 702. Termination liability sense of Congress.
- Sec. 703. Baseline and cost controls.
- Sec. 704. Project and program reserves.
- Sec. 705. Independent reviews.

- Sec. 706. Commercial technology transfer program.
- Sec. 707. National Aeronautics and Space Administration Advisory Council.
- Sec. 708. Cost estimation.
- Sec. 709. Avoiding organizational conflicts of interest in major Administration acquisition programs.
- Sec. 710. Facilities and infrastructure.
- Sec. 711. Detection and avoidance of counterfeit electronic parts.
- Sec. 712. Space Act Agreements.
- Sec. 713. Human spaceflight accident investigations.
- Sec. 714. Fullest commercial use of space.
- Sec. 715. Orbital debris.
- Sec. 716. Review of orbital debris removal concepts.
- Sec. 717. Use of operational commercial suborbital vehicles for research, development, and education.
- Sec. 718. Fundamental space life and physical sciences research.
- Sec. 719. Restoring commitment to engineering research.
- Sec. 720. Liquid rocket engine development program.
- Sec. 721. Remote satellite servicing demonstrations.
- Sec. 722. Information technology governance.
- Sec. 723. Strengthening Administration security.
- Sec. 724. Prohibition on use of funds for contractors that have committed fraud or other crimes.
- Sec. 725. Protection of Apollo landing sites.
- Sec. 726. Astronaut occupational healthcare.
- Sec. 727. Sense of Congress on access to observational data sets.

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 Administra-
8 tion.

9 (3) ORION CREW CAPSULE.—The term “Orion
10 crew capsule” means the multipurpose crew vehicle
11 described in section 303 of the National Aeronautics
12 and Space Administration Authorization Act of 2010
13 (42 U.S.C. 18323).

1 (4) SPACE ACT AGREEMENT.—The term “Space
2 Act Agreement” means an agreement created under
3 the authority to enter into “other transactions”
4 under section 20113(e) of title 51, United States
5 Code.

6 (5) SPACE LAUNCH SYSTEM.—The term “Space
7 Launch System” means the follow-on Government-
8 owned civil launch system developed, managed, and
9 operated by the Administration to serve as a key
10 component to expand human presence beyond low-
11 Earth orbit, as described in section 302 of the Na-
12 tional Aeronautics and Space Administration Au-
13 thorization Act of 2010 (42 U.S.C. 18322).

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

16 **SEC. 101. FISCAL YEAR 2014.**

17 There are authorized to be appropriated to the Ad-
18 ministration for fiscal year 2014 \$17,646,500,000 as fol-
19 lows:

20 (1) For Space Exploration, \$4,113,200,000, of
21 which—

22 (A) \$1,918,200,000 shall be for the Space
23 Launch System, of which \$318,200,000 shall be
24 for Exploration Ground Systems;

1 (B) \$1,197,000,000 shall be for the Orion
2 crew capsule;

3 (C) \$302,000,000 shall be for Exploration
4 Research and Development; and

5 (D) \$696,000,000 shall be for Commercial
6 Crew Development activities.

7 (2) For Space Operations, \$3,778,000,000, of
8 which \$2,984,100,000 shall be for the International
9 Space Station Program.

10 (3) For Science, \$5,151,200,000, of which—

11 (A) \$1,826,000,000 shall be for Earth
12 Science;

13 (B) \$1,345,000,000 shall be for Planetary
14 Science, of which \$30,000,000 shall be for the
15 Astrobiology Institute;

16 (C) \$668,000,000 shall be for Astro-
17 physics;

18 (D) \$658,200,000 shall be for the James
19 Webb Space Telescope; and

20 (E) \$654,000,000 shall be for
21 Heliophysics.

22 (4) For Aeronautics, \$566,000,000.

23 (5) For Space Technology, \$576,000,000.

24 (6) For Education, \$116,600,000.

25 (7) For Cross-Agency Support, \$2,793,000,000.

1 (8) For Construction and Environmental Com-
2 pliance and Restoration, \$515,000,000.

3 (9) For Inspector General, \$37,500,000.

4 **TITLE II—HUMAN SPACE FLIGHT**
5 **Subtitle A—Exploration**

6 **SEC. 201. SPACE EXPLORATION POLICY.**

7 (a) **POLICY.**—Human exploration deeper into the
8 solar system shall be a core mission of the Administration.
9 It is the policy of the United States that the goal of the
10 Administration’s exploration program shall be to success-
11 fully conduct a crewed mission to the surface of Mars to
12 begin human exploration of that planet. The use of the
13 surface of the Moon, cis-lunar space, near-Earth asteroids,
14 Lagrangian points, and Martian moons may be pursued
15 provided they are properly incorporated into the Human
16 Exploration Roadmap described in section 70504 of title
17 51, United States Code.

18 (b) **VISION FOR SPACE EXPLORATION.**—Section
19 20302 of title 51, United States Code, is amended by add-
20 ing at the end the following:

21 “(c) **DEFINITIONS.**—In this section:

22 “(1) **ORION CREW CAPSULE.**—The term ‘Orion
23 crew capsule’ means the multipurpose crew vehicle
24 described in section 303 of the National Aeronautics

1 and Space Administration Authorization Act of 2010
2 (42 U.S.C. 18323).

3 “(2) SPACE LAUNCH SYSTEM.—The term
4 ‘Space Launch System’ means the follow-on Govern-
5 ment-owned civil launch system developed, managed,
6 and operated by the Administration to serve as a
7 key component to expand human presence beyond
8 low-Earth orbit, as described in section 302 of the
9 National Aeronautics and Space Administration Au-
10 thorization Act of 2010 (42 U.S.C. 18322).”.

11 (c) KEY OBJECTIVES.—Section 202(b) of the Na-
12 tional Aeronautics and Space Administration Authoriza-
13 tion Act of 2010 (42 U.S.C. 18312(b)) is amended—

14 (1) in paragraph (3), by striking “and” after
15 the semicolon;

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

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

19 “(5) to accelerate the development of capabili-
20 ties to enable a human exploration mission to the
21 surface of Mars and beyond through the
22 prioritization of those technologies and capabilities
23 best suited for such a mission in accordance with the
24 Human Exploration Roadmap under section 70504
25 of title 51, United States Code.”.

1 (d) USE OF NON-UNITED STATES HUMAN SPACE
2 FLIGHT TRANSPORTATION CAPABILITIES.—Section
3 201(a) of the National Aeronautics and Space Administra-
4 tion Authorization Act of 2010 (42 U.S.C. 18311(a)) is
5 amended to read as follows:

6 “(a) USE OF NON-UNITED STATES HUMAN SPACE
7 FLIGHT TRANSPORTATION CAPABILITIES.—

8 “(1) IN GENERAL.—NASA may not obtain non-
9 United States human space flight capabilities unless
10 no domestic commercial or public-private partnership
11 provider that the Administrator has determined to
12 meet safety and affordability requirements estab-
13 lished by NASA for the transport of its astronauts
14 is available to provide such capabilities.

15 “(2) DEFINITION.—For purposes of this sub-
16 section, the term ‘domestic commercial provider’
17 means a person providing space transportation serv-
18 ices or other space-related activities, the majority
19 control of which is held by persons other than a
20 Federal, State, local, or foreign government, foreign
21 company, or foreign national.”.

22 (e) REPEAL OF SPACE SHUTTLE CAPABILITY ASSUR-
23 ANCE.—Section 203 of the National Aeronautics and
24 Space Administration Authorization Act of 2010 (42
25 U.S.C. 18313) is amended—

- 1 (1) by striking subsection (b);
- 2 (2) in subsection (d), by striking “subsection
- 3 (c)” and inserting “subsection (b)”; and
- 4 (3) by redesignating subsections (c) and (d) as
- 5 subsections (b) and (c), respectively.

6 **SEC. 202. STEPPING STONE APPROACH TO EXPLORATION.**

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

9 **“§ 70504. Stepping stone approach to exploration**

10 “(a) IN GENERAL.—In order to maximize the cost
11 effectiveness of the long-term space exploration and utili-
12 zation activities of the United States, the Administrator
13 shall direct the Human Exploration and Operations Mis-
14 sion Directorate, or its successor division, to develop a
15 Human Exploration Roadmap to define the specific capa-
16 bilities and technologies necessary to extend human pres-
17 ence to the surface of Mars and the sets and sequences
18 of missions required to demonstrate such capabilities and
19 technologies.

20 “(b) INTERNATIONAL PARTICIPATION.—The Presi-
21 dent should invite the United States partners in the Inter-
22 national Space Station program and other nations, as ap-
23 propriate, to participate in an international initiative
24 under the leadership of the United States to achieve the

1 goal of successfully conducting a crewed mission to the
2 surface of Mars.

3 “(c) ROADMAP REQUIREMENTS.—In developing the
4 Human Exploration Roadmap, the Administrator shall—

5 “(1) include the specific set of capabilities and
6 technologies that contribute to extending human
7 presence to the surface of Mars and the sets and se-
8 quences of missions necessary to demonstrate the
9 proficiency of these capabilities and technologies
10 with an emphasis on using or not using the Inter-
11 national Space Station, lunar landings, cis-lunar
12 space, trans-lunar space, Lagrangian points, and the
13 natural satellites of Mars, Phobos and Deimos, as
14 testbeds, as necessary, and shall include the most
15 appropriate process for developing such capabilities
16 and technologies;

17 “(2) include information on the phasing of
18 planned intermediate destinations, Mars mission risk
19 areas and potential risk mitigation approaches, tech-
20 nology requirements and phasing of required tech-
21 nology development activities, the management strat-
22 egy to be followed, related International Space Sta-
23 tion activities, and planned international collabo-
24 rative activities, potential commercial contributions,
25 and other activities relevant to the achievement of

1 the goal established in section 201(a) of the Na-
2 tional Aeronautics and Space Administration Au-
3 thorization Act of 2014;

4 “(3) describe those technologies already under
5 development across the Federal Government or by
6 nongovernment entities which meet or exceed the
7 needs described in paragraph (1);

8 “(4) provide a specific process for the evolution
9 of the capabilities of the fully integrated Orion crew
10 capsule with the Space Launch System and how
11 these systems demonstrate the capabilities and tech-
12 nologies described in paragraph (1);

13 “(5) provide a description of the capabilities
14 and technologies that need to be demonstrated or re-
15 search data that could be gained through the utiliza-
16 tion of the International Space Station and the sta-
17 tus of the development of such capabilities and tech-
18 nologies;

19 “(6) describe a framework for international co-
20 operation in the development of all technologies and
21 capabilities required in this section, as well as an as-
22 sessment of the risks posed by relying on inter-
23 national partners for capabilities and technologies on
24 the critical path of development;

1 “(7) describe a process for utilizing nongovern-
2 mental entities for future human exploration beyond
3 lunar landings and cis-lunar space and specify what,
4 if any, synergy could be gained from—

5 “(A) partnerships using Space Act Agree-
6 ments (as defined in section 2 of the National
7 Aeronautics and Space Administration Author-
8 ization Act of 2014); or

9 “(B) other acquisition instruments;

10 “(8) include in the Human Exploration Road-
11 map an addendum from the National Aeronautics
12 and Space Administration Advisory Council, and an
13 addendum from the Aerospace Safety Advisory
14 Panel, each with a statement of review of the
15 Human Exploration Roadmap that shall include—

16 “(A) subjects of agreement;

17 “(B) areas of concern; and

18 “(C) recommendations; and

19 “(9) include in the Human Exploration Road-
20 map an examination of the benefits of utilizing cur-
21 rent Administration launch facilities for trans-lunar
22 missions.

23 “(d) UPDATES.—The Administrator shall update
24 such Human Exploration Roadmap as needed but no less
25 frequently than every 2 years and include it in the budget

1 for that fiscal year transmitted to Congress under section
2 1105(a) of title 31, and describe—

3 “(1) the achievements and goals reached in the
4 process of developing such capabilities and tech-
5 nologies during the 2-year period prior to the sub-
6 mission of the update to Congress; and

7 “(2) the expected goals and achievements in the
8 following 2-year period.

9 “(e) DEFINITIONS.—In this section, the terms ‘Orion
10 crew capsule’ and ‘Space Launch System’ have the mean-
11 ings given such terms in section 20302.”.

12 (b) REPORT.—

13 (1) IN GENERAL.—Not later than 180 days
14 after the date of enactment of this Act, the Adminis-
15 trator shall transmit a copy of the Human Explo-
16 ration Roadmap developed under section 70504 of
17 title 51, United States Code, to the Committee on
18 Science, Space, and Technology of the House of
19 Representatives and the Committee on Commerce,
20 Science, and Transportation of the Senate.

21 (2) UPDATES.—The Administrator shall trans-
22 mit a copy of each updated Human Exploration
23 Roadmap to the Committee on Science, Space, and
24 Technology of the House of Representatives and the
25 Committee on Commerce, Science, and Transpor-

1 tation of the Senate not later than 7 days after such
2 Human Exploration Roadmap is updated.

3 **SEC. 203. SPACE LAUNCH SYSTEM.**

4 (a) FINDINGS.—Congress finds that—

5 (1) the Space Launch System is the most prac-
6 tical approach to reaching the Moon, Mars, and be-
7 yond, and Congress reaffirms the policy and min-
8 imum capability requirements for the Space Launch
9 System contained in section 302 of the National
10 Aeronautics and Space Administration Authorization
11 Act of 2010 (42 U.S.C. 18322);

12 (2) the primary goal for the design of the fully
13 integrated Space Launch System, including an
14 upper stage needed to go beyond low-Earth orbit, is
15 to safely carry a total payload to enable human
16 space exploration of the Moon, Mars, and beyond
17 over the course of the next century as required in
18 section 302(c) of the National Aeronautics and
19 Space Administration Authorization Act of 2010 (42
20 U.S.C. 18322(c)); and

21 (3) In order to promote safety and reduce pro-
22 grammatic risk, the Administrator shall budget for
23 and undertake a robust ground test and uncrewed
24 and crewed flight test and demonstration program
25 for the Space Launch System and the Orion crew

1 capsule and shall budget for an operational flight
2 rate sufficient to maintain safety and operational
3 readiness.

4 (b) SENSE OF CONGRESS.—It is the sense of Con-
5 gress that the President’s annual budget requests for the
6 Space Launch System and Orion crew capsule develop-
7 ment, test, and operational phases should strive to accu-
8 rately reflect the resource requirements of each of those
9 phases, consistent with the policy established in section
10 201(a) of this Act.

11 (c) IN GENERAL.—Given the critical importance of
12 a heavy-lift launch vehicle and crewed spacecraft to enable
13 the achievement of the goal established in section 201(a)
14 of this Act, as well as the accomplishment of intermediate
15 exploration milestones and the provision of a backup capa-
16 bility to transfer crew and cargo to the International
17 Space Station, the Administrator shall make the expedi-
18 tious development, test, and achievement of operational
19 readiness of the Space Launch System and the Orion crew
20 capsule the highest priority of the exploration program.

21 (d) GOVERNMENT ACCOUNTABILITY OFFICE RE-
22 VIEW.—Not later than 270 days after the date of enact-
23 ment of this Act, the Comptroller General shall transmit
24 to the Committee on Science, Space, and Technology of
25 the House of Representatives and the Committee on Com-

1 merce, Science, and Transportation of the Senate a report
2 on the Administration's acquisition of ground systems in
3 support of the Space Launch System. The report shall as-
4 sess the extent to which ground systems acquired in sup-
5 port of the Space Launch System are focused on the direct
6 support of the Space Launch System and shall identify
7 any ground support projects or activities that the Admin-
8 istration is undertaking that do not solely or primarily
9 support the Space Launch System.

10 (e) UTILIZATION REPORT.—The Administrator, in
11 consultation with the Secretary of Defense and the Direc-
12 tor of National Intelligence, shall prepare a report that
13 addresses the effort and budget required to enable and
14 utilize a cargo variant of the 130-ton Space Launch Sys-
15 tem configuration described in section 302(c) of the Na-
16 tional Aeronautics and Space Administration Authoriza-
17 tion Act of 2010 (42 U.S.C. 18322(c)). This report shall
18 also include consideration of the technical requirements of
19 the scientific and national security communities related to
20 such Space Launch System and shall directly assess the
21 utility and estimated cost savings obtained by using such
22 Space Launch System for national security and space
23 science missions. The Administrator shall transmit such
24 report to the Committee on Science, Space, and Tech-
25 nology of the House of Representatives and the Committee

1 on Commerce, Science, and Transportation of the Senate
2 not later than 180 days after the date of enactment of
3 this Act.

4 (f) NAMING COMPETITION.—Beginning not later
5 than 180 days after the date of enactment of this Act and
6 concluding not later than 1 year after such date of enact-
7 ment, the Administrator shall conduct a well-publicized
8 competition among students in elementary and secondary
9 schools to name the elements of the Administration’s ex-
10 ploration program, including—

11 (1) a name for the deep space human explo-
12 ration program as a whole, which includes the Space
13 Launch System, the Orion crew capsule, and future
14 missions; and

15 (2) a name for the Space Launch System.

16 (g) ADVANCED BOOSTER COMPETITION.—

17 (1) REPORT.—Not later than 90 days after the
18 date of enactment of this Act, the Associate Admin-
19 istrator of the Administration shall transmit to the
20 Committee on Science, Space, and Technology of the
21 House of Representatives and the Committee on
22 Commerce, Science, and Transportation of the Sen-
23 ate a report that—

1 (A) describes the estimated total develop-
2 ment cost of an advanced booster for the Space
3 Launch System;

4 (B) details any reductions or increases to
5 the development cost of the Space Launch Sys-
6 tem which may result from conducting a com-
7 petition for an advanced booster; and

8 (C) outlines any potential schedule delay to
9 the Space Launch System 2017 Exploration
10 Mission-1 launch as a result of increased costs
11 associated with conducting a competition for an
12 advanced booster.

13 (2) COMPETITION.—If the Associate Adminis-
14 trator reports reductions pursuant to paragraph
15 (1)(B), and no adverse schedule impact pursuant to
16 paragraph (1)(C), then the Administration shall con-
17 duct a full and open competition for an advanced
18 booster for the Space Launch System to meet the
19 requirements described in section 302(c) of the Na-
20 tional Aeronautics and Space Administration Au-
21 thorization Act of 2010 (42 U.S.C. 18322(c)), to
22 begin as soon as practicable after the development of
23 the upper stage has been initiated.

1 **SEC. 204. ORION CREW CAPSULE.**

2 (a) IN GENERAL.—The Orion crew capsule shall meet
3 the practical needs and the minimum capability require-
4 ments described in section 303 of the National Aero-
5 nautics and Space Administration Authorization Act of
6 2010 (42 U.S.C. 18323).

7 (b) REPORT.—Not later than 60 days after the date
8 of enactment of this Act, the Administrator shall transmit
9 a report to the Committee on Science, Space, and Tech-
10 nology of the House of Representatives and the Committee
11 on Commerce, Science, and Transportation of the Sen-
12 ate—

13 (1) detailing those components and systems of
14 the Orion crew capsule that ensure it is in compli-
15 ance with section 303(b) of such Act (42 U.S.C.
16 18323(b));

17 (2) detailing the expected date that the Orion
18 crew capsule will be available to transport crew and
19 cargo to the International Space Station; and

20 (3) certifying that the requirements of section
21 303(b)(3) of such Act (42 U.S.C. 18323(b)(3)) will
22 be met by the Administration.

23 **SEC. 205. SPACE RADIATION.**

24 (a) STRATEGY AND PLAN.—

25 (1) IN GENERAL.—The Administrator shall de-
26 velop a space radiation mitigation and management

1 strategy and implementation plan to enable the
2 achievement of the goal established in section 201
3 that includes key research and monitoring require-
4 ments, milestones, a timetable, and an estimate of
5 facility and budgetary requirements.

6 (2) COORDINATION.—The strategy shall include
7 a mechanism for coordinating Administration re-
8 search, technology, facilities, engineering, operations,
9 and other functions required to support the strategy
10 and plan.

11 (3) TRANSMITTAL.—Not later than 1 year after
12 the date of enactment of this Act, the Administrator
13 shall transmit the strategy and plan to the Com-
14 mittee on Science, Space, and Technology of the
15 House of Representatives and the Committee on
16 Commerce, Science, and Transportation of the Sen-
17 ate.

18 (b) SPACE RADIATION RESEARCH FACILITIES.—The
19 Administrator, in consultation with the heads of other ap-
20 propriate Federal agencies, shall assess the national capa-
21 bilities for carrying out critical ground-based research on
22 space radiation biology and shall identify any issues that
23 could affect the ability to carry out that research.

1 **SEC. 206. PLANETARY PROTECTION FOR HUMAN EXPLO-**
2 **RATION MISSIONS.**

3 (a) STUDY.—The Administrator shall enter into an
4 arrangement with the National Academies for a study to
5 explore the planetary protection ramifications of potential
6 future missions by astronauts such as to the lunar polar
7 regions, near-Earth asteroids, the moons of Mars, and the
8 surface of Mars.

9 (b) SCOPE.—The study shall—

10 (1) collate and summarize what has been done
11 to date with respect to planetary protection meas-
12 ures to be applied to potential human missions such
13 as to the lunar polar regions, near-Earth asteroids,
14 the moons of Mars, and the surface of Mars;

15 (2) identify and document planetary protection
16 concerns associated with potential human missions
17 such as to the lunar polar regions, near-Earth aster-
18 oids, the moons of Mars, and the surface of Mars;

19 (3) develop a methodology, if possible, for defin-
20 ing and classifying the degree of concern associated
21 with each likely destination;

22 (4) assess likely methodologies for addressing
23 planetary protection concerns; and

24 (5) identify areas for future research to reduce
25 current uncertainties.

1 (c) COMPLETION DATE.—Not later than 2 years
2 after the date of enactment of this Act, the Administrator
3 shall provide the results of the study to the Committee
4 on Science, Space, and Technology of the House of Rep-
5 resentatives and the Committee on Commerce, Science,
6 and Transportation of the Senate.

7 **Subtitle B—Space Operations**

8 **SEC. 211. INTERNATIONAL SPACE STATION.**

9 (a) FINDINGS.—Congress finds the following:

10 (1) The International Space Station is an ideal
11 testbed for future exploration systems development,
12 including long-duration space travel.

13 (2) The use of the private market to provide
14 cargo and crew transportation services is currently
15 the most expeditious process to restore domestic ac-
16 cess to the International Space Station and low-
17 Earth orbit.

18 (3) Government access to low-Earth orbit is
19 paramount to the continued success of the Inter-
20 national Space Station and National Laboratory.

21 (b) IN GENERAL.—The following is the policy of the
22 United States:

23 (1) The United States International Space Sta-
24 tion program shall have two primary objectives: sup-
25 porting achievement of the goal established in sec-

1 tion 201 of this Act and pursuing a research pro-
2 gram that advances knowledge and provides benefits
3 to the Nation. It shall continue to be the policy of
4 the United States to, in consultation with its inter-
5 national partners in the International Space Station
6 program, support full and complete utilization of the
7 International Space Station.

8 (2) The International Space Station shall be
9 utilized to the maximum extent practicable for the
10 development of capabilities and technologies needed
11 for the future of human exploration beyond low-
12 Earth orbit and shall be considered in the develop-
13 ment of the Human Exploration Roadmap developed
14 under section 70504 of title 51, United States Code.

15 (3) The Administrator shall, in consultation
16 with the International Space Station partners—

17 (A) take all necessary measures to support
18 the operation and full utilization of the Inter-
19 national Space Station; and

20 (B) seek to minimize, to the extent prac-
21 ticable, the operating costs of the International
22 Space Station.

23 (4) Reliance on foreign carriers for crew trans-
24 fer is unacceptable, and the Nation's human space
25 flight program must acquire the capability to launch

1 United States astronauts on United States rockets
2 from United States soil as soon as is safe and prac-
3 tically possible, whether on Government-owned and
4 operated space transportation systems or privately
5 owned systems that have been certified for flight by
6 the appropriate Federal agencies.

7 (c) REAFFIRMATION OF POLICY.—Congress reaf-
8 firms—

9 (1) its commitment to the development of a
10 commercially developed launch and delivery system
11 to the International Space Station for crew missions
12 as expressed in the National Aeronautics and Space
13 Administration Authorization Act of 2005 (Public
14 Law 109–155), the National Aeronautics and Space
15 Administration Authorization Act of 2008 (Public
16 Law 110–422), and the National Aeronautics and
17 Space Administration Authorization Act of 2010
18 (Public Law 111–267);

19 (2) that the Administration shall make use of
20 United States commercially provided International
21 Space Station crew transfer and crew rescue services
22 to the maximum extent practicable;

23 (3) that the Orion crew capsule shall provide an
24 alternative means of delivery of crew and cargo to
25 the International Space Station, in the event other

1 vehicles, whether commercial vehicles or partner-sup-
2 plied vehicles, are unable to perform that function;
3 and

4 (4) the policy stated in section 501(b) of the
5 National Aeronautics and Space Administration Au-
6 thorization Act of 2010 (42 U.S.C. 18351(b)) that
7 the Administration shall pursue international, com-
8 mercial, and intragovernmental means to maximize
9 International Space Station logistics supply, mainte-
10 nance, and operational capabilities, reduce risks to
11 International Space Station systems sustainability,
12 and offset and minimize United States operations
13 costs relating to the International Space Station.

14 (d) ASSURED ACCESS TO LOW-EARTH ORBIT.—Sec-
15 tion 70501(a) of title 51, United States Code, is amended
16 to read as follows:

17 “(a) POLICY STATEMENT.—It is the policy of the
18 United States to maintain an uninterrupted capability for
19 human space flight and operations in low-Earth orbit, and
20 beyond, as an essential instrument of national security
21 and the capability to ensure continued United States par-
22 ticipation and leadership in the exploration and utilization
23 of space.”.

24 (e) REPEALS.—

1 (1) USE OF SPACE SHUTTLE OR ALTER-
2 NATIVES.—Chapter 701 of title 51, United States
3 Code, and the item relating to such chapter in the
4 table of chapters for such title, are repealed.

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

10 (3) SHUTTLE PRIVATIZATION.—Section 50133
11 of title 51, United States Code, and the item relat-
12 ing to such section in the table of sections for chap-
13 ter 501 of such title, are repealed.

14 (f) EXTENSION CRITERIA REPORT.—Not later than
15 1 year after the date of enactment of this Act, the Admin-
16 istrator shall submit to the Committee on Science, Space,
17 and Technology of the House of Representatives and the
18 Committee on Commerce, Science, and Transportation of
19 the Senate a report on the feasibility of extending the op-
20 eration of the International Space Station that includes—

21 (1) criteria for defining the International Space
22 Station as a research success;

23 (2) any necessary contributions to enabling exe-
24 cution of the Human Exploration Roadmap devel-

1 oped under section 70504 of title 51, United States
2 Code;

3 (3) cost estimates for operating the Inter-
4 national Space Station to achieve the criteria re-
5 quired under paragraph (1);

6 (4) cost estimates for extending operations to
7 2024 and 2030;

8 (5) an assessment of how the defined criteria
9 under paragraph (1) respond to the National Acad-
10 emies Decadal Survey on Biological and Physical
11 Sciences in Space; and

12 (6) an identification of the actions and cost es-
13 timate needed to deorbit the International Space
14 Station once a decision is made to deorbit the lab-
15 oratory.

16 (g) STRATEGIC PLAN FOR INTERNATIONAL SPACE
17 STATION RESEARCH.—

18 (1) IN GENERAL.—The Director of the Office of
19 Science and Technology Policy, in consultation with
20 the Administrator, academia, other Federal agencies,
21 the International Space Station National Laboratory
22 Advisory Committee, and other potential stake-
23 holders, shall develop and transmit to the Committee
24 on Science, Space, and Technology of the House of
25 Representatives and the Committee on Commerce,

1 Science, and Transportation of the Senate a stra-
2 tegic plan for conducting competitive, peer-reviewed
3 research in physical and life sciences and related
4 technologies on the International Space Station
5 through at least 2020.

6 (2) PLAN REQUIREMENTS.—The strategic plan
7 shall—

8 (A) be consistent with the priorities and
9 recommendations established by the National
10 Academies in its Decadal Survey on Biological
11 and Physical Sciences in Space;

12 (B) provide a research timeline and iden-
13 tify resource requirements for its implementa-
14 tion, including the facilities and instrumenta-
15 tion necessary for the conduct of such research;
16 and

17 (C) identify—

18 (i) criteria for the proposed research,
19 including—

20 (I) a justification for the research
21 to be carried out in the space micro-
22 gravity environment;

23 (II) the use of model systems;

24 (III) the testing of flight hard-
25 ware to understand and ensure its

1 functioning in the microgravity envi-
2 ronment;

3 (IV) the use of controls to help
4 distinguish among the direct and indi-
5 rect effects of microgravity, among
6 other effects of the flight or space en-
7 vironment;

8 (V) approaches for facilitating
9 data collection, analysis, and interpre-
10 tation;

11 (VI) procedures to ensure repeti-
12 tion of experiments, as needed;

13 (VII) support for timely presen-
14 tation of the peer-reviewed results of
15 the research;

16 (VIII) defined metrics for the
17 success of each study; and

18 (IX) how these activities enable
19 the Human Exploration Roadmap de-
20 scribed in section 70504 of title 51,
21 United States Code;

22 (ii) instrumentation required to sup-
23 port the measurements and analysis of the
24 research to be carried out under the stra-
25 tegic plan;

1 (iii) the capabilities needed to support
2 direct, real-time communications between
3 astronauts working on research experi-
4 ments onboard the International Space
5 Station and the principal investigator on
6 the ground;

7 (iv) a process for involving the exter-
8 nal user community in research planning,
9 including planning for relevant flight hard-
10 ware and instrumentation, and for utiliza-
11 tion of the International Space Station,
12 free flyers, or other research platforms;

13 (v) the acquisition strategy the Ad-
14 ministration plans to use to acquire any
15 new support capabilities which are not
16 operational on the International Space Sta-
17 tion as of the date of enactment of this
18 Act, and the criteria the Administration
19 will apply if less than full and open com-
20 petition is selected; and

21 (vi) defined metrics for success of the
22 research plan.

23 (3) REPORT.—

24 (A) IN GENERAL.—Not later than 1 year
25 after the date of enactment of this Act, the

1 Comptroller General of the United States shall
2 transmit to the Committee on Science, Space,
3 and Technology of the House of Representa-
4 tives and the Committee on Commerce, Science,
5 and Transportation of the Senate a report on
6 the progress of the organization chosen for the
7 management of the International Space Station
8 National Laboratory as directed in section 504
9 of the National Aeronautics and Space Admin-
10 istration Authorization Act of 2010 (42 U.S.C.
11 18354).

12 (B) SPECIFIC REQUIREMENTS.—The re-
13 port shall assess the management, organization,
14 and performance of such organization and shall
15 include a review of the status of each of the 7
16 required activities listed in section 504(c) of
17 such Act (42 U.S.C. 18354(c)).

18 **SEC. 212. BARRIERS IMPEDING ENHANCED UTILIZATION OF**
19 **THE ISS'S NATIONAL LABORATORY BY COM-**
20 **MERCIAL COMPANIES.**

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

23 (1) enhanced utilization of the International
24 Space Station's National Laboratory requires a full
25 understanding of the barriers impeding such utiliza-

1 tion and actions needed to be taken to remove or
2 mitigate them to the maximum extent practicable;
3 and

4 (2) doing so will allow the Administration to en-
5 courage commercial companies to invest in micro-
6 gravity research using National Laboratory research
7 facilities.

8 (b) ASSESSMENT.—The Administrator shall enter
9 into an arrangement with the National Academies for an
10 assessment to—

11 (1) identify barriers impeding enhanced utiliza-
12 tion of the International Space Station’s National
13 Laboratory;

14 (2) recommend ways to encourage commercial
15 companies to make greater use of the International
16 Space Station’s National Laboratory, including cor-
17 porate investment in microgravity research; and

18 (3) identify any legislative changes that may be
19 required.

20 (c) TRANSMITTAL.—Not later than one year after the
21 date of enactment of this Act, the Administrator shall
22 transmit to the Committee on Science, Space, and Tech-
23 nology of the House of Representatives and the Committee
24 on Commerce, Science, and Transportation of the Senate
25 the results of the assessment described in subsection (b).

1 **SEC. 213. UTILIZATION OF INTERNATIONAL SPACE STA-**
2 **TION FOR SCIENCE MISSIONS.**

3 The Administrator shall utilize the International
4 Space Station for Science Mission Directorate missions in
5 low-Earth orbit wherever it is practical and cost effective
6 to do so.

7 **SEC. 214. INTERNATIONAL SPACE STATION CARGO RESUP-**
8 **PLY SERVICES LESSONS LEARNED.**

9 Not later than 120 days after the date of enactment
10 of this Act, the Administrator shall transmit a report to
11 the Committee on Science, Space, and Technology of the
12 House of Representatives and the Committee on Com-
13 merce, Science, and Transportation of the Senate that—

14 (1) identifies the lessons learned to date from
15 the Commercial Resupply Services contract;

16 (2) indicates whether changes are needed to the
17 manner in which the Administration procures and
18 manages similar services upon the expiration of the
19 existing Commercial Resupply Services contract; and

20 (3) identifies any lessons learned from the Com-
21 mercial Resupply Services contract that should be
22 applied to the procurement and management of com-
23 mercially provided crew transfer services to and
24 from the International Space Station.

1 **SEC. 215. COMMERCIAL CREW PROGRAM.**

2 (a) SENSE OF CONGRESS.—It is the sense of Con-
3 gress that once developed and certified to meet the Admin-
4 istration’s safety and reliability requirements, United
5 States commercially provided crew transportation systems
6 offer the potential of serving as the primary means of
7 transporting American astronauts and international part-
8 ner astronauts to and from the International Space Sta-
9 tion and serving as International Space Station emergency
10 crew rescue vehicles. At the same time, the budgetary as-
11 sumptions used by the Administration in its planning for
12 the Commercial Crew Program have consistently assumed
13 significantly higher funding levels than have been author-
14 ized and appropriated by Congress. It is the sense of Con-
15 gress that credibility in the Administration’s budgetary es-
16 timates for the Commercial Crew Program can be en-
17 hanced by an independently developed cost estimate. Such
18 credibility in budgetary estimates is an important factor
19 in understanding program risk.

20 (b) OBJECTIVE.—The objective of the Administra-
21 tion’s Commercial Crew Program shall be to assist the de-
22 velopment of at least one crew transportation system to
23 carry Administration astronauts safely, reliably, and
24 affordably to and from the International Space Station
25 and to serve as an emergency crew rescue vehicle as soon
26 as practicable within the funding levels authorized. The

1 Administration shall not use any considerations beyond
2 this objective in the overall acquisition strategy.

3 (c) SAFETY.—Consistent with the findings and rec-
4 ommendations of the Columbia Accident Investigation
5 Board, the Administration shall—

6 (1) ensure that, in its evaluation and selection
7 of contracts for the development of commercial crew
8 transportation capabilities, safety is the highest pri-
9 ority; and

10 (2) seek to ensure that minimization of the
11 probability of loss of crew shall be an important se-
12 lection criterion of the Commercial Crew Transpor-
13 tation Capability Contract.

14 (d) COST MINIMIZATION.—The Administrator shall
15 strive through the competitive selection process to mini-
16 mize the life cycle cost to the Administration through the
17 planned period of commercially provided crew transpor-
18 tation services.

19 (e) TRANSPARENCY.—Transparency is the corner-
20 stone of ensuring a safe and reliable commercial crew
21 transportation service to the International Space Station.
22 The Administrator shall, to the greatest extent prac-
23 ticable, ensure that every commercial crew transportation
24 services provider has provided evidence-based support for
25 their costs and schedule.

1 (f) INDEPENDENT COST AND SCHEDULE ESTI-
2 MATE.—

3 (1) REQUIREMENT.—Not later than 30 days
4 after the Federal Acquisition Regulation-based con-
5 tract for the Commercial Crew Transportation Capa-
6 bility Contract is awarded, the Administrator shall
7 arrange for the initiation of an Independent Cost
8 and Schedule Estimate for—

9 (A) all activities associated with the devel-
10 opment, test, demonstration, and certification
11 of commercial crew transportation systems;

12 (B) transportation and rescue services re-
13 quired by the Administration for International
14 Space Station operations through calendar year
15 2020 or later if Administration requirements so
16 dictate; and

17 (C) the estimated date of operational read-
18 iness for the program each assumption listed in
19 paragraph (2) of this subsection.

20 (2) ASSUMPTIONS.—The Independent Cost and
21 Schedule Estimate shall provide an estimate for each
22 of the following scenarios:

23 (A) An appropriation of \$600,000,000 over
24 the next 3 fiscal years.

1 (B) An appropriation of \$700,000,000
2 over the next 3 fiscal years.

3 (C) An appropriation of \$800,000,000 over
4 the next 3 fiscal years.

5 (D) The funding level assumptions over
6 the next 3 fiscal years that are included as part
7 of commercial crew transportation capability
8 contract awards.

9 (3) TRANSMITTAL.—Not later than 180 days
10 after initiation of the Independent Cost and Sched-
11 ule Estimate under paragraph (1), the Adminis-
12 trator shall transmit the results of the Independent
13 Cost and Schedule Estimate to the Committee on
14 Science, Space, and Technology of the House of
15 Representatives and the Committee on Commerce,
16 Science, and Transportation of the Senate.

17 (g) IMPLEMENTATION STRATEGIES.—

18 (1) REPORT.—Not later than 60 days after the
19 completion of the Independent Cost and Schedule
20 Estimate under subsection (f), the Administrator
21 shall transmit to the Committee on Science, Space,
22 and Technology of the House of Representatives and
23 the Committee on Commerce, Science, and Trans-
24 portation of the Senate a report containing 4 dis-
25 tinct implementation strategies based on such Inde-

1 pendent Cost and Schedule Estimate for the final
2 stages of the commercial crew program.

3 (2) REQUIREMENTS.—These options shall in-
4 clude—

5 (A) a strategy that assumes an appropria-
6 tion of \$600,000,000 over the next 3 fiscal
7 years;

8 (B) a strategy that assumes an appropria-
9 tion of \$700,000,000 over the next 3 fiscal
10 years;

11 (C) a strategy that assumes an appropria-
12 tion of \$800,000,000 over the next 3 fiscal
13 years; and

14 (D) a strategy that has yet to be consid-
15 ered previously in any budget submission but
16 that the Administration believes could ensure
17 the flight readiness date of 2017 for at least
18 one provider.

19 (3) INCLUSIONS.—Each strategy shall include
20 the contracting instruments the Administration will
21 employ to acquire the services in each phase of de-
22 velopment or acquisition and the number of commer-
23 cial providers the Administration will include in the
24 program.

1 **SEC. 216. SPACE COMMUNICATIONS.**

2 (a) PLAN.—The Administrator shall develop a plan,
3 in consultation with relevant Federal agencies, for updat-
4 ing the Administration’s space communications and navi-
5 gation architecture for low-Earth orbital and deep space
6 operations so that it is capable of meeting the Administra-
7 tion’s communications needs over the next 20 years. The
8 plan shall include lifecycle cost estimates, milestones, esti-
9 mated performance capabilities, and 5-year funding pro-
10 files. The plan shall also include an estimate of the
11 amounts of any reimbursements the Administration is
12 likely to receive from other Federal agencies during the
13 expected life of the upgrades described in the plan. At a
14 minimum, the plan shall include a description of the fol-
15 lowing:

16 (1) Steps to sustain the existing space commu-
17 nications and navigation network and infrastructure
18 and priorities for how resources will be applied and
19 cost estimates for the maintenance of existing space
20 communications network capabilities.

21 (2) Upgrades needed to support space commu-
22 nications and navigation network and infrastructure
23 requirements, including cost estimates and schedules
24 and an assessment of the impact on missions if re-
25 sources are not secured at the level needed.

1 (3) Projected space communications and navi-
2 gation network requirements for the next 20 years,
3 including those in support of human space explo-
4 ration missions.

5 (4) Projected Tracking and Data Relay Sat-
6 ellite System requirements for the next 20 years, in-
7 cluding those in support of other relevant Federal
8 agencies, and cost and schedule estimates to main-
9 tain and upgrade the Tracking and Data Relay Sat-
10 ellite System to meet projected requirements.

11 (5) Steps the Administration is taking to meet
12 future space communications requirements after all
13 Tracking and Data Relay Satellite System third-gen-
14 eration communications satellites are operational.

15 (6) Steps the Administration is taking to miti-
16 gate threats to electromagnetic spectrum use.

17 (b) SCHEDULE.—The Administrator shall transmit
18 the plan developed under this section to the Committee
19 on Science, Space, and Technology of the House of Rep-
20 resentatives and the Committee on Commerce, Science,
21 and Transportation of the Senate not later than 1 year
22 after the date of enactment of this Act.

TITLE III—SCIENCE**Subtitle A—General****3 SEC. 301. SCIENCE PORTFOLIO.**

4 (a) BALANCED AND ADEQUATELY FUNDED ACTIVITIES.—Section 803 of the National Aeronautics and Space
5 Administration Authorization Act of 2010 (124 Stat.
6 2832) is amended to read as follows:

8 **“SEC. 803. OVERALL SCIENCE PORTFOLIO—SENSE OF THE**
9 **CONGRESS.**

10 “Congress reaffirms its sense, expressed in the Na-
11 tional Aeronautics and Space Administration Authoriza-
12 tion Act of 2010, that a balanced and adequately funded
13 set of activities, consisting of research and analysis grants
14 programs, technology development, small, medium, and
15 large space missions, and suborbital research activities,
16 contributes to a robust and productive science program
17 and serves as a catalyst for innovation and discovery.”.

18 (b) DECADAL SURVEYS.—In proposing the funding
19 of programs and activities for the Administration for each
20 fiscal year, the Administrator shall to the greatest extent
21 practicable follow guidance provided in the current decadal
22 surveys from the National Academies’ Space Studies
23 Board.

1 **SEC. 302. RADIOISOTOPE POWER SYSTEMS.**

2 (a) SENSE OF CONGRESS.—It is the sense of Con-
3 gress that conducting deep space exploration requires ra-
4 dioisotope power systems, and establishing continuity in
5 the production of the material needed to power these sys-
6 tems is paramount to the success of these future deep
7 space missions. It is further the sense of Congress that
8 Federal agencies supporting the Administration through
9 the production of such material should do so in a cost ef-
10 fective manner so as not to impose excessive reimburse-
11 ment requirements on the Administration.

12 (b) ANALYSIS OF REQUIREMENTS AND RISKS.—The
13 Director of the Office of Science and Technology Policy
14 and the Administrator, in consultation with other Federal
15 agencies, shall conduct an analysis of—

16 (1) the requirements of the Administration for
17 radioisotope power system material that is needed to
18 carry out planned, high priority robotic missions in
19 the solar system and other surface exploration activi-
20 ties beyond low-Earth orbit; and

21 (2) the risks to missions of the Administration
22 in meeting those requirements, or any additional re-
23 quirements, due to a lack of adequate radioisotope
24 power system material.

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

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

4 (2) explain the assumptions used to determine
5 the Administration’s requirements for the material,
6 including—

7 (A) the planned use of advanced thermal
8 conversion technology such as advanced
9 thermocouples and Stirling generators and con-
10 verters; and

11 (B) the risks and implications of, and con-
12 tingencies for, any delays or unanticipated tech-
13 nical challenges affecting or related to the Ad-
14 ministration’s mission plans for the anticipated
15 use of advanced thermal conversion technology;

16 (3) assess the risk to the Administration’s pro-
17 grams of any potential delays in achieving the sched-
18 ule and milestones for planned domestic production
19 of radioisotope power system material;

20 (4) outline a process for meeting any additional
21 Administration requirements for the material;

22 (5) estimate the incremental costs required to
23 increase the amount of material produced each year,
24 if such an increase is needed to support additional
25 Administration requirements for the material;

1 (6) detail how the Administration and other
2 Federal agencies will manage, operate, and fund
3 production facilities and the design and development
4 of all radioisotope power systems used by the Ad-
5 ministration and other Federal agencies as nec-
6 essary;

7 (7) specify the steps the Administration will
8 take, in consultation with the Department of En-
9 ergy, to preserve the infrastructure and workforce
10 necessary for production of radioisotope power sys-
11 tems and ensure that its reimbursements to the De-
12 partment of Energy associated with such preserva-
13 tion are equitable and justified; and

14 (8) detail how the Administration has imple-
15 mented or rejected the recommendations from the
16 National Research Council’s 2009 report titled “Ra-
17 dioisotope Power Systems: An Imperative for Main-
18 taining U.S. Leadership in Space Exploration”.

19 (d) TRANSMITTAL.—Not later than 180 days after
20 the date of enactment of this Act, the Administrator shall
21 transmit the results of the analysis to the Committee on
22 Science, Space, and Technology of the House of Rep-
23 resentatives and the Committee on Commerce, Science,
24 and Transportation of the Senate.

1 **SEC. 303. CONGRESSIONAL DECLARATION OF POLICY AND**
2 **PURPOSE.**

3 Section 20102(d) of title 51, United States Code, is
4 amended by adding at the end the following new para-
5 graph:

6 “(10) The direction of the unique competence
7 of the Administration to the search for life’s origin,
8 evolution, distribution, and future in the Universe.
9 In carrying out this objective, the Administration
10 may use any practicable ground-based, airborne, or
11 space-based technical means and spectra of electro-
12 magnetic radiation.”.

13 **SEC. 304. UNIVERSITY CLASS SCIENCE MISSIONS.**

14 (a) SENSE OF CONGRESS.—It is the sense of Con-
15 gress that principal investigator-led small orbital science
16 missions, including CubeSat class, University Explorer
17 (UNEX) class, Small Explorer (SMEX) class, and Ven-
18 ture class, offer valuable opportunities to advance science
19 at low cost, train the next generation of scientists and en-
20 gineers, and enable participants in the program to acquire
21 skills in systems engineering and systems integration that
22 are critical to maintaining the Nation’s leadership in space
23 and to enhancing the United States innovation and com-
24 petitiveness abroad.

25 (b) REVIEW OF PRINCIPAL INVESTIGATOR-LED
26 SMALL ORBITAL SCIENCE MISSIONS.—The Administrator

1 shall conduct a review of the science missions described
2 in subsection (a). The review shall include—

3 (1) the status, capability, and availability of ex-
4 isting small orbital science mission programs and
5 the extent to which each program enables the par-
6 ticipation of university scientists and students;

7 (2) the opportunities such mission programs
8 provide for scientific research;

9 (3) the opportunities such mission programs
10 provide for training and education, including sci-
11 entific and engineering workforce development, in-
12 cluding for the Administration's scientific and engi-
13 neering workforce; and

14 (4) the extent to which commercial applications
15 such as hosted payloads, free flyers, and data buys
16 could provide measurable benefits for such mission
17 programs, while preserving the principle of inde-
18 pendent peer review as the basis for mission selec-
19 tion.

20 (c) REPORT.—Not later than 270 days after the date
21 of enactment of this Act, the Administrator shall transmit
22 to the Committee on Science, Space, and Technology of
23 the House of Representatives and the Committee on Com-
24 merce, Science, and Transportation of the Senate a report
25 on the review required under subsection (b) and on rec-

1 ommendations to enhance principal investigator-led small
2 orbital science missions conducted by the Administration
3 in accordance with the results of the review required by
4 subsection (b).

5 **SEC. 305. ASSESSMENT OF SCIENCE MISSION EXTENSIONS.**

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

8 **“§ 30504. Assessment of science mission extensions**

9 “(a) ASSESSMENT.—The Administrator shall carry
10 out biennial reviews within each of the Science divisions
11 to assess the cost and benefits of extending the date of
12 the termination of data collection for those missions that
13 exceed their planned missions’ lifetime. The assessment
14 shall take into consideration how extending missions im-
15 pacts the start of future missions.

16 “(b) CONSULTATION AND CONSIDERATION OF PO-
17 TENTIAL BENEFITS OF INSTRUMENTS ON MISSIONS.—

18 When deciding whether to extend a mission that has an
19 operational component, the Administrator shall consult
20 with any affected Federal agency and shall take into ac-
21 count the potential benefits of instruments on missions
22 that are beyond their planned mission lifetime.

23 “(c) REPORT.—The Administrator shall transmit to
24 the Committee on Science, Space, and Technology of the
25 House of Representatives and the Committee on Com-

1 merce, Science, and Transportation of the Senate, at the
 2 same time as the submission to Congress of the Adminis-
 3 tration’s annual budget request for each fiscal year, a re-
 4 port detailing any assessment required by subsection (a)
 5 that was carried out during the previous year.”.

6 **Subtitle B—Astrophysics**

7 **SEC. 311. DECADAL CADENCE.**

8 In carrying out section 301(b), the Administrator
 9 shall seek to ensure to the extent practicable a steady ca-
 10 dence of large, medium, and small astrophysics missions.

11 **SEC. 312. EXTRASOLAR PLANET EXPLORATION STRATEGY.**

12 (a) STRATEGY.—The Administrator shall enter into
 13 an arrangement with the National Academies to develop
 14 a science strategy for the study and exploration of
 15 extrasolar planets, including the use of the Transiting
 16 Exoplanet Survey Satellite, the James Webb Space Tele-
 17 scope, a potential Wide-Field Infrared Survey Telescope
 18 mission, or any other telescope, spacecraft, or instrument
 19 as appropriate. Such strategy shall—

20 (1) outline key scientific questions;

21 (2) identify the most promising research in the
 22 field;

23 (3) indicate the extent to which the mission pri-
 24 orities in existing decadal surveys address the key
 25 extrasolar planet research goals;

1 (4) identify opportunities for coordination with
2 international partners, commercial partners, and
3 other not-for-profit partners; and

4 (5) make recommendations on the above as ap-
5 propriate.

6 (b) USE OF STRATEGY.—The Administrator shall use
7 the strategy to—

8 (1) inform roadmaps, strategic plans, and other
9 activities of the Administration as they relate to
10 extrasolar planet research and exploration; and

11 (2) provide a foundation for future activities
12 and initiatives.

13 (c) REPORT TO CONGRESS.—Not later than 18
14 months after the date of enactment of this Act, the Na-
15 tional Academies shall transmit a report to the Adminis-
16 trator, and to the Committee on Science, Space, and Tech-
17 nology of the House of Representatives and the Committee
18 on Commerce, Science, and Transportation of the Senate,
19 containing the strategy developed under subsection (a).

20 **SEC. 313. JAMES WEBB SPACE TELESCOPE.**

21 It is the sense of Congress that—

22 (1) the James Webb Space Telescope will revo-
23 lutionize our understanding of star and planet for-
24 mation and how galaxies evolved, and advance the
25 search for the origins of the universe;

1 (2) the James Webb Space Telescope will en-
2 able American scientists to maintain their leadership
3 in astrophysics and other disciplines;

4 (3) the James Webb Space Telescope program
5 is making steady progress towards a launch in 2018;

6 (4) the on-time and on-budget delivery of the
7 James Webb Space Telescope is a high congressional
8 priority; and

9 (5) maintaining this progress will require the
10 Administrator to ensure that integrated testing is
11 appropriately timed and sufficiently comprehensive
12 to enable potential issues to be identified and ad-
13 dressed early enough to be handled within the James
14 Webb Space Telescope’s development schedule prior
15 to launch.

16 **SEC. 314. NATIONAL RECONNAISSANCE OFFICE TELESCOPE**
17 **DONATION.**

18 Not later than 90 days after the date of enactment
19 of this Act, the Administrator shall transmit a report to
20 the Committee on Science, Space, and Technology of the
21 House of Representatives and the Committee on Com-
22 merce, Science, and Transportation of the Senate out-
23 lining the cost of the Administration’s potential plan for
24 developing the Wide-Field Infrared Survey Telescope as
25 described in the 2010 National Academies’ astronomy and

1 astrophysics decadal survey, including an alternative plan
2 for the Wide-Field Infrared Survey Telescope 2.4, which
3 includes the donated 2.4-meter aperture National Recon-
4 naissance Office telescope. Due to the budget constraints
5 on the Administration’s science programs, this report shall
6 include—

7 (1) an assessment of cost efficient approaches
8 to develop the Wide-Field Infrared Survey Telescope;

9 (2) a comparison to the development of mission
10 concepts that exclude the utilization of the donated
11 asset;

12 (3) an assessment of how the Administration’s
13 existing science missions will be affected by the utili-
14 zation of the donated asset described in this section;
15 and

16 (4) a description of the cost associated with
17 storing and maintaining the donated asset.

18 **SEC. 315. WIDE-FIELD INFRARED SURVEY TELESCOPE.**

19 (a) SENSE OF CONGRESS.—It is the sense of Con-
20 gress that the Administrator, to the extent practicable,
21 should make progress on the technologies and capabilities
22 needed to position the Administration to meet the objec-
23 tives of the Wide-Field Infrared Survey Telescope mission,
24 as outlined in the 2010 National Academies’ astronomy
25 and astrophysics decadal survey, in a way that maximizes

1 the scientific productivity of meeting those objectives for
2 the resources invested. It is further the sense of Congress
3 that the Wide-Field Infrared Survey Telescope mission
4 has the potential to enable scientific discoveries that will
5 transform our understanding of the universe.

6 (b) CONTINUITY OF DEVELOPMENT.—The Adminis-
7 trator shall ensure that the concept definition and pre-
8 formulation activities of a Wide-Field Infrared Survey Tel-
9 escope mission continue while the James Webb Space Tel-
10 escope is being completed.

11 **SEC. 316. STRATOSPHERIC OBSERVATORY FOR INFRARED**
12 **ASTRONOMY.**

13 The Administrator shall not use any funding appro-
14 priated to the Administration for fiscal year 2014 for the
15 shutdown of the Stratospheric Observatory for Infrared
16 Astronomy or for the preparation therefor.

17 **Subtitle C—Planetary Science**

18 **SEC. 321. DECADAL CADENCE.**

19 In carrying out section 301(b), the Administrator
20 shall seek to ensure to the greatest extent practicable that
21 the Administration carries out a balanced set of planetary
22 science programs in accordance with the priorities estab-
23 lished in the most recent decadal survey for planetary
24 science. Such programs shall include, at a minimum—

1 (1) a Discovery-class mission at least once every
2 24 months;

3 (2) a New Frontiers-class mission at least once
4 every 60 months; and

5 (3) at least one Flagship-class mission per
6 decadal survey period, including a Europa mission
7 with a goal of launching by 2021.

8 **SEC. 322. NEAR-EARTH OBJECTS.**

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

11 (1) Near-Earth objects pose a serious and cred-
12 ible threat to humankind, as many scientists believe
13 that a major asteroid or comet was responsible for
14 the mass extinction of the majority of the Earth’s
15 species, including the dinosaurs, approximately
16 65,000,000 years ago.

17 (2) Similar objects have struck the Earth or
18 passed through the Earth’s atmosphere several times
19 in the Earth’s history and pose a similar threat in
20 the future.

21 (3) Several such near-Earth objects have only
22 been discovered within days of the objects’ closest
23 approach to Earth, and recent discoveries of such
24 large objects indicate that many large near-Earth
25 objects remain to be discovered.

1 (4) The efforts undertaken by the Administra-
2 tion for detecting and characterizing the hazards of
3 near-Earth objects should continue to seek to fully
4 determine the threat posed by such objects to cause
5 widespread destruction and loss of life.

6 (b) DEFINITION.—For purposes of this section, the
7 term “near-Earth object” means an asteroid or comet with
8 a perihelion distance of less than 1.3 Astronomical Units
9 from the Sun.

10 (c) NEAR-EARTH OBJECT SURVEY.—The Adminis-
11 trator shall continue to detect, track, catalogue, and char-
12 acterize the physical characteristics of near-Earth objects
13 equal to or greater than 140 meters in diameter in order
14 to assess the threat of such near-Earth objects to the
15 Earth, pursuant to the George E. Brown, Jr. Near-Earth
16 Object Survey Act (42 U.S.C. 16691). It shall be the goal
17 of the Survey program to achieve 90 percent completion
18 of its near-Earth object catalogue (based on statistically
19 predicted populations of near-Earth objects) by 2020.

20 (d) WARNING AND MITIGATION OF POTENTIAL HAZ-
21 ARDS OF NEAR-EARTH OBJECTS.—Congress reaffirms
22 the policy set forth in section 20102(g) of title 51, United
23 States Code (relating to detecting, tracking, cataloguing,
24 and characterizing asteroids and comets).

1 (e) PROGRAM REPORT.—The Director of the Office
2 of Science and Technology Policy and the Administrator
3 shall transmit to the Committee on Science, Space, and
4 Technology of the House of Representatives and the Com-
5 mittee on Commerce, Science, and Transportation of the
6 Senate, not later than 1 year after the date of enactment
7 of this Act, an initial report that provides—

8 (1) recommendations for carrying out the Sur-
9 vey program and an associated proposed budget;

10 (2) analysis of possible options that the Admin-
11 istration could employ to divert an object on a likely
12 collision course with Earth; and

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

19 (f) ANNUAL REPORTS.—Subsequent to the initial re-
20 port the Administrator shall annually transmit to the
21 Committee on Science, Space, and Technology of the
22 House of Representatives and the Committee on Com-
23 merce, Science, and Transportation of the Senate a report
24 that provides—

1 (1) a summary of all activities carried out pur-
2 suant to subsection (c) since the date of enactment
3 of this Act, including the progress toward achieving
4 90 percent completion of the survey described in
5 subsection (c); and

6 (2) a summary of expenditures for all activities
7 carried out pursuant to subsection (c) since the date
8 of enactment of this Act.

9 (g) STUDY.—The Administrator, in collaboration
10 with other relevant Federal agencies, shall carry out a
11 technical and scientific assessment of the capabilities and
12 resources to—

13 (1) accelerate the survey described in subsection
14 (c); and

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

20 (h) TRANSMITTAL.—Not later than 270 days after
21 the date of enactment of this Act, the Administrator shall
22 transmit the results of the assessment carried out under
23 subsection (g) to the Committee on Science, Space, and
24 Technology of the House of Representatives and the Com-

1 mittee on Commerce, Science, and Transportation of the
2 Senate.

3 **SEC. 323. NEAR-EARTH OBJECTS PUBLIC-PRIVATE PART-**
4 **NERSHIPS.**

5 (a) SENSE OF CONGRESS.—It is the sense of Con-
6 gress that the Administration should seek to leverage the
7 capabilities of the private sector and philanthropic organi-
8 zations to the maximum extent practicable in carrying out
9 the Near-Earth Object Survey program in order to meet
10 the goal of the Survey program.

11 (b) REPORT.—Not later than 180 days after the date
12 of enactment of this Act, the Administrator shall transmit
13 to the Committee on Science, Space, and Technology of
14 the House of Representatives and the Committee on Com-
15 merce, Science, Transportation of the Senate a report de-
16 scribing how the Administration can expand collaborative
17 partnerships to detect, track, catalogue, and categorize
18 near-Earth objects.

19 **SEC. 324. RESEARCH ON NEAR-EARTH OBJECT TSUNAMI**
20 **EFFECTS.**

21 (a) REPORT ON POTENTIAL TSUNAMI EFFECTS
22 FROM NEAR-EARTH OBJECT IMPACT.—The Adminis-
23 trator, in collaboration with the Administrator of the Na-
24 tional Oceanic and Atmospheric Administration and other
25 relevant agencies, shall prepare a report identifying and

1 describing existing research activities and further research
2 objectives that would increase our understanding of the
3 nature of the effects of potential tsunamis that could occur
4 if a near-Earth object were to impact an ocean of Earth.

5 (b) TRANSMITTAL.—Not later than 180 days after
6 the date of enactment of this Act, the Administrator shall
7 transmit the report required and prepared under sub-
8 section (a) to the Committee on Science, Space, and Tech-
9 nology of the House of Representatives and the Committee
10 on Commerce, Science, and Transportation of the Senate.

11 **SEC. 325. ASTROBIOLOGY STRATEGY.**

12 (a) STRATEGY.—The Administrator shall enter into
13 an arrangement with the National Academies to develop
14 a science strategy for astrobiology that would outline key
15 scientific questions, identify the most promising research
16 in the field, and indicate the extent to which the mission
17 priorities in existing decadal surveys address the search
18 for life’s origin, evolution, distribution, and future in the
19 Universe. The strategy shall include recommendations for
20 coordination with international partners.

21 (b) USE OF STRATEGY.—The Administrator shall use
22 the strategy developed under subsection (a) in planning
23 and funding research and other activities and initiatives
24 in the field of astrobiology.

1 (c) REPORT TO CONGRESS.—Not later than 18
2 months after the date of enactment of this Act, the Na-
3 tional Academies shall transmit a report to the Adminis-
4 trator, and to the Committee on Science, Space, and Tech-
5 nology of the House of Representatives and the Committee
6 on Commerce, Science, and Transportation of the Senate,
7 containing the strategy developed under subsection (a).

8 **SEC. 326. ASTROBIOLOGY PUBLIC-PRIVATE PARTNERSHIPS.**

9 Not later than 180 days after the date of enactment
10 of this Act, the Administrator shall transmit to the Com-
11 mittee on Science, Space, and Technology of the House
12 of Representatives and the Committee on Commerce,
13 Science, Transportation of the Senate a report describing
14 how the Administration can expand collaborative partner-
15 ships to study life’s origin, evolution, distribution, and fu-
16 ture in the Universe.

17 **SEC. 327. ASSESSMENT OF MARS ARCHITECTURE.**

18 (a) ASSESSMENT.—The Administrator shall enter
19 into an arrangement with the National Academies to as-
20 sess—

21 (1) the Administration’s revised post-2016
22 Mars exploration architecture and its responsiveness
23 to the strategies, priorities, and guidelines put for-
24 ward by the National Academies’ planetary science

1 decadal surveys and other relevant National Acad-
2 emies Mars-related reports;

3 (2) the long-term goals of the Administration’s
4 Mars Exploration Program and such program’s abil-
5 ity to optimize the science return, given the current
6 fiscal posture of the program;

7 (3) the Mars architecture’s relationship to
8 Mars-related activities to be undertaken by agencies
9 and organizations outside of the United States; and

10 (4) the extent to which the Mars architecture
11 represents a reasonably balanced mission portfolio.

12 (b) TRANSMITTAL.—Not later than 18 months after
13 the date of enactment of this Act, the Administrator shall
14 transmit the results of the assessment to the Committee
15 on Science, Space, and Technology of the House of Rep-
16 resentatives and the Committee on Commerce, Science,
17 and Transportation of the Senate.

18 **Subtitle D—Heliophysics**

19 **SEC. 331. DECADAL CADENCE.**

20 In carrying out section 301(b), the Administrator
21 shall seek to ensure to the extent practicable a steady ca-
22 dence of large, medium, and small heliophysics missions.

23 **SEC. 332. REVIEW OF SPACE WEATHER.**

24 (a) REVIEW.—The Director of the Office of Science
25 and Technology Policy, in consultation with the Adminis-

1 trator, the Administrator of the National Oceanic and At-
2 mospheric Administration, the Director of the National
3 Science Foundation, and heads of other relevant Federal
4 agencies, shall enter into an arrangement with the Na-
5 tional Academies to provide a comprehensive study that
6 reviews current and planned ground-based and space-
7 based space weather monitoring requirements and capa-
8 bilities, identifies gaps, and identifies options for a robust
9 and resilient capability. The study shall inform the process
10 of identifying national needs for future space weather
11 monitoring, forecasts, and mitigation. The National Acad-
12 emies shall give consideration to international and private
13 sector efforts and collaboration that could potentially con-
14 tribute to national space weather needs. The study shall
15 also review the current state of research capabilities in ob-
16 serving, modeling, and prediction and provide rec-
17 ommendations to ensure future advancement of predictive
18 capability.

19 (b) REPORT TO CONGRESS.—Not later than 14
20 months after the date of enactment of this Act, the Na-
21 tional Academies shall transmit a report containing the
22 results of the study provided under subsection (a) to the
23 Director of the Office of Science and Technology Policy,
24 and to the Committee on Science, Space, and Technology

1 of the House of Representatives and the Committee on
2 Commerce, Science, and Transportation of the Senate.

3 **Subtitle E—Earth Science**

4 **SEC. 341. GOAL.**

5 (a) SENSE OF CONGRESS.—It is the sense of Con-
6 gress that the Administration is being asked to undertake
7 important Earth science activities in an environment of
8 increasingly constrained fiscal resources, and that any
9 transfer of additional responsibilities to the Administra-
10 tion, such as climate instrument development and meas-
11 urements that are currently part of the portfolio of the
12 National Oceanic and Atmospheric Administration, should
13 be accompanied by the provision of additional resources
14 to allow the Administration to carry out the increased re-
15 sponsibilities without adversely impacting its implementa-
16 tion of its existing Earth science programs and priorities.

17 (b) GENERAL.—The Administrator shall continue to
18 carry out a balanced Earth science program that includes
19 Earth science research, Earth systematic missions, com-
20 petitive Venture class missions, other missions and data
21 analysis, mission operations, technology development, and
22 applied sciences, consistent with the recommendations and
23 priorities established in the National Academies' Earth
24 Science Decadal Survey.

1 (c) COLLABORATION.—The Administrator shall col-
2 laborate with other Federal agencies, including the Na-
3 tional Oceanic and Atmospheric Administration, non-gov-
4 ernment entities, and international partners, as appro-
5 priate, in carrying out the Administration’s Earth science
6 program. The Administration shall continue to develop
7 first-of-a-kind instruments that, once proved, can be
8 transitioned to other agencies for operations.

9 (d) REIMBURSEMENT.—Whenever responsibilities for
10 the development of sensors or for measurements are trans-
11 ferred to the Administration from another agency, the Ad-
12 ministration shall seek, to the extent possible, to be reim-
13 bursed for the assumption of such responsibilities.

14 **SEC. 342. DECADAL CADENCE.**

15 In carrying out section 341(b), the Administrator
16 shall seek to ensure to the extent practicable a steady ca-
17 dence of large, medium, and small Earth science missions.

18 **SEC. 343. VENTURE CLASS MISSIONS.**

19 It is the sense of Congress that the Administration’s
20 Venture class missions provide opportunities for innova-
21 tion in the Earth science program, offer low-cost ap-
22 proaches for high-quality competitive science investiga-
23 tions, enable frequent flight opportunities to engage the
24 Earth science and applications community, and serve as
25 a training ground for students and young scientists. It is

1 further the sense of Congress that the Administration
2 should seek to increase the number of Venture class
3 projects to the extent practicable as part of a balanced
4 Earth science program.

5 **SEC. 344. ASSESSMENT.**

6 The Administrator shall carry out a scientific assess-
7 ment of the Administration’s Earth science global datasets
8 for the purpose of identifying those datasets that are use-
9 ful for understanding regional changes and variability, and
10 for informing applied science research. The Administrator
11 shall complete and transmit the assessment to the Com-
12 mittee on Science, Space, and Technology in the House
13 of Representatives and the Committee on Commerce,
14 Science, and Transportation of the Senate not later than
15 180 days after the date of enactment of this Act.

16 **TITLE IV—AERONAUTICS**

17 **SEC. 401. SENSE OF CONGRESS.**

18 It is the sense of Congress that—

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

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

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

3 (3) the Administrator should coordinate and
4 consult with relevant Federal agencies and the pri-
5 vate sector to minimize duplication and leverage re-
6 sources; and

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

12 **SEC. 402. AERONAUTICS RESEARCH GOALS.**

13 The Administrator shall ensure that the Administra-
14 tion maintains a strong aeronautics research portfolio
15 ranging from fundamental research through integrated
16 systems research with specific research goals, including
17 the following:

18 (1) **ENHANCE AIRSPACE OPERATIONS AND**
19 **SAFETY.**—The Administration’s Aeronautics Re-
20 search Mission Directorate shall address research
21 needs of the Next Generation Air Transportation
22 System and identify critical gaps in technology
23 which must be bridged to enable the implementation
24 of the Next Generation Air Transportation System

1 so that safety and productivity improvements can be
2 achieved as soon as possible.

3 (2) IMPROVE AIR VEHICLE PERFORMANCE.—

4 The Administration’s Aeronautics Research Mission
5 Directorate shall conduct research to improve air-
6 craft performance and minimize environmental im-
7 pacts. The Associate Administrator for the Aero-
8 nautics Research Mission Directorate shall consider
9 and pursue concepts to reduce noise, emissions, and
10 fuel consumption while maintaining high safety
11 standards, and shall conduct research related to the
12 impact of alternative fuels on the safety, reliability
13 and maintainability of current and new air vehicles.

14 (3) STRENGTHEN AVIATION SAFETY.—The Ad-

15 ministration’s Aeronautics Research Mission Direc-
16 torate shall proactively address safety challenges as-
17 sociated with current and new air vehicles and with
18 operations in the Nation’s current and future air
19 transportation system.

20 (4) DEMONSTRATE CONCEPTS AT THE SYSTEM

21 LEVEL.—The Administration’s Aeronautics Research
22 Mission Directorate shall mature the most promising
23 technologies to the point at which they can be dem-
24 onstrated in a relevant environment and shall inte-
25 grate individual components and technologies as ap-

1 appropriate to ensure that they perform in an inte-
2 grated manner as well as they do when operated in-
3 dividually.

4 **SEC. 403. UNMANNED AERIAL SYSTEMS RESEARCH AND DE-**
5 **VELOPMENT.**

6 (a) IN GENERAL.—The Administrator, in consulta-
7 tion with the Administrator of the Federal Aviation Ad-
8 ministration and other Federal agencies, shall carry out
9 research and technological development to facilitate the
10 safe integration of unmanned aerial systems into the Na-
11 tional Airspace System, including—

- 12 (1) positioning and navigation systems;
- 13 (2) sense and avoid capabilities;
- 14 (3) secure data and communication links;
- 15 (4) flight recovery systems; and
- 16 (5) human systems integration.

17 (b) ROADMAP.—The Administrator shall update a
18 roadmap for unmanned aerial systems research and devel-
19 opment and transmit this roadmap to the Committee on
20 Science, Space, and Technology of the House of Rep-
21 resentatives and the Committee on Commerce, Science,
22 and Transportation of the Senate not later than 180 days
23 after the date of enactment of this Act.

24 (c) COOPERATIVE UNMANNED AERIAL VEHICLE AC-
25 TIVITIES.—Section 31504 of title 51, United States Code,

1 is amended by inserting “Operational flight data derived
2 from these cooperative agreements shall be made available,
3 in appropriate and usable formats, to the Administration
4 and the Federal Aviation Administration for the develop-
5 ment of regulatory standards.” after “in remote areas.”.

6 **SEC. 404. RESEARCH PROGRAM ON COMPOSITE MATERIALS**

7 **USED IN AERONAUTICS.**

8 (a) **PURPOSE OF RESEARCH.**—The Administrator
9 shall continue the Administration’s cooperative research
10 program with industry to identify and demonstrate more
11 effective and safe ways of developing, manufacturing, and
12 maintaining composite materials for use in airframes, sub-
13 systems, and propulsion components.

14 (b) **EXPOSURE OF RESEARCH TO NEXT GENERATION**
15 **OF ENGINEERS AND TECHNICIANS.**—To the extent prac-
16 ticable, the Administration’s cooperative research program
17 with industry on composite materials shall provide timely
18 access to that research to the next generation of engineers
19 and technicians at universities, community colleges, and
20 vocational schools, thereby helping to develop a workforce
21 ready to take on the development, manufacture, and main-
22 tenance of components reliant on advanced composite ma-
23 terials.

24 (c) **CONSULTATION.**—The Administrator, in over-
25 seeing the Administration’s work on composite materials,

1 shall consult with relevant Federal agencies and partners
2 in industry to accelerate safe development and certifi-
3 cation processes for new composite materials and design
4 methods while maintaining rigorous inspection of new
5 composite materials.

6 (d) REPORT.—Not later than 1 year after the date
7 of enactment of this Act, the Administrator shall transmit
8 a report to the Committee on Science, Space, and Tech-
9 nology of the House of Representatives and the Committee
10 on Commerce, Science, and Transportation of the Senate
11 detailing the Administration’s work on new composite ma-
12 terials and the coordination efforts among Federal agen-
13 cies and industry partners.

14 **SEC. 405. HYPERSONIC RESEARCH.**

15 Not later than 1 year after the date of enactment
16 of this Act, the Administrator, in consultation with other
17 Federal agencies, shall develop and transmit to the Com-
18 mittee on Science, Space, and Technology of the House
19 of Representatives and the Committee on Commerce,
20 Science, and Transportation of the Senate a research and
21 development roadmap for hypersonic aircraft research
22 with the objective of exploring hypersonic science and
23 technology using air-breathing propulsion concepts,
24 through a mix of theoretical work, basic and applied re-
25 search, and development of flight research demonstration

1 vehicles. The roadmap shall prescribe appropriate agency
2 contributions, coordination efforts, and technology mile-
3 stones.

4 **SEC. 406. SUPERSONIC RESEARCH.**

5 (a) FINDINGS.—Congress finds that—

6 (1) the ability to fly commercial aircraft over
7 land at supersonic speeds without adverse impacts
8 on the environment or on local communities could
9 open new global markets and enable new transpor-
10 tation capabilities; and

11 (2) continuing the Administration’s research
12 program is necessary to assess the impact in a rel-
13 evant environment of commercial supersonic flight
14 operations and provide the basis for establishing ap-
15 propriate sonic boom standards for such flight oper-
16 ations.

17 (b) ROADMAP FOR SUPERSONIC RESEARCH.—Not
18 later than 1 year after the date of enactment of this Act,
19 the Administrator shall develop and transmit to the Com-
20 mittee on Science, Space, and Technology of the House
21 of Representatives and the Committee on Commerce,
22 Science, and Transportation of the Senate a roadmap that
23 allows for flexible funding profiles for supersonic aero-
24 nautics research and development with the objective of de-
25 veloping and demonstrating, in a relevant environment,

1 airframe and propulsion technologies to minimize the envi-
2 ronmental impact, including noise, of supersonic overland
3 flight in an efficient and economical manner. The roadmap
4 shall include—

5 (1) the baseline research as embodied by the
6 Administration’s existing research on supersonic
7 flight;

8 (2) a list of specific technological, environ-
9 mental, and other challenges that must be overcome
10 to minimize the environmental impact, including
11 noise, of supersonic overland flight;

12 (3) a research plan to address such challenges,
13 as well as a project timeline for accomplishing rel-
14 evant research goals;

15 (4) a plan for coordination with stakeholders,
16 including relevant government agencies and indus-
17 try; and

18 (5) a plan for how the Administration will en-
19 sure that sonic boom research is coordinated as ap-
20 propriate with relevant Federal agencies.

21 **SEC. 407. RESEARCH ON NEXTGEN AIRSPACE MANAGE-**
22 **MENT CONCEPTS AND TOOLS.**

23 (a) IN GENERAL.—The Administrator shall, in con-
24 sultation with other Federal agencies, review at least an-
25 nually the alignment and timing of the Administration’s

1 research and development activities in support of the
2 NextGen airspace management modernization initiative,
3 and shall make any necessary adjustments by
4 reprioritizing or retargeting the Administration’s research
5 and development activities in support of the NextGen ini-
6 tiative.

7 (b) ANNUAL REPORTS.—The Administrator shall re-
8 port to the Committee on Science, Space, and Technology
9 of the House of Representatives and the Committee on
10 Commerce, Science, and Transportation of the Senate an-
11 nually regarding the progress of the Administration’s re-
12 search and development activities in support of the
13 NextGen airspace management modernization initiative,
14 including details of technologies transferred to relevant
15 Federal agencies for eventual operation implementation,
16 consultation with other Federal agencies, and any adjust-
17 ments made to research activities.

18 **SEC. 408. ROTORCRAFT RESEARCH.**

19 Not later than 1 year after the date of enactment
20 of this Act, the Administrator, in consultation with other
21 Federal agencies, shall prepare and transmit to the Com-
22 mittee on Science, Space, and Technology of the House
23 of Representatives and the Committee on Commerce,
24 Science, and Transportation of the Senate a roadmap for
25 research relating to rotorcraft and other runway-inde-

1 pendent air vehicles, with the objective of developing and
2 demonstrating improved safety, noise, and environmental
3 impact in a relevant environment. The roadmap shall in-
4 clude specific goals for the research, a timeline for imple-
5 mentation, metrics for success, and guidelines for collabo-
6 ration and coordination with industry and other Federal
7 agencies.

8 **SEC. 409. TRANSFORMATIVE AERONAUTICS RESEARCH.**

9 It is the sense of Congress that the Administrator,
10 in looking strategically into the future and ensuring that
11 the Administration's Center personnel are at the leading
12 edge of aeronautics research, should encourage investiga-
13 tions into the early-stage advancement of new processes,
14 novel concepts, and innovative technologies that have the
15 potential to meet national aeronautics needs. The Admin-
16 istrator shall continue to ensure that awards for the inves-
17 tigation of these concepts and technologies are open for
18 competition among Administration civil servants at its
19 Centers, separate from other awards open only to non-Ad-
20 ministration sources.

21 **SEC. 410. STUDY OF UNITED STATES LEADERSHIP IN AERO-**
22 **NAUTICS RESEARCH.**

23 (a) STUDY.—The Administrator shall enter into an
24 arrangement with the National Academies for a study to
25 benchmark the position of the United States in civil aero-

1 nautics research compared to the rest of the world. The
2 study shall—

3 (1) seek to define metrics by which relative
4 leadership in civil aeronautics research can be deter-
5 mined;

6 (2) ascertain how the United States compares
7 to other countries in the field of civil aeronautics re-
8 search and any relevant trends; and

9 (3) provide recommendations on what can be
10 done to regain or retain global leadership, includ-
11 ing—

12 (A) identifying research areas where
13 United States expertise has been or is at risk
14 of being overtaken;

15 (B) defining appropriate roles for the Ad-
16 ministration;

17 (C) identifying public-private partnerships
18 that could be formed; and

19 (D) estimating the impact on the Adminis-
20 tration's budget should such recommendations
21 be implemented.

22 (b) REPORT.—Not later than 18 months after the
23 date of enactment of this Act, the Administrator shall pro-
24 vide the results of the study to the Committee on Science,
25 Space, and Technology of the House of Representatives

1 and the Committee on Commerce, Science, and Transpor-
2 tation of the Senate.

3 **TITLE V—SPACE TECHNOLOGY**

4 **SEC. 501. SENSE OF CONGRESS.**

5 It is the sense of Congress that space technology is
6 critical to—

7 (1) enabling a new class of Administration mis-
8 sions beyond low-Earth orbit;

9 (2) developing technologies and capabilities that
10 will make the Administration’s missions more afford-
11 able and more reliable; and

12 (3) improving technological capabilities and pro-
13 moting innovation for the Administration and the
14 Nation.

15 **SEC. 502. SPACE TECHNOLOGY PROGRAM.**

16 (a) AMENDMENT.—Section 70507 of title 51, United
17 States Code, is amended to read as follows:

18 **“§ 70507. Space Technology Program authorized**

19 “(a) PROGRAM AUTHORIZED.—The Administrator
20 shall establish a Space Technology Program to pursue the
21 research and development of advanced space technologies
22 that have the potential of delivering innovative solutions
23 and to support human exploration of the solar system or
24 advanced space science. The program established by the
25 Administrator shall take into consideration the rec-

1 ommendations of the National Academies’ review of the
2 Administration’s Space Technology roadmaps and prior-
3 ities, as well as applicable enabling aspects of the Human
4 Exploration Roadmap specified in section 70504. In con-
5 ducting the space technology program established under
6 this section, the Administrator shall—

7 “(1) to the maximum extent practicable, use a
8 competitive process to select projects to be supported
9 as part of the program;

10 “(2) make use of small satellites and the Ad-
11 ministration’s suborbital and ground-based plat-
12 forms, to the extent practicable and appropriate, to
13 demonstrate space technology concepts and develop-
14 ments; and

15 “(3) undertake partnerships with other Federal
16 agencies, universities, private industry, and other
17 spacefaring nations, as appropriate.

18 “(b) SMALL BUSINESS PROGRAMS.—The Adminis-
19 trator shall organize and manage the Administration’s
20 Small Business Innovation Research program and Small
21 Business Technology Transfer Program within the Space
22 Technology Program.

23 “(c) NONDUPLICATION CERTIFICATION.—The Ad-
24 ministrator shall include in the budget for each fiscal year,
25 as transmitted to Congress under section 1105(a) of title

1 31, a certification that no project, program, or mission
2 undertaken by the Space Technology Program is duplica-
3 tive of any other project, program, or mission conducted
4 by another office or directorate of the Administration.”.

5 (b) COLLABORATION, COORDINATION, AND ALIGN-
6 MENT.—The Administrator shall ensure that the Adminis-
7 tration’s projects, programs, and activities in support of
8 technology research and development of advanced space
9 technologies are fully coordinated and aligned and that re-
10 sults from such work are shared and leveraged within the
11 Administration. Projects, programs, and activities being
12 conducted by the Human Exploration and Operations Mis-
13 sion Directorate in support of research and development
14 of advanced space technologies and systems focusing on
15 human space exploration should continue in that Direc-
16 torate. The Administrator shall ensure that organizational
17 responsibility for research and development activities in
18 support of human space exploration not initiated as of the
19 date of enactment of this Act is established on the basis
20 of a sound rationale. The Administrator shall provide the
21 rationale in the report specified in subsection (d).

22 (c) REPORT.—Not later than 180 days after the date
23 of enactment of this Act, the Administrator shall provide
24 to the Committee on Science, Space, and Technology of
25 the House of Representatives and the Committee on Com-

1 merce, Science, and Transportation of the Senate a report
2 comparing the Administration’s space technology invest-
3 ments with the high-priority technology areas identified by
4 the National Academies in the National Research Coun-
5 cil’s report on the Administration’s Space Technology
6 Roadmaps. The Administrator shall identify how the Ad-
7 ministration will address any gaps between the agency’s
8 investments and the recommended technology areas, in-
9 cluding a projection of funding requirements.

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

17 (e) TABLE OF SECTIONS AMENDMENT.—The item
18 relating to section 70507 in the table of sections for chap-
19 ter 705 of title 51, United States Code, is amended to
20 read as follows:

“70507. Space Technology Program authorized.”.

21 **SEC. 503. UTILIZATION OF THE INTERNATIONAL SPACE**
22 **STATION FOR TECHNOLOGY DEMONSTRA-**
23 **TIONS.**

24 The Administrator shall utilize the International
25 Space Station and commercial services for space tech-

1 nology demonstration missions in low-Earth orbit when-
2 ever it is practical and cost effective to do so.

3 **TITLE VI—EDUCATION**

4 **SEC. 601. EDUCATION.**

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

7 (1) the Administration’s missions are an inspi-
8 ration for Americans and in particular for the next
9 generation, and that this inspiration has a powerful
10 effect in stimulating interest in science, technology,
11 engineering, and mathematics (in this section re-
12 ferred to as “STEM”) education and careers;

13 (2) the Administration’s Office of Education
14 and mission directorates have been effective in deliv-
15 ering Administration educational content because of
16 the strong engagement of Administration scientists
17 and engineers in the Administration’s education and
18 outreach activities; and

19 (3) the Administration should be a central part-
20 ner in contributing to the goals of the National
21 Science and Technology Council’s Federal Science,
22 Technology, Engineering, and Mathematics (STEM)
23 Education 5-Year Strategic Plan.

24 (b) IN GENERAL.—The Administration shall continue
25 its education and outreach efforts to—

1 (1) increase student interest and participation
2 in STEM education;

3 (2) improve public literacy in STEM;

4 (3) employ proven strategies for improving stu-
5 dent learning and teaching;

6 (4) provide curriculum support materials; and

7 (5) create and support opportunities for profes-
8 sional development for STEM teachers.

9 (c) ORGANIZATION.—In order to ensure the inspira-
10 tion and engagement of children and the general public,
11 the Administration shall continue its STEM education and
12 outreach activities within the Science, Aeronautics Re-
13 search, Space Operations, and Exploration Mission Direc-
14 torates.

15 (d) CONTINUATION OF EDUCATION AND OUTREACH
16 ACTIVITIES AND PROGRAMS.—The Administrator shall
17 continue to carry out education and outreach programs
18 and activities through the Office of Education and the Ad-
19 ministration mission directorates and shall continue to en-
20 gage, to the maximum extent practicable, Administration
21 and Administration-supported researchers and engineers
22 in carrying out those programs and activities.

23 (e) CONTINUATION OF SPACE GRANT PROGRAM.—
24 The Administrator shall continue to operate the National
25 Space Grant College and Fellowship program through a

1 national network consisting of a State-based consortium
2 in each State that provides flexibility to the States, with
3 the objective of providing hands-on research, training, and
4 education programs, with measurable outcomes, to en-
5 hance America's STEM education and workforce.

6 (f) REAFFIRMATION OF POLICY.—Congress reaffirms
7 its commitment to informal science education at science
8 centers and planetariums as set forth in section 616 of
9 the National Aeronautics and Space Administration Au-
10 thorization Act of 2005 (51 U.S.C. 40907).

11 **SEC. 602. INDEPENDENT REVIEW OF THE NATIONAL SPACE**
12 **GRANT COLLEGE AND FELLOWSHIP PRO-**
13 **GRAM.**

14 (a) SENSE OF CONGRESS.—It is the sense of Con-
15 gress that the National Space Grant College and Fellow-
16 ship Program, which was established in the National Aero-
17 nautics and Space Administration Authorization Act of
18 1988 (42 U.S.C. 2486 et seq.), has been an important
19 program by which the Federal Government has partnered
20 with State and local governments, universities, private in-
21 dustry, and other organizations to enhance the under-
22 standing and use of space and aeronautics activities and
23 their benefits through education, fostering of interdiscipli-
24 nary and multidisciplinary space research and training,

1 and supporting Federal funding for graduate fellowships
2 in space-related fields, among other purposes.

3 (b) REVIEW.—The Administrator shall enter into an
4 arrangement with the National Academies for—

5 (1) a review of the National Space Grant Col-
6 lege and Fellowship Program, including its structure
7 and capabilities for supporting science, technology,
8 engineering, and mathematics education and train-
9 ing consistent with the National Science and Tech-
10 nology Council’s Federal Science, Technology, Engi-
11 neering, and Mathematics (STEM) Education 5-
12 Year Strategic Plan; and

13 (2) recommendations on measures, if needed, to
14 enhance the Program’s effectiveness and mecha-
15 nisms by which any increases in funding appro-
16 priated by Congress can be applied.

17 (c) NATIONAL SPACE GRANT COLLEGE AND FEL-
18 LOWSHIP PROGRAM AMENDMENTS.—

19 (1) PURPOSES.—Section 40301 of title 51,
20 United States Code, is amended—

21 (A) by striking “and” at the end of para-
22 graph (5);

23 (B) by striking the period at the end of
24 paragraph (6) and inserting “; and”; and

1 (C) by adding at the end the following new
2 paragraph:

3 “(7) support outreach to primary and sec-
4 ondary schools to help support STEM engagement
5 and learning at the K–12 level and to encourage K–
6 12 students to pursue postsecondary degrees in
7 fields related to space.”.

8 (2) REGIONAL CONSORTIUM.—Section 40306 of
9 title 51, United States Code, is amended—

10 (A) in subsection (a)—

11 (i) by redesignating paragraphs (2)
12 and (3) as paragraphs (3) and (4), respec-
13 tively; and

14 (ii) by inserting after paragraph (1)
15 the following new paragraph:

16 “(2) INCLUSION OF 2-YEAR INSTITUTIONS.—A
17 space grant regional consortium designated in para-
18 graph (1)(B) may include one or more 2-year insti-
19 tutions of higher education.”; and

20 (B) in subsection (b)(1), by striking “para-
21 graphs (2)(C) and (3)(D)” and inserting “para-
22 graphs (3)(C) and (4)(D)”.

23 **SEC. 603. SENSE OF CONGRESS.**

24 It is the sense of Congress that the Administrator
25 should make the continuation of the Administration’s Mi-

1 nority University Research and Education Program a pri-
2 ority in order to further STEM education for underrep-
3 resented students.

4 **TITLE VII—POLICY PROVISIONS**

5 **SEC. 701. ASTEROID RETRIEVAL MISSION.**

6 (a) ASTEROID RETRIEVAL REPORT.—Not later than
7 180 days after the date of enactment of this Act, the Ad-
8 ministrator shall provide to the Committee on Science,
9 Space, and Technology of the House of Representatives
10 and the Committee on Commerce, Science, and Transpor-
11 tation of the Senate a report on the proposed Asteroid
12 Retrieval Mission. Such report shall include—

13 (1) a detailed budget profile, including cost esti-
14 mates for the development of all necessary tech-
15 nologies and spacecraft required for the mission;

16 (2) a detailed technical plan that includes mile-
17 stones and a specific schedule;

18 (3) a description of the technologies and capa-
19 bilities anticipated to be gained from the proposed
20 mission that will enable future human missions to
21 Mars which could not be gained by lunar missions;

22 (4) a description of the technologies and capa-
23 bilities anticipated to be gained from the proposed
24 mission that will enable future planetary defense
25 missions, against impact threats from near-Earth

1 objects equal to or greater than 140 meters in di-
2 ameter, which could not be gained by robotic mis-
3 sions; and

4 (5) a complete assessment by the Small Bodies
5 Assessment Group and the National Aeronautics and
6 Space Administration Advisory Council of how the
7 proposed mission is in the strategic interests of the
8 United States in space exploration.

9 (b) MARS FLYBY REPORT.—Not later than 60 days
10 after the date of enactment of this Act, an independent,
11 private systems engineering and technical assistance orga-
12 nization contracted by the Human Exploration Operations
13 Mission Directorate shall transmit to the Administrator,
14 the Committee on Science, Space, and Technology of the
15 House of Representatives, and the Committee on Com-
16 merce, Science, and Transportation of the Senate a report
17 analyzing the proposal for a Mars Flyby human
18 spaceflight mission to be launched in 2021. Such report
19 shall include—

20 (1) a technical development, test, fielding, and
21 operations plan using the Space Launch System and
22 other systems to successfully mount a Mars Flyby
23 mission by 2021;

24 (2) a description of the benefits in scientific
25 knowledge and technologies demonstrated by a Mars

1 Flyby mission to be launched in 2021 suitable for
2 future Mars missions; and

3 (3) an annual budget profile, including cost es-
4 timates, for the development test, fielding, and oper-
5 ations plan to carry out a Mars Flyby mission
6 through 2021 and comparison of that budget profile
7 to the 5-year budget profile contained in the Presi-
8 dent's Budget request for fiscal year 2015.

9 (c) ASSESSMENT.—Not later than 60 days after
10 transmittal of the report specified in subsection (b), the
11 Administrator shall transmit to the Committee on Science,
12 Space, and Technology of the House of Representatives
13 and the Committee on Commerce, Science, and Transpor-
14 tation of the Senate an assessment by the National Aero-
15 nautics and Space Administration Advisory Council of
16 whether the proposal for a Mars Flyby Mission to be
17 launched in 2021 is in the strategic interests of the United
18 States in space exploration.

19 (d) CREWED MISSION.—The report transmitted
20 under subsection (b) may consider a crewed mission with
21 the Space Launch System in cis-lunar space prior to the
22 Mars Flyby mission in 2021.

23 **SEC. 702. TERMINATION LIABILITY SENSE OF CONGRESS.**

24 It is the sense of Congress that:

1 (1) The International Space Station, the Space
2 Launch System, and the Orion crew capsule will en-
3 able the Nation to continue operations in low-Earth
4 orbit and to send its astronauts to deep space. The
5 James Webb Space Telescope will revolutionize our
6 understanding of star and planet formation and how
7 galaxies evolved and advance the search for the ori-
8 gins of our universe. As a result of their unique ca-
9 pabilities and their critical contribution to the future
10 of space exploration, these systems have been des-
11 ignated by Congress and the Administration as pri-
12 ority investments.

13 (2) In addition, contractors are currently hold-
14 ing program funding, estimated to be in the hun-
15 dreds of millions of dollars, to cover the potential
16 termination liability should the Government choose
17 to terminate a program for convenience. As a result,
18 hundreds of millions of taxpayer dollars are unavail-
19 able for meaningful work on these programs.

20 (3) According to the Government Accountability
21 Office, the Administration procures most of its
22 goods and services through contracts, and it termi-
23 nates very few of them. In fiscal year 2010, the Ad-
24 ministration terminated 28 of 16,343 active con-

1 tracts and orders—a termination rate of about 0.17
2 percent.

3 (4) The Administration should vigorously pur-
4 sue a policy on termination liability that maximizes
5 the utilization of its appropriated funds to make
6 maximum progress in meeting established technical
7 goals and schedule milestones on these high-priority
8 programs.

9 **SEC. 703. BASELINE AND COST CONTROLS.**

10 Section 30104 of title 51, United States Code, is
11 amended—

12 (1) in subsection (a)(1), by striking “Proce-
13 dural Requirements 7120.5c, dated March 22,
14 2005” and inserting “Procedural Requirements
15 7120.5E, dated August 14, 2012”; and

16 (2) in subsection (f), by striking “beginning 18
17 months after the date the Administrator transmits a
18 report under subsection (e)(1)(A)” and inserting
19 “beginning 18 months after the Administrator
20 makes such determination”.

21 **SEC. 704. PROJECT AND PROGRAM RESERVES.**

22 (a) SENSE OF CONGRESS.—It is the sense of Con-
23 gress that the judicious use of program and project re-
24 serves provides the Administration’s project and program
25 managers with the flexibility needed to manage projects

1 and programs to ensure that the impacts of contingencies
2 can be mitigated.

3 (b) REPORT.—Not later than 180 days after the date
4 of enactment of this Act the Administrator shall transmit
5 to the Committee on Science, Space, and Technology of
6 the House of Representatives and the Committee on Com-
7 merce, Science, and Transportation of the Senate a report
8 describing—

9 (1) the Administration’s criteria for establishing
10 the amount of reserves held at the project and pro-
11 gram levels;

12 (2) how such criteria relate to the agency’s pol-
13 icy of budgeting at a 70-percent confidence level;
14 and

15 (3) the Administration’s criteria for waiving the
16 policy of budgeting at a 70-percent confidence level
17 and alternative strategies and mechanisms aimed at
18 controlling program and project costs when a waiver
19 is granted.

20 **SEC. 705. INDEPENDENT REVIEWS.**

21 Not later than 270 days after the date of enactment
22 of this Act, the Administrator shall transmit to the Com-
23 mittee on Science, Space, and Technology of the House
24 of Representatives and the Committee on Commerce,

1 Science, and Transportation of the Senate a report de-
2 scribing—

3 (1) the Administration’s procedures for con-
4 ducting independent reviews of projects and pro-
5 grams at lifecycle milestones and how the Adminis-
6 tration ensures the independence of the individuals
7 who conduct those reviews prior to their assignment;

8 (2) the internal and external entities inde-
9 pendent of project and program management that
10 conduct reviews of projects and programs at life
11 cycle milestones; and

12 (3) how the Administration ensures the inde-
13 pendence of such entities and their members.

14 **SEC. 706. COMMERCIAL TECHNOLOGY TRANSFER PRO-**
15 **GRAM.**

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

19 **SEC. 707. NATIONAL AERONAUTICS AND SPACE ADMINIS-**
20 **TRATION ADVISORY COUNCIL.**

21 (a) STUDY.—The Administrator shall enter into an
22 arrangement with the National Academy of Public Admin-
23 istration to assess the effectiveness of the NASA Advisory
24 Council and to make recommendations to Congress for
25 any change to—

- 1 (1) the functions of the Council;
- 2 (2) the appointment of members to the Council;
- 3 (3) qualifications for members of the Council;
- 4 (4) duration of terms of office for members of
- 5 the Council;
- 6 (5) frequency of meetings of the Council;
- 7 (6) the structure of leadership and Committees
- 8 of the Council; and
- 9 (7) levels of professional staffing for the Coun-
- 10 cil.

11 In carrying out the assessment, the Academy shall also
12 assess the impacts of broadening the Council’s role to ad-
13 vising Congress, and any other issues that the Academy
14 determines could potentially impact the effectiveness of
15 the Council. The Academy shall consider the past activities
16 of the NASA Advisory Council, as well as the activities
17 of other analogous federal advisory bodies in conducting
18 its assessment. The results of the assessment, including
19 any recommendations, shall be transmitted to the Com-
20 mittee on Science, Space, and Technology of the House
21 of Representatives and the Committee on Commerce,
22 Science, and Transportation of the Senate.

23 (b) CONSULTATION AND ADVICE.—Section 20113(g)
24 of title 51, United States Code, is amended by inserting
25 “and Congress” after “advice to the Administration”.

1 (c) SUNSET.—Subsection (b) shall expire on Sep-
2 tember 30, 2014.

3 **SEC. 708. COST ESTIMATION.**

4 (a) SENSE OF CONGRESS.—It is the sense of Con-
5 gress that realistic cost estimating is critically important
6 to the ultimate success of major space development
7 projects. The Administration has devoted significant ef-
8 forts over the past five years to improving its cost esti-
9 mating capabilities, but it is important that the Adminis-
10 tration continue its efforts to develop and implement guid-
11 ance in establishing realistic cost estimates.

12 (b) GUIDANCE AND CRITERIA.—The Administrator
13 shall provide to programs and projects and in a manner
14 consistent with the Administration’s Space Flight Pro-
15 gram and Project Management Requirements—

16 (1) guidance on when an Independent Cost Es-
17 timate and Independent Cost Assessment should be
18 used; and

19 (2) the criteria to be used to make such a de-
20 termination.

21 (c) REPORT.—Not later than 270 days after the date
22 of enactment of this Act, the Administrator shall transmit
23 to the Committee on Science, Space, and Technology of
24 the House of Representatives and the Committee on Com-

1 merce, Science, and Transportation of the Senate a re-
2 port—

3 (1) describing efforts to enhance internal cost
4 estimation and assessment expertise;

5 (2) describing the mechanisms the Administra-
6 tion is using and will continue to use to ensure that
7 adequate resources are dedicated to cost estimation;

8 (3) listing the steps the Administration is un-
9 dertaking to advance consistent implementation of
10 the joint cost and schedule process;

11 (4) identifying criteria used by programs and
12 projects in determining when to conduct an Inde-
13 pendent Cost Estimate and Independent Cost As-
14 sessment; and

15 (5) listing—

16 (A) the costs of each individual Inde-
17 pendent Cost Estimate or Independent Cost As-
18 sessment activity conducted in fiscal year 2011,
19 fiscal year 2012, and fiscal year 2013;

20 (B) the purpose of the activity;

21 (C) identification of the primary Adminis-
22 tration unit or outside body that conducted the
23 activity; and

24 (D) key findings and recommendations.

1 (d) UPDATED REPORT.—Subsequent to submission
2 of the report under subsection (c), for each subsequent
3 year, the Administrator shall provide an update of listed
4 elements in conjunction with subsequent congressional
5 budget justifications.

6 **SEC. 709. AVOIDING ORGANIZATIONAL CONFLICTS OF IN-**
7 **TEREST IN MAJOR ADMINISTRATION ACQUI-**
8 **SITION PROGRAMS.**

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

17 (b) ELEMENTS.—The revised regulations required by
18 subsection (a) shall, at a minimum—

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

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

1 (B) the ownership of business units per-
2 forming systems engineering and technical as-
3 sistance functions, professional services, or
4 management support services in relation to
5 major acquisition programs by contractors who
6 simultaneously own business units competing to
7 perform as either the prime contractor or the
8 supplier of a major subsystem or component for
9 such programs;

10 (C) the award of major subsystem con-
11 tracts by a prime contractor for a major acqui-
12 sition program to business units or other affili-
13 ates of the same parent corporate entity, and
14 particularly the award of subcontracts for soft-
15 ware integration or the development of a pro-
16 prietary software system architecture; or

17 (D) the performance by, or assistance of,
18 contractors in technical evaluations on major
19 acquisition programs;

20 (2) ensure that the Administration receives ad-
21 vice on systems architecture and systems engineer-
22 ing matters with respect to major acquisition pro-
23 grams from objective sources independent of the
24 prime contractor;

1 (3) require that a contract for the performance
2 of systems engineering and technical assistance
3 functions for a major acquisition program contains
4 a provision prohibiting the contractor or any affiliate
5 of the contractor from participating as a prime con-
6 tractor or a major subcontractor in the development
7 of a system under the program; and

8 (4) establish such limited exceptions to the re-
9 quirement in paragraphs (2) and (3) as may be nec-
10 essary to ensure that the Administration has contin-
11 ued access to advice on systems architecture and
12 systems engineering matters from highly-qualified
13 contractors with domain experience and expertise,
14 while ensuring that such advice comes from sources
15 that are objective and unbiased.

16 **SEC. 710. FACILITIES AND INFRASTRUCTURE.**

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

19 (1) the Administration must reverse the deterio-
20 rating condition of its facilities and infrastructure,
21 as this condition is hampering the effectiveness and
22 efficiency of research performed by both the Admin-
23 istration and industry participants making use of
24 Administration facilities, thus reducing the competi-
25 tiveness of the United States aerospace industry;

1 (2) the Administration has a role in providing
2 laboratory capabilities to industry participants that
3 are economically viable as commercial entities and
4 thus are not available elsewhere;

5 (3) to ensure continued access to reliable and
6 efficient world-class facilities by researchers, the Ad-
7 ministration should seek to establish strategic part-
8 nerships with other Federal agencies, academic insti-
9 tutions, and industry, as appropriate; and

10 (4) decisions on whether to dispose of, main-
11 tain, or modernize existing facilities must be made
12 in the context of meeting future Administration and
13 other Federal agencies' laboratory needs, including
14 those required to meet the activities supporting the
15 Human Exploration Roadmap required by section
16 70504 of title 51, United States Code.

17 (b) POLICY.—It is the policy of the United States
18 that the Administration maintain reliable and efficient fa-
19 cilities and that decisions on whether to dispose of, main-
20 tain, or modernize existing facilities be made in the con-
21 text of meeting future Administration needs.

22 (c) PLAN.—The Administrator shall develop a plan
23 that has the goal of positioning the Administration to have
24 the facilities, laboratories, tools, and approaches necessary

1 to address future Administration requirements. Such plan
2 shall identify—

3 (1) future Administration research and develop-
4 ment and testing needs;

5 (2) a strategy for identifying facilities that are
6 candidates for disposal, that is consistent with the
7 national strategic direction set forth in—

8 (A) the National Space Policy;

9 (B) the National Aeronautics Research,
10 Development, Test, and Evaluation Infrastruc-
11 ture Plan;

12 (C) National Aeronautics and Space Ad-
13 ministration Authorization Acts; and

14 (D) the Human Exploration Roadmap
15 specified in section 70504 of title 51, United
16 States Code;

17 (3) a strategy for the maintenance, repair, up-
18 grading, and modernization of the Administration’s
19 laboratories, facilities, and equipment;

20 (4) criteria for prioritizing deferred mainte-
21 nance tasks and also for upgrading or modernizing
22 laboratories, facilities, and equipment and imple-
23 menting processes, plans, and policies for guiding
24 the Administration’s Centers on whether to main-

1 tain, repair, upgrade, or modernize a facility and for
2 determining the type of instrument to be used;

3 (5) an assessment of modifications needed to
4 maximize usage of facilities that offer unique and
5 highly specialized benefits to the aerospace industry
6 and the American public; and

7 (6) implementation steps, including a timeline,
8 milestones, and an estimate of resources required for
9 carrying out the plan.

10 (d) POLICY.—Not later than 180 days after the date
11 of enactment of this Act, the Administrator shall establish
12 and make publically available a policy that guides the Ad-
13 ministration’s use of existing authorities to out-grant,
14 lease, excess to the General Services Administration, sell,
15 decommission, demolish, or otherwise transfer property,
16 facilities, or infrastructure. This policy shall establish cri-
17 teria for the use of authorities, best practices, standard-
18 ized procedures, and guidelines for how to appropriately
19 manage property, infrastructure, and facilities.

20 (e) TRANSMITTAL.—Not later than one year after the
21 date of enactment of this Act, the Administrator shall
22 transmit the plan developed under subsection (c) to the
23 Committee on Science, Space, and Technology of the
24 House of Representatives and the Committee on Com-
25 merce, Science, and Transportation of the Senate.

1 (f) ESTABLISHMENT OF CAPITAL FUND.—The Ad-
2 ministrator shall establish a capital fund for the mod-
3 ernization of facilities and laboratories. The Administrator
4 shall ensure to the maximum extent practicable that all
5 financial savings achieved by closing outdated or surplus
6 facilities at an Administration Center shall be made avail-
7 able to that Center for the purpose of modernizing the
8 Center’s facilities and laboratories and for upgrading the
9 infrastructure at the Center.

10 (g) REPORT ON CAPITAL FUND.—Expenditures and
11 other activities of the fund established under subsection
12 (f) shall require review and approval by the Administrator
13 and the status, including the amounts held in the capital
14 fund, shall be reported to the Committee on Science,
15 Space, and Technology of the House of Representatives
16 and the Committee on Commerce, Science, and Transpor-
17 tation of the Senate in conjunction with the Administra-
18 tion’s annual budget request justification for each fiscal
19 year.

20 **SEC. 711. DETECTION AND AVOIDANCE OF COUNTERFEIT**
21 **ELECTRONIC PARTS.**

22 (a) REGULATIONS.—

23 (1) IN GENERAL.—Not later than 270 days
24 after the date of enactment of this Act, the Adminis-
25 trator shall revise the National Aeronautics and

1 Space Administration Supplement to the Federal
2 Acquisition Regulation to address the detection and
3 avoidance of counterfeit electronic parts.

4 (2) CONTRACTOR RESPONSIBILITIES.—The re-
5 vised regulations issued pursuant to paragraph (1)
6 shall provide that—

7 (A) Administration contractors who supply
8 electronic parts or products that include elec-
9 tronic parts are responsible for detecting and
10 avoiding the use or inclusion of counterfeit elec-
11 tronic parts or suspect counterfeit electronic
12 parts in such products and for any rework or
13 corrective action that may be required to rem-
14 edy the use or inclusion of such parts; and

15 (B) the cost of counterfeit electronic parts
16 and suspect counterfeit electronic parts and the
17 cost of rework or corrective action that may be
18 required to remedy the use or inclusion of such
19 parts are not allowable costs under Administra-
20 tion contracts, unless—

21 (i) the covered contractor has an oper-
22 ational system to detect and avoid counter-
23 feit parts and suspect counterfeit electronic
24 parts that has been reviewed and approved

1 by the Administration or the Department
2 of Defense;

3 (ii) the covered contractor provides
4 timely notice to the Administration pursu-
5 ant to paragraph (4); or

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

11 (3) SUPPLIERS OF ELECTRONIC PARTS.—The
12 revised regulations issued pursuant to paragraph (1)
13 shall—

14 (A) require that the Administration and
15 Administration contractors and subcontractors
16 at all tiers—

17 (i) obtain electronic parts that are in
18 production or currently available in stock
19 from the original manufacturers of the
20 parts or their authorized dealers, or from
21 suppliers who obtain such parts exclusively
22 from the original manufacturers of the
23 parts or their authorized dealers; and

24 (ii) obtain electronic parts that are
25 not in production or currently available in

1 stock from suppliers that meet qualifica-
2 tion requirements established pursuant to
3 subparagraph (C);

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

7 (i) notification of the Administration;

8 and

9 (ii) inspection, testing, and authen-
10 tication of electronic parts that the Admin-
11 istration or an Administration contractor
12 or subcontractor obtains from any source
13 other than a source described in subpara-
14 graph (A);

15 (C) establish qualification requirements,
16 consistent with the requirements of section
17 2319 of title 10, United States Code, pursuant
18 to which the Administration may identify sup-
19 pliers that have appropriate policies and proce-
20 dures in place to detect and avoid counterfeit
21 electronic parts and suspect counterfeit elec-
22 tronic parts; and

23 (D) authorize Administration contractors
24 and subcontractors to identify and use addi-

1 tional suppliers beyond those identified pursu-
2 ant to subparagraph (C) provided that—

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

6 (ii) the contractor or subcontractor
7 assumes responsibility for the authenticity
8 of parts provided by such suppliers as pro-
9 vided in paragraph (2); and

10 (iii) the selection of such suppliers is
11 subject to review and audit by appropriate
12 Administration officials.

13 (4) **TIMELY NOTIFICATION.**—The revised regu-
14 lations issued pursuant to paragraph (1) shall re-
15 quire that any Administration contractor or subcon-
16 tractor who becomes aware, or has reason to sus-
17 pect, that any end item, component, part, or mate-
18 rial contained in supplies purchased by the Adminis-
19 tration, or purchased by a contractor or subcon-
20 tractor for delivery to, or on behalf of, the Adminis-
21 tration, contains counterfeit electronic parts or sus-
22 pect counterfeit electronic parts, shall provide notifi-
23 cation to the applicable Administration contracting
24 officer within 30 calendar days.

1 (b) REPORT.—Not later than 120 days after the re-
2 vised regulations specified in subsection (a) have been im-
3 plemented, the Administrator shall submit to the Com-
4 mittee on Science, Space, and Technology of the House
5 of Representatives and the Committee on Commerce,
6 Science, and Transportation of the Senate a report updat-
7 ing the Administration’s actions to prevent counterfeit
8 electronic parts from entering the supply chain as de-
9 scribed in its October 2011 report pursuant to section
10 1206(d) of the National Aeronautics and Space Adminis-
11 tration Authorization Act of 2010 (42 U.S.C. 18444(d)).

12 (c) DEFINITION.—In this section, the term “elec-
13 tronic part” means a discrete electronic component, in-
14 cluding a microcircuit, transistor, capacitor, resistor, or
15 diode that is intended for use in a safety or mission critical
16 application.

17 **SEC. 712. SPACE ACT AGREEMENTS.**

18 (a) COST SHARING.—To the extent that the Adminis-
19 trator determines practicable, the funds provided by the
20 Government under a funded Space Act Agreement shall
21 not exceed the total amount provided by other parties to
22 the Space Act Agreement.

23 (b) NEED.—A funded Space Act Agreement may be
24 used only when the use of a standard contract, grant, or
25 cooperative agreement is not feasible or appropriate, as

1 determined by the Associate Administrator for Procure-
2 ment.

3 (c) PUBLIC NOTICE AND COMMENT.—The Adminis-
4 trator shall make available for public notice and comment
5 each proposed Space Act Agreement at least 30 days be-
6 fore entering into such agreement, with appropriate
7 redactions for proprietary, sensitive, or classified informa-
8 tion.

9 (d) TRANSPARENCY.—The Administrator shall pub-
10 licly disclose on the Administration’s website and make
11 available in a searchable format each Space Act Agree-
12 ment, with appropriate redactions for proprietary, sen-
13 sitive, or classified information, not later than 60 days
14 after such agreement is signed.

15 (e) ANNUAL REPORT.—

16 (1) REQUIREMENT.—Not later than 90 days
17 after the end of each fiscal year, the Administrator
18 shall submit to the Committee on Science, Space,
19 and Technology of the House of Representatives and
20 the Committee on Commerce, Science, and Trans-
21 portation of the Senate a report on the use of Space
22 Act Agreement authority by the Administration dur-
23 ing the previous fiscal year.

1 (2) CONTENTS.—The report shall include for
2 each Space Act Agreement in effect at the time of
3 the report—

4 (A) an indication of whether the agreement
5 is a reimbursable, nonreimbursable, or funded
6 Space Act Agreement;

7 (B) a description of—

8 (i) the subject and terms;

9 (ii) the parties;

10 (iii) the responsible—

11 (I) mission directorate;

12 (II) center; or

13 (III) headquarters element;

14 (iv) the value;

15 (v) the extent of the cost sharing
16 among Federal Government and non-Fed-
17 eral sources;

18 (vi) the time period or schedule; and

19 (vii) all milestones; and

20 (C) an indication of whether the agreement
21 was renewed during the previous fiscal year.

22 (3) ANTICIPATED AGREEMENTS.—The report
23 shall also include a list of all anticipated reimburs-
24 able, nonreimbursable, and funded Space Act Agree-
25 ments for the upcoming fiscal year.

1 (4) CUMULATIVE PROGRAM BENEFITS.—The
2 report shall also include, with respect to the Space
3 Act Agreements covered by the report, a summary
4 of—

5 (A) the technology areas in which research
6 projects were conducted under such agreements;

7 (B) the extent to which the use of the
8 Space Act Agreements—

9 (i) has contributed to a broadening of
10 the technology and industrial base avail-
11 able for meeting Administration needs; and

12 (ii) has fostered within the technology
13 and industrial base new relationships and
14 practices that support the United States;
15 and

16 (C) the total amount of value received by
17 the Federal Government during the fiscal year
18 pursuant to such Space Act Agreements.

19 **SEC. 713. HUMAN SPACEFLIGHT ACCIDENT INVESTIGA-**
20 **TIONS.**

21 Section 70702(a) of title 51, United States Code, is
22 amended by striking paragraph (3) and inserting the fol-
23 lowing:

24 “(3) any other orbital or suborbital space vehi-
25 cle carrying humans—

1 “(A) that is owned by the Federal Govern-
2 ment; or

3 “(B) that is being used pursuant to a con-
4 tract or Space Act Agreement, as defined in
5 section 2 of the National Aeronautics and
6 Space Administration Authorization Act of
7 2014, with the Federal Government for car-
8 rying a researcher or payload funded by the
9 Federal Government; or”.

10 **SEC. 714. FULLEST COMMERCIAL USE OF SPACE.**

11 (a) REPORT.—Not later than 90 days after the date
12 of enactment of this Act, the Administrator shall transmit
13 to the Committee on Science, Space, and Technology of
14 the House of Representatives and the Committee on Com-
15 merce, Science, and Transportation of the Senate a report
16 on current and continuing efforts by the Administration
17 to “seek and encourage, to the maximum extent possible,
18 the fullest commercial use of space,” as described in sec-
19 tion 20102(c) of title 51, United States Code.

20 (b) ELEMENTS.—The report required under sub-
21 section (a) shall include—

22 (1) an assessment of the Administration’s ef-
23 forts to comply with the policy;

24 (2) an explanation of criteria used to define
25 compliance;

1 (3) a description of programs, policies, and ac-
2 tivities the Administration is using, and will continue
3 to use, to ensure compliance;

4 (4) an explanation of how the Administration
5 could expand on the efforts to comply; and

6 (5) a summary of all current and planned ac-
7 tivities pursuant to this policy.

8 (c) **BARRIERS TO FULLEST COMMERCIAL USE OF**
9 **SPACE.**—Not later than 90 days after the date of enact-
10 ment of this Act, the Administrator shall transmit to the
11 Committee on Science, Space, and Technology of the
12 House of Representatives and the Committee on Com-
13 merce, Science, and Transportation of the Senate a report
14 on current and continuing efforts by the Administration
15 to reduce impediments, bureaucracy, redundancy, and
16 burdens to ensure the fullest commercial use of space as
17 required by section 20102(c) of title 51, United States
18 Code.

19 **SEC. 715. ORBITAL DEBRIS.**

20 (a) **FINDINGS.**—Congress finds that orbital debris
21 poses serious risks to the operational space capabilities of
22 the United States and that an international commitment
23 and integrated strategic plan are needed to mitigate the
24 growth of orbital debris wherever possible. Congress finds
25 the delay in the Office of Science and Technology Policy’s

1 submission of a report on the status of international co-
2 ordination and development of mitigation strategies to be
3 inconsistent with such risks.

4 (b) REPORTS.—

5 (1) COORDINATION.—Not later than 90 days
6 after the date of enactment of this Act, the Adminis-
7 trator shall provide the Committee on Science,
8 Space, and Technology of the House of Representa-
9 tives and the Committee on Commerce, Science, and
10 Transportation of the Senate with a report on the
11 status of efforts to coordinate with countries within
12 the Inter-Agency Space Debris Coordination Com-
13 mittee to mitigate the effects and growth of orbital
14 debris as required by section 1202(b)(1) of the Na-
15 tional Aeronautics and Space Administration Au-
16 thorization Act of 2010 (42 U.S.C. 18441(b)(1)).

17 (2) MITIGATION STRATEGY.—Not later than 90
18 days after the date of enactment of this Act, the Di-
19 rector of the Office of Science and Technology Policy
20 shall provide the Committee on Science, Space, and
21 Technology of the House of Representatives and the
22 Committee on Commerce, Science, and Transpor-
23 tation of the Senate with a report on the status of
24 the orbital debris mitigation strategy required under
25 section 1202(b)(2) of the National Aeronautics and

1 Space Administration Authorization Act of 2010 (42
2 U.S.C. 18441(b)(2)).

3 **SEC. 716. REVIEW OF ORBITAL DEBRIS REMOVAL CON-**
4 **CEPTS.**

5 (a) SENSE OF CONGRESS.—It is the sense of Con-
6 gress that the amount of orbital debris in low-Earth orbit
7 poses risks for human activities and robotic spacecraft and
8 that this debris may increase due to collisions between ex-
9 isting debris objects. Understanding options to address
10 and remove orbital debris is important for ensuring safe
11 and effective spacecraft operations in low-Earth orbit.

12 (b) REVIEW.—The Administrator, in collaboration
13 with other relevant Federal agencies, shall solicit and re-
14 view concepts and technological options for removing or-
15 bital debris from low-Earth orbit. The solicitation and re-
16 view shall also address the requirements for and feasibility
17 of developing and implementing each of the options.

18 (c) TRANSMITTAL.—Not later than 270 days after
19 the date of enactment of this Act, the Administrator shall
20 provide a report to the Committee on Science, Space, and
21 Technology of the House of Representatives and the Com-
22 mittee on Commerce, Science, and Transportation of the
23 Senate on the solicitation and review required under sub-
24 section (b).

1 **SEC. 717. USE OF OPERATIONAL COMMERCIAL SUB-**
2 **ORBITAL VEHICLES FOR RESEARCH, DEVEL-**
3 **OPMENT, AND EDUCATION.**

4 (a) **POLICY.**—The Administrator shall develop a pol-
5 icy on the use of operational commercial reusable sub-
6 orbital flight vehicles for carrying out scientific and engi-
7 neering investigations and educational activities.

8 (b) **PLAN.**—The Administrator shall prepare a plan
9 on the Administration’s use of operational commercial re-
10 usable suborbital flight vehicles for carrying out scientific
11 and engineering investigations and educational activities.
12 The plan shall—

13 (1) describe the purposes for which the Admin-
14 istration intends to use such vehicles;

15 (2) describe the processes required to support
16 such use, including the criteria used to determine
17 which scientific and engineering investigations and
18 educational activities are selected for a suborbital
19 flight;

20 (3) describe Administration, space flight oper-
21 ator, and supporting contractor responsibilities for
22 developing standard payload interfaces and con-
23 ducting payload safety analyses, payload integration
24 and processing, payload operations, and safety as-
25 surance for Administration-sponsored space flight
26 participants, among other functions required to fly

1 Administration-sponsored payloads and space flight
2 participants on operational commercial suborbital ve-
3 hicles;

4 (4) identify Administration-provided hardware,
5 software, or services that may be provided to com-
6 mercial reusable suborbital space flight operators on
7 a cost-reimbursable basis, through agreements or
8 contracts entered into under section 20113(e) of
9 title 51, United States Code; and

10 (5) describe the United States Government and
11 space flight operator responsibilities for liability and
12 indemnification with respect to commercial sub-
13 orbital vehicle flights that involve Administration-
14 sponsored payloads or activities, Administration-sup-
15 ported space flight participants, or other Adminis-
16 tration-related contributions.

17 (c) ASSESSMENT OF CAPABILITIES AND RISKS.—The
18 Administrator shall assess and characterize the potential
19 capabilities and performance of commercial reusable sub-
20 orbital vehicles for addressing scientific research, includ-
21 ing research requiring access to low-gravity and micro-
22 gravity environments, for carrying out technology dem-
23 onstrations related to science, exploration, or space oper-
24 ations requirements, and for providing opportunities for
25 educating and training space scientists and engineers,

1 once those vehicles become operational. The assessment
2 shall also characterize the risks of using potential commer-
3 cial reusable suborbital flights to Administration-spon-
4 sored researchers and scientific investigations and flight
5 hardware.

6 (d) TRANSMITTAL.—Not later than 1 year after the
7 date of enactment of this Act, the Administrator shall
8 transmit the plan and assessment described in subsections
9 (b) and (c) to the Committee on Science, Space, and Tech-
10 nology of the House of Representatives and the Committee
11 on Commerce, Science, and Transportation of the Senate.

12 (e) ANNUAL PROGRESS REPORTS.—In conjunction
13 with the Administration’s annual budget request justifica-
14 tion for each fiscal year, the Administrator shall transmit
15 a report to the Committee on Science, Space, and Tech-
16 nology of the House of Representatives and the Committee
17 on Commerce, Science, and Transportation of the Senate
18 describing progress in carrying out the Commercial Reus-
19 able Suborbital Research Program, including the number
20 and type of suborbital missions planned in each fiscal
21 year.

22 (f) INDEMNIFICATION AND LIABILITY.—The Admin-
23 istrator shall not proceed with a request for proposals,
24 award any contract, commit any United States Govern-
25 ment funds, or enter into any other agreement for the pro-

1 vision of a commercial reusable suborbital vehicle launch
2 service for an Administration-sponsored spaceflight partic-
3 ipant until transmittal of the plan and assessment speci-
4 fied in subsections (b) and (c), the liability issues associ-
5 ated with the use of such systems by the United States
6 Government have been addressed, and the liability and in-
7 demnification provisions that are planned to be included
8 in such contracts or agreements have been provided to the
9 Committee on Science, Space, and Technology of the
10 House of Representatives and the Committee on Com-
11 merce, Science, and Transportation of the Senate.

12 **SEC. 718. FUNDAMENTAL SPACE LIFE AND PHYSICAL**
13 **SCIENCES RESEARCH.**

14 (a) SENSE OF CONGRESS.—It the sense of Congress
15 that fundamental, discovery-based space life and physical
16 sciences research is critical for enabling space exploration,
17 protecting humans in space, and providing societal bene-
18 fits, and that the space environment facilitates the ad-
19 vancement of understanding of the life sciences and phys-
20 ical sciences. Space life and physical science research con-
21 tributes to advancing science, technology, engineering, and
22 mathematics research, and provides careers and training
23 opportunities in academia, Federal laboratories, and com-
24 mercial industry. Congress encourages the Administrator
25 to augment discovery-based fundamental research and to

1 establish requirements reflecting the importance of such
2 research in keeping with the priorities established in the
3 National Academies' decadal survey entitled "Recapturing
4 a Future for Space Exploration: Life and Physical
5 Sciences Research for a New Era".

6 (b) BUDGET REQUEST.—The Administrator shall in-
7 clude as part of the Administration's annual budget re-
8 quest for each fiscal year a budget line for fundamental
9 space life and physical sciences research, devoted to com-
10 petitive, peer-reviewed grants, that is separate from the
11 International Space Station Operations account.

12 (c) STRATEGIC PLAN.—

13 (1) DEVELOPMENT.—The Administrator, in
14 consultation with academia, other Federal agencies,
15 and other potential stakeholders, shall develop a
16 strategic plan for carrying out competitive, peer-re-
17 viewed fundamental space life science and physical
18 sciences and related technology research, among
19 other activities, consistent with the priorities in the
20 National Academies' decadal survey described in
21 subsection (a).

22 (2) TRANSMITTAL.—Not later than 270 days
23 after the date of enactment of this Act, the Adminis-
24 trator shall transmit the strategic plan developed
25 under paragraph (1) to the Committee on Science,

1 Space, and Technology of the House of Representa-
2 tives and the Committee on Commerce, Science, and
3 Transportation of the Senate.

4 **SEC. 719. RESTORING COMMITMENT TO ENGINEERING RE-**
5 **SEARCH.**

6 (a) SENSE OF CONGRESS.—It is the sense of Con-
7 gress that engineering excellence has long been a hallmark
8 of the Administration’s ability to make significant ad-
9 vances in aeronautics and space exploration. However, as
10 has been noted in recent National Academies reports, in-
11 creasingly constrained funding and competing priorities
12 have led to an erosion of the Administration’s commitment
13 to basic engineering research. This research provides the
14 basis for the technology development that enables the Ad-
15 ministration’s many challenging missions to succeed. If
16 current trends continue, the Administration’s ability to at-
17 tract and maintain the best and brightest engineering
18 workforce at its Centers as well as its ability to remain
19 on the cutting edge of aeronautical and space technology
20 will continue to erode and will threaten the Administra-
21 tion’s ability to be a world leader in aeronautics research
22 and development and space exploration.

23 (b) PLAN.—The Administrator shall develop a plan
24 for restoring a meaningful basic engineering research pro-
25 gram at the Administration’s Centers, including, as appro-

1 piate, collaborations with industry, universities, and other
2 relevant organizations. The plan shall identify the organi-
3 zational approach to be followed, an initial set of basic
4 research priorities, and a proposed budget.

5 (c) REPORT.—Not later than 180 days after the date
6 of enactment of this Act, the Administrator shall transmit
7 the plan specified in subsection (b) to the Committee on
8 Science, Space, and Technology of the House of Rep-
9 resentatives and the Committee on Commerce, Science,
10 and Transportation of the Senate.

11 **SEC. 720. LIQUID ROCKET ENGINE DEVELOPMENT PRO-**
12 **GRAM.**

13 The Administrator shall consult with the Secretary
14 of Defense to ensure that any next generation liquid rock-
15 et engine made in the United States for national security
16 space launch objectives can contribute, to the extent prac-
17 ticable, to the space programs and missions carried out
18 by the Administration.

19 **SEC. 721 REMOTE SATELLITE SERVICING DEMONSTRA-**
20 **TIONS.**

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

23 (1) the Administration plays a key role in dem-
24 onstrating the feasibility of using robotic tech-

1 nologies for a spacecraft that could autonomously
2 access, inspect, repair, and refuel satellites;

3 (2) demonstrating this feasibility would both as-
4 sist the Administration in its future missions and
5 provide other Federal agencies and private sector en-
6 tities with enhanced confidence in the feasibility to
7 robotically refuel, inspect, repair, and maintain their
8 satellites in both near and distant orbits; and

9 (3) the capability to refuel, inspect, repair, and
10 maintain satellites robotically could add years of
11 functional life to satellites.

12 (b) REPORT.—Not later than 120 days after the date
13 of enactment of this Act, the Administrator shall transmit
14 a report to the Committee on Science, Space, and Tech-
15 nology of the House of Representatives and the Committee
16 on Commerce, Science, and Transportation of the Senate
17 describing the Administration’s—

18 (1) activities, tools, and techniques associated
19 with the ultimate goal of autonomously servicing sat-
20 ellites using robotic spacecraft;

21 (2) efforts to coordinate its technology develop-
22 ment and demonstrations with other Federal agen-
23 cies and private sector entities that conduct pro-
24 grams, projects, or activities on on-orbit satellite in-
25 spection and servicing capabilities;

1 (3) efforts to leverage the work of these Federal
2 agencies and private sector entities into the Admin-
3 istration’s plans;

4 (4) accomplishments to date in demonstrating
5 various servicing technologies;

6 (5) major technical and operational challenges
7 encountered and mitigation measures taken; and

8 (6) demonstrations needed to increase con-
9 fidence in the use of the technologies for operational
10 missions, and the timeframe for these demonstra-
11 tions.

12 **SEC. 722. INFORMATION TECHNOLOGY GOVERNANCE.**

13 (a) SENSE OF CONGRESS.—It is the sense of Con-
14 gress that information security is central to the Adminis-
15 tration’s ability to protect information and information
16 systems vital to its mission.

17 (b) STUDY.—The Comptroller General of the United
18 States shall conduct a study to assess the effectiveness of
19 the Administration’s Information Technology Governance.
20 The study shall include an assessment of—

21 (1) the resources available for overseeing Ad-
22 ministration-wide information technology operations,
23 investments, and security measures and the Chief
24 Information Officer’s visibility into and access to
25 those resources;

1 (2) the effectiveness of the Administration’s de-
2 centralized information technology structure, deci-
3 sionmaking processes and authorities and its ability
4 to enforce information security; and

5 (3) the impact of providing the Chief Informa-
6 tion Officer approval authority over information
7 technology investments that exceed a defined mone-
8 tary threshold and any potential impacts of the
9 Chief Information Officer having such authority on
10 the Administration’s missions, flights programs and
11 projects, research activities, and Center operations.

12 (c) REPORT.—Not later than 1 year after the date
13 of enactment of this Act, the Comptroller General shall
14 transmit a report detailing the results of the study con-
15 ducted under subsection (b) to the Committee on Science,
16 Space, and Technology of the House of Representatives
17 and the Committee on Commerce, Science, and Transpor-
18 tation of the Senate.

19 **SEC. 723. STRENGTHENING ADMINISTRATION SECURITY.**

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

22 (1) Following the public disclosure of security
23 and export control violations at its research centers,
24 the Administration contracted with the National
25 Academy of Public Administration to conduct an

1 independent assessment of how the Administration
2 carried out Foreign National Access Management
3 practices and other security matters.

4 (2) The assessment by the National Academy of
5 Public Administration concluded that “NASA net-
6 works are compromised”, that the Administration
7 lacked a standardized and systematic approach to
8 export compliance, and that individuals within the
9 Administration were not held accountable when
10 making serious, preventable errors in carrying out
11 Foreign National Access Management practices and
12 other security matters.

13 (b) REPORT.—Not later than 90 days after the date
14 of enactment of this Act, the Administration shall report
15 to the Committee on Science, Space, and Technology of
16 the House of Representatives and the Committee on Com-
17 merce, Science, and Transportation of the Senate on how
18 it plans to address each of the recommendations made in
19 the security assessment by the National Academy of Pub-
20 lic Administration and the recommendations made by the
21 Government Accountability Office and the Administra-
22 tion’s Office of the Inspector General regarding security
23 and safeguarding export control information.

24 (c) REVIEW.—Within one year of enactment of this
25 Act, the Comptroller General of the United States shall

1 report to the Committee on Science, Space, and Tech-
2 nology of the House of Representatives and the Committee
3 on Commerce, Science, and Transportation of the Senate
4 its assessment of how the Administration has complied
5 with the recommendations described in subsection (b).

6 **SEC. 724. PROHIBITION ON USE OF FUNDS FOR CONTRAC-**
7 **TORS THAT HAVE COMMITTED FRAUD OR**
8 **OTHER CRIMES.**

9 None of the funds authorized to be appropriated or
10 otherwise made available for fiscal year 2014 or any fiscal
11 year thereafter for the Administration may be used to
12 enter into a contract with any offeror or any of its prin-
13 cipals if the offeror certifies, pursuant to the Federal Ac-
14 quisition Regulation, that the offeror or any of its prin-
15 cipals—

16 (1) within a three-year period preceding this
17 offer has been convicted of or had a civil judgment
18 rendered against it for—

19 (A) commission of fraud or a criminal of-
20 fense in connection with obtaining, attempting
21 to obtain, or performing a public (Federal,
22 State, or local) contract or subcontract;

23 (B) violation of Federal or State antitrust
24 statutes relating to the submission of offers; or

1 (C) commission of embezzlement, theft,
2 forgery, bribery, falsification or destruction of
3 records, making false statements, tax evasion,
4 violating Federal criminal tax laws, or receiving
5 stolen property;

6 (2) are presently indicted for, or otherwise
7 criminally or civilly charged by a governmental enti-
8 ty with, commission of any of the offenses enumer-
9 ated in paragraph (1); or

10 (3) within a three-year period preceding this
11 offer, has been notified of any delinquent Federal
12 taxes in an amount that exceeds \$3,000 for which
13 the liability remains unsatisfied.

14 **SEC. 725. PROTECTION OF APOLLO LANDING SITES.**

15 (a) ASSESSMENT.—The Director of the Office of
16 Science and Technology Policy, in consultation with all rel-
17 evant agencies of the Federal Government and other ap-
18 propriate entities and individuals, shall carry out a review
19 and assessment of the issues involved in protecting and
20 preserving historically important Apollo Program lunar
21 landing sites and Apollo program artifacts residing on the
22 lunar surface, including those pertaining to Apollo 11 and
23 Apollo 17. The review and assessment shall, at a min-
24 imum, include determination of what risks to the protec-
25 tion and preservation of those sites and artifacts exist or

1 may exist in the future, what measures are required to
2 ensure such protection and preservation, the extent to
3 which additional domestic legislation or international trea-
4 ties or agreements will be required, and specific rec-
5 ommendations for protecting and preserving those lunar
6 landing sites and artifacts.

7 (b) REPORT.—Not later than one year after the date
8 of enactment of this Act, the Director shall transmit to
9 the Committee on Science, Space, and Technology of the
10 House of Representatives and the Committee on Com-
11 merce, Science, and Transportation of the Senate the re-
12 sults of the assessment required under subsection (a).

13 **SEC. 726. ASTRONAUT OCCUPATIONAL HEALTHCARE.**

14 (a) IN GENERAL.—The National Academies’ Insti-
15 tute of Medicine report “Health Standards for Long Du-
16 ration and Exploration Spaceflight: Ethics Principles, Re-
17 sponsibilities, and Decision Framework” found that the
18 Administration has ethical responsibilities for and should
19 adopt policies and processes related to health standards
20 for long duration and exploration spaceflights that recog-
21 nize those ethical responsibilities. In particular, the report
22 recommended that the Administration “provide preventa-
23 tive long-term health screening and surveillance of astro-
24 nauts and lifetime health care to protect their health, sup-
25 port ongoing evaluation of health standards, improve mis-

1 sion safety, and reduce risks for current and future astro-
2 nauts”.

3 (b) RESPONSE.—The Administration shall prepare a
4 response to the National Academies report recommenda-
5 tion described in subsection (a). The response shall include
6 the estimated budgetary resources required for the imple-
7 mentation of those recommendations, and any options that
8 might be considered as part of the response.

9 (c) TRANSMITTAL.—The response required under
10 subsection (b) shall be transmitted to the Committee on
11 Science, Space, and Technology of the House of Rep-
12 resentatives and the Committee on Commerce, Science,
13 and Transportation of the Senate not later than 6 months
14 after the date of enactment of this Act.

15 **SEC. 727. SENSE OF CONGRESS ON ACCESS TO OBSERVA-**
16 **TIONAL DATA SETS.**

17 It is the sense of Congress that the Administration
18 should prioritize the development of tools and interfaces
19 that make publicly available observational data sets more
20 easy to access, analyze, manipulate, and understand for
21 students, teachers, and the American public at large, with

- 1 a particular focus on K–12 and undergraduate STEM
- 2 education settings.

Passed the House of Representatives June 9, 2014.

Attest:

KAREN L. HAAS,

Clerk.