

**AMENDMENT IN THE NATURE OF A SUBSTITUTE
TO H.R. 4412
OFFERED BY MR. PALAZZO OF MISSISSIPPI AND
MS. EDWARDS OF MARYLAND**

Strike all after the enacting clause and insert the
following:

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. Commercial crew program.

TITLE III—SCIENCE

Subtitle A—General

- Sec. 301. Science portfolio.
- Sec. 302. Radioisotope power systems.
- Sec. 303. Congressional declaration of policy and purpose.

Subtitle B—Astrophysics

- Sec. 311. Decadal cadence.
- Sec. 312. Extrasolar planet exploration strategy.
- Sec. 313. James Webb Telescope.
- Sec. 314. National reconnaissance office telescope donation.

Subtitle C—Planetary Science

- Sec. 321. Decadal cadence.
- Sec. 322. Near-Earth objects.
- Sec. 323. Near-Earth objects public-private partnerships.
- Sec. 324. Astrobiology strategy.
- Sec. 325. Astrobiology public-private partnerships.
- Sec. 326. Assessment of Mars architecture.

Subtitle D—Heliophysics

- Sec. 331. Decadal cadence.

Subtitle E—Earth Science

- Sec. 341. Reimbursement for additional responsibilities.

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—POLICY PROVISIONS

- Sec. 601. Asteroid Retrieval Mission.
- Sec. 602. Termination liability.
- Sec. 603. Baseline and cost controls.
- Sec. 604. Project and program reserves.
- Sec. 605. Independent reviews.
- Sec. 606. Commercial technology transfer program.
- Sec. 607. NASA Advisory Council.

Sec. 608. Cost estimation.

Sec. 609. Avoiding organizational conflicts of interest in major NASA acquisition programs.

Sec. 610. Facilities and infrastructure.

Sec. 612. Detection and avoidance of counterfeit electronic parts.

Sec. 613. Space Act Agreements.

1 **SEC. 2. DEFINITIONS.**

2 In this Act:

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

6 (2) ADMINISTRATOR.—The term “Adminis-
7 trator” means the Administrator of the Administra-
8 tion.

9 (3) ORION CREW CAPSULE.—The term “Orion
10 crew capsule” refers to the multipurpose crew vehi-
11 cle described in section 303 of the National Aero-
12 nautics and Space Administration Authorization Act
13 of 2010 (42 U.S.C. 18323).

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

19 (5) SPACE LAUNCH SYSTEM.—The term “Space
20 Launch System” refers to the follow-on Government
21 owned civil launch system developed, managed, and
22 operated by the Administration to serve as a key

1 component to expand human presence beyond low-
2 Earth orbit, as described in section 302 of the Na-
3 tional Aeronautics and Space Administration Au-
4 thorization Act of 2010 (42 U.S.C. 18322).

5 **TITLE I—AUTHORIZATION OF**
6 **APPROPRIATIONS**

7 **SEC. 101. FISCAL YEAR 2014.**

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

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

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

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

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

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

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

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

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

3 (B) \$1,345,000,000 shall be for Planetary
4 Science, of which \$30,000,000 shall be for the
5 Astrobiology Institute;

6 (C) \$668,000,000 shall be for Astro-
7 physics;

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

10 (E) \$654,000,000 shall be for
11 Heliophysics.

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

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

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

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

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

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

19 **TITLE II—HUMAN SPACE FLIGHT**
20 **Subtitle A—Exploration**

21 **SEC. 201. SPACE EXPLORATION POLICY.**

22 (a) POLICY.—Human exploration deeper into the
23 solar system shall be a core mission of the Administration.
24 It is the policy of the United States that the goal of
25 NASA's exploration program shall be to successfully con-

1 duct a crewed mission to the surface of Mars to begin
2 human exploration of that planet. The use of the surface
3 of the Moon, cis-lunar space, near-Earth asteroids,
4 Lagrangian points, and Martian moons may be pursued
5 provided they are properly incorporated into the Roadmap
6 described in section 202 of this Act.

7 (b) VISION FOR SPACE EXPLORATION.—Section
8 20302 of title 51, United States Code, is amended—

9 (1) by adding at the end the following:

10 “(c) DEFINITIONS.—In this section:

11 “(1) ORION CREW CAPSULE.—The term ‘Orion
12 crew capsule’ refers to the multipurpose crew vehicle
13 described in section 303 of the National Aeronautics
14 and Space Administration Authorization Act of 2010
15 (42 U.S.C. 18323).

16 “(2) SPACE LAUNCH SYSTEM.—The term
17 ‘Space Launch System’ refers to the follow-on Gov-
18 ernment-owned civil launch system developed, man-
19 aged, and operated by the Administration to serve as
20 a key component to expand human presence beyond
21 low-Earth orbit, as described in section 302 of the
22 National Aeronautics and Space Administration Au-
23 thorization Act of 2010 (42 U.S.C. 18322).”.

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

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

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

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

9 “(5) to accelerate the development of capabili-
10 ties to enable a human exploration mission to the
11 surface of Mars and beyond through the
12 prioritization of those technologies and capabilities
13 best suited for such a mission in accordance with the
14 Exploration Roadmap under section 70504 of title
15 51, United States Code.”.

16 (d) USE OF NON-UNITED STATES HUMAN SPACE
17 FLIGHT TRANSPORTATION CAPABILITIES.—Section
18 201(a) of the National Aeronautics and Space Administra-
19 tion Authorization Act of 2010 (42 U.S.C. 18311(a)) is
20 amended to read as follows:

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

23 “(1) IN GENERAL.—NASA may not obtain non-
24 United States human space flight capabilities unless
25 no domestic commercial or public-private partnership

1 provider that the Administrator has determined to
2 meet safety and affordability requirements estab-
3 lished by NASA for the transport of its astronauts
4 is available to provide such capabilities.

5 “(2) DEFINITION.—For purposes of this sub-
6 section, the term ‘domestic commercial provider’
7 means a person providing space transportation serv-
8 ices or other space-related activities, the majority
9 control of which is held by persons other than a
10 Federal, State, local, or foreign government, foreign
11 company, or foreign national.”.

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

16 (1) by striking subsection (b);

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

19 (3) by redesignating subsections (c) and (d) as
20 subsections (b) and (c), respectively.

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

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

1 **“§ 70504. Stepping stone approach to exploration**

2 “(a) IN GENERAL.—In order to maximize the cost
3 effectiveness of the long-term space exploration and utili-
4 zation activities of the United States, the Administrator
5 shall direct the Human Exploration and Operations Mis-
6 sion Directorate, or successor division, to develop a Explo-
7 ration Roadmap to define the specific capabilities and
8 technologies necessary to extend human presence to the
9 surface of Mars and the sets and sequences of missions
10 required to demonstrate such capabilities and tech-
11 nologies.

12 “(b) INTERNATIONAL PARTICIPATION.—The Presi-
13 dent should invite the United States partners in the Inter-
14 national Space Station program and other nations, as ap-
15 propriate, to participate in an international initiative
16 under the leadership of the United States to achieve the
17 goal of successfully conducting a crewed mission to the
18 surface of Mars.

19 “(c) ROADMAP REQUIREMENTS.—In developing the
20 Mars Human Exploration Roadmap, the Administrator
21 shall—

22 “(1) include the specific set of capabilities and
23 technologies that contribute to extending human
24 presence to the surface of Mars and the sets and se-
25 quences of missions necessary to demonstrate the
26 proficiency of these capabilities and technologies

1 with an emphasis on using or not using the Inter-
2 national Space Station, lunar landings, cislunar
3 space, trans-lunar space, Lagrangian points, and the
4 natural satellites of Mars, Phobos and Deimos, as
5 testbeds, as necessary, and shall include the most
6 appropriate process for developing such capabilities
7 and technologies;

8 “(2) include information on the phasing of
9 planned intermediate destinations, Mars mission risk
10 areas and potential risk mitigation approaches, tech-
11 nology requirements and phasing of required tech-
12 nology development activities, the management strat-
13 egy to be followed, related ISS activities, and
14 planned international collaborative activities, poten-
15 tial commercial contributions, and other activities
16 relevant to the achievement of the goal established
17 in section 201 of the National Aeronautics and
18 Space Administration Authorization Act of 2014;

19 “(3) describe those technologies already under
20 development across the Federal Government or by
21 nongovernment entities which meet or exceed the
22 needs described in paragraph (1);

23 “(4) provide a specific process for the evolution
24 of the capabilities of the fully integrated Orion crew
25 capsule with the Space Launch System and how

1 these systems demonstrate the capabilities and tech-
2 nologies described in paragraph (1);

3 “(5) provide a description of the capabilities
4 and technologies that need to be demonstrated or re-
5 search data that could be gained through the utiliza-
6 tion of the International Space Station and the sta-
7 tus of the development of such capabilities and tech-
8 nologies;

9 “(6) describe a framework for international co-
10 operation in the development of all technologies and
11 capabilities required in this section, as well as an as-
12 sessment of the risks posed by relying on inter-
13 national partners for capabilities and technologies on
14 the critical path of development;

15 “(7) describe a process for utilizing nongovern-
16 mental entities for future human exploration beyond
17 trans-lunar space and specify what, if any, synergy
18 could be gained from—

19 “(A) partnerships using Space Act Agree-
20 ments (as defined in section 2 of the National
21 Aeronautics and Space Administration Author-
22 ization Act of 2014); or

23 “(B) other acquisition instruments;

24 “(8) include in the Exploration Roadmap an
25 addendum from the NASA Advisory Council, and an

1 addendum from the Aerospace Safety Advisory
2 Panel, each with a statement of review of the Road-
3 map that shall include—

4 “(A) subjects of agreement;

5 “(B) areas of concern; and

6 “(C) recommendations; and

7 “(9) include in the Roadmap an examination of
8 the benefits of utilizing current Administration
9 launch facilities for trans-lunar missions.

10 “(d) UPDATES.—The Administrator shall update
11 such Roadmap as needed but no more than every 2 years
12 and include it in the budget for that fiscal year trans-
13 mitted to Congress under section 1105(a) of title 31, and
14 describe—

15 “(1) the achievements and goals reached in the
16 process of developing such capabilities and tech-
17 nologies during the 2-year period prior to the sub-
18 mission of the Roadmap to Congress; and

19 “(2) the expected goals and achievements in the
20 following 2-year period.

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

24 (b) REPORT.—

1 (1) IN GENERAL.—Not later than 180 days
2 after the date of enactment of this Act, the Adminis-
3 trator shall transmit a copy of the Human Explo-
4 ration Roadmap developed under section 70504 of
5 title 51, United States Code, to the Committee on
6 Science, Space, and Technology of the House of
7 Representatives and the Committee on Commerce,
8 Science, and Transportation of the Senate.

9 (2) UPDATES.—The Administrator shall trans-
10 mit a copy of each updated Human Exploration
11 Roadmap to the Committee on Science, Space, and
12 Technology of the House of Representatives and the
13 Committee on Commerce, Science, and Transpor-
14 tation of the Senate not later than 7 days after such
15 Roadmap is updated.

16 **SEC. 203. SPACE LAUNCH SYSTEM.**

17 (a) FINDINGS.—Congress finds that—

18 (1) the Space Launch System is the most prac-
19 tical approach to reaching the Moon, Mars, and be-
20 yond, and Congress reaffirms the policy and min-
21 imum capability requirements for the Space Launch
22 System contained in section 302 of the National
23 Aeronautics and Space Administration Authorization
24 Act of 2010 (42 U.S.C. 18322);

1 (2) the primary goal for the design of the fully
2 integrated Space Launch System is to enable human
3 space exploration of the Moon, Mars, and beyond
4 over the course of the next century as required in
5 section 302(c) of the National Aeronautics and
6 Space Administration Authorization Act of 2010 (42
7 U.S.C. 18322(c)); and

8 (3) In order to promote safety and reduce pro-
9 grammatic risk, the Administrator shall budget for
10 and undertake a robust ground test and uncrewed
11 and crewed flight test and demonstration program
12 for the Space Launch System and the Orion multi-
13 purpose crew vehicle and shall budget for an oper-
14 ational flight rate sufficient to maintain safety and
15 operational readiness.

16 (b) SENSE OF CONGRESS.—It is the sense of Con-
17 gress that the President’s annual budget requests for the
18 Space Launch System and Orion multipurpose crew vehi-
19 cle development, test, and operational phases should strive
20 to accurately reflect the resource requirements of each of
21 those phases, consistent with the policy established in sec-
22 tion 201 of this Act.

23 (c) IN GENERAL.—Given the critical importance of
24 a heavy-lift launch vehicle and crewed spacecraft to enable
25 the achievement of the goal established in section 201 of

1 this Act, as well as to the accomplishment of intermediate
2 exploration milestones and the provision of a backup capa-
3 bility to transfer crew and cargo to the ISS, the Adminis-
4 trator shall make the expeditious development, test, and
5 achievement of operational readiness of the Space Launch
6 System and the Orion crew capsule the highest priority
7 of the exploration program.

8 (d) GOVERNMENT ACCOUNTABILITY OFFICE RE-
9 VIEW.—Not later than 270 days after the date of enact-
10 ment of this Act, the Comptroller General shall transmit
11 to the Committee on Science, Space, and Technology of
12 the House of Representatives and the Committee on Com-
13 merce, Science, and Transportation of the Senate a report
14 on NASA’s acquisition of ground systems in support of
15 the Space Launch System. The report shall assess the ex-
16 tent to which NASA’s exploration systems development of
17 ground systems is focused on the direct support of the
18 Space Launch System and shall identify any ground sup-
19 port projects or activities that NASA is undertaking that
20 do not solely or primarily support the Space Launch Sys-
21 tem.

22 (e) UTILIZATION REPORT.—The Administrator, in
23 consultation with the Secretary of Defense and the Direc-
24 tor of National Intelligence, shall prepare a report that
25 addresses the effort and budget required to enable and

1 utilize a cargo variant of the 130-ton Space Launch Sys-
2 tem configuration described in section 302(c) of the Na-
3 tional Aeronautics and Space Administration Authoriza-
4 tion Act of 2010 (42 U.S.C. 18322(c)). This report shall
5 also include consideration of the technical requirements of
6 the scientific and national security communities related to
7 such Space Launch System and shall directly assess the
8 utility and estimated cost savings obtained by using such
9 Space Launch System for national security and space
10 science missions. The Administrator shall transmit such
11 report to the Committee on Science, Space, and Tech-
12 nology of the House of Representatives and the Committee
13 on Commerce, Science, and Transportation of the Senate
14 not later than 180 days after the date of enactment of
15 this Act.

16 (f) NAMING COMPETITION.—Beginning not later
17 than 180 days after the date of enactment of this Act and
18 concluding not later than 1 year after such date of enact-
19 ment, the Administrator shall conduct a well-publicized
20 competition among students in elementary and secondary
21 schools to name the elements of the Administration’s ex-
22 ploration program, including—

23 (1) a name for the deep space human explo-
24 ration program as a whole, which includes the Space

1 Launch System, the Orion crew capsule, and future
2 missions; and

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

4 (g) ADVANCED BOOSTER COMPETITION.—

5 (1) REPORT.—Not later than 90 days after the
6 date of enactment of this Act, the Associate Admin-
7 istrator of the National Aeronautics and Space Ad-
8 ministration shall transmit to the Committee on
9 Science, Space, and Technology of the House of
10 Representatives and the Committee on Commerce,
11 Science, and Transportation of the Senate a report
12 that—

13 (A) describes the estimated total develop-
14 ment cost of an advanced booster for the Space
15 Launch System;

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

20 (C) outlines any potential schedule delay to
21 the Space Launch System 2017 EM-1 launch
22 as a result of increased costs associated with
23 conducting a competition for an advanced
24 booster.

1 (2) COMPETITION.—If the Associate Adminis-
2 trator reports reductions pursuant to paragraph
3 (1)(B), and no adverse schedule impact pursuant to
4 paragraph (1)(C), then the Administration shall con-
5 duct a full and open competition for an advanced
6 booster for the Space Launch System to meet the
7 requirements described in section 302(c) of the Na-
8 tional Aeronautics and Space Administration Au-
9 thorization Act of 2010 (42 U.S.C. 18322(c)), to
10 begin not later than 1 year after the Associate Ad-
11 ministrators transmits the report required under
12 paragraph (1).

13 **SEC. 204. ORION CREW CAPSULE.**

14 (a) IN GENERAL.—The Orion crew capsule shall meet
15 the practical needs and the minimum capability require-
16 ments described in section 303 of the National Aero-
17 nautics and Space Administration Authorization Act of
18 2010 (42 U.S.C. 18323).

19 (b) REPORT.—Not later than 60 days after the date
20 of enactment of this Act, the Administrator shall transmit
21 a report to the Committee on Science, Space, and Tech-
22 nology of the House of Representatives and the Committee
23 on Commerce, Science, and Transportation of the Sen-
24 ate—

1 (1) detailing those components and systems of
2 the Orion crew capsule that ensure it is in compli-
3 ance with section 303(b) of such Act (42 U.S.C.
4 18323(b));

5 (2) detailing the expected date that the Orion
6 crew capsule will be available to transport crew and
7 cargo to the International Space Station; and

8 (3) certifying that the requirements of section
9 303(b)(3) of such Act (42 U.S.C. 18323(b)(3)) will
10 be met by the Administration.

11 **SEC. 205. SPACE RADIATION.**

12 (a) STRATEGY AND PLAN.—

13 (1) IN GENERAL.—The Administrator shall de-
14 velop a space radiation mitigation and management
15 strategy and implementation plan to enable the
16 achievement of the goal established in section 201
17 that includes key research and monitoring require-
18 ments, milestones, a timetable, and an estimate of
19 facility and budgetary requirements.

20 (2) COORDINATION.—The strategy shall include
21 a mechanism for coordinating NASA research, tech-
22 nology, facilities, engineering, operations, and other
23 functions required to support the strategy and plan.

24 (3) TRANSMITTAL.—Not later than 1 year after
25 the date of enactment of this Act, the Administrator

1 shall transmit the strategy and plan to the Com-
2 mittee on Science, Space, and Technology of the
3 House of Representatives and the Committee on
4 Commerce, Science, and Transportation of the Sen-
5 ate.

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

12 **SEC. 206. PLANETARY PROTECTION FOR HUMAN EXPLO-**
13 **RATION MISSIONS.**

14 (a) STUDY.—The Administrator shall enter into an
15 arrangement with the National Academies for a study to
16 explore the planetary protection ramifications of potential
17 future missions by astronauts such as to the lunar polar
18 regions, near-Earth asteroids, the moons of Mars, and the
19 surface of Mars.

20 (b) SCOPE.—The study shall—

21 (1) collate and summarize what has been done
22 to date with respect to planetary protection meas-
23 ures to be applied to potential human missions such
24 as to the lunar polar regions, near-Earth asteroids,
25 the moons of Mars, and the surface of Mars;

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

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

8 (4) assess likely methodologies for addressing
9 planetary protection concerns; and

10 (5) identify areas for future research to reduce
11 current uncertainties.

12 (c) COMPLETION DATE.—Not later than 2 years
13 after the date of enactment of this Act, the Administrator
14 shall provide the results of the study 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 B—Space Operations**

19 **SEC. 211. INTERNATIONAL SPACE STATION.**

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

22 (1) The United States ISS program shall have
23 two primary objectives: Supporting Achievement of
24 the goal established in section 201 of this Act and
25 pursuing a research program that advances knowl-

1 edge and provides benefits to the Nation. It shall
2 continue to be the policy of the United States to, in
3 consultation with its international partners in the
4 ISS program, support full and complete utilization
5 of the ISS.

6 (2) The International Space Station shall be
7 utilized to the maximum extent practicable for the
8 development of capabilities and technologies needed
9 for the future of human exploration beyond low-
10 Earth orbit and shall be considered in the develop-
11 ment of the Exploration Roadmap specified in sec-
12 tion 202 of this Act.

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

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

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

21 (4) Reliance on foreign carriers for crew trans-
22 fer is unacceptable, and the Nation's human space
23 flight program must acquire the capability to launch
24 United States astronauts on United States rockets
25 from United States soil as soon as is safe and prac-

1 tically possible, whether on Government-owned and
2 operated space transportation systems or privately
3 owned systems that have been certified for flight by
4 the appropriate Federal agencies.

5 (b) REAFFIRMATION OF POLICY.—Congress reaffirms—
6 firms—

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

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

21 (3) that the Orion crew capsule shall provide an
22 alternative means of deliver of crew and cargo to the
23 International Space Station, in the event other vehi-
24 cles, whether commercial vehicles or partner-supplied
25 vehicles, are unable to perform that function; and

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

11 (c) ASSURED ACCESS TO LOW-EARTH ORBIT.—Sec-
12 tion 70501(a) of title 51, United States Code, is amended
13 to read as follows:

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

21 (d) REPEALS.—

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

1 (2) SHUTTLE PRICING POLICY FOR COMMER-
2 CIAL AND FOREIGN USERS.—Chapter 703 of title
3 51, United States Code, and the item relating to
4 such chapter in the table of chapters for such title,
5 are repealed.

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

10 (e) EXTENSION CRITERIA REPORT.—Not later than
11 1 year after the date of enactment of this Act, the Admin-
12 istrator shall submit to the Committee on Science, Space,
13 and Technology of the House of Representatives and the
14 Committee on Commerce, Science, and Transportation of
15 the Senate a report on the feasibility of extending the op-
16 eration of the International Space Station that includes—

17 (1) criteria for defining the International Space
18 Station as a research success;

19 (2) any necessary contributions to enabling exe-
20 cution of the Exploration Roadmap specified in sec-
21 tion 202 of this Act;

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

1 (4) cost estimates for extending operations to
2 2024 and 2030;

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

7 (6) an identification of the actions and cost es-
8 timate needed to deorbit the ISS once a decision is
9 made to deorbit the laboratory.

10 (f) STRATEGIC PLAN FOR INTERNATIONAL SPACE
11 STATION RESEARCH.—

12 (1) IN GENERAL.—The Director of the Office of
13 Science and Technology Policy, in consultation with
14 the Administrator, academia, other Federal agencies,
15 the International Space Station National Laboratory
16 Advisory Committee, and other potential stake-
17 holders, shall develop and transmit to the Committee
18 on Science, Space, and Technology of the House of
19 Representatives and the Committee on Commerce,
20 Science, and Transportation of the Senate a stra-
21 tegic plan for conducting competitive, peer-reviewed
22 research in physical and life sciences and related
23 technologies on the International Space Station
24 through at least 2020.

1 (2) PLAN REQUIREMENTS.—The strategic plan
2 shall—

3 (A) be consistent with the priorities and
4 recommendations established by the National
5 Academies in its Decadal Survey on Biological
6 and Physical Sciences in Space;

7 (B) provide a research timeline and iden-
8 tify resource requirements for its implementa-
9 tion, including but not exclusive to, the facilities
10 and instrumentation necessary for the conduct
11 of such research; and

12 (C) identify—

13 (i) criteria for the proposed research,
14 including—

15 (I) a justification for the research
16 to be carried out in the space micro-
17 gravity environment;

18 (II) the use of model systems;

19 (III) the testing of flight hard-
20 ware to understand and ensure its
21 functioning in the microgravity envi-
22 ronment;

23 (IV) the use of controls to help
24 distinguish among the direct and indi-
25 rect effects of microgravity, among

1 other effects of the flight or space en-
2 vironment;

3 (V) approaches for facilitating
4 data collection, analysis, and interpre-
5 tation;

6 (VI) procedures to ensure repeti-
7 tion of experiments, as needed;

8 (VII) support for timely presen-
9 tation of the peer-reviewed results of
10 the research;

11 (VIII) defined metrics for the
12 success of each study; and

13 (IX) how these activities enable
14 the Exploration Roadmap described in
15 section 202 of this Act.

16 (ii) instrumentation required to sup-
17 port the measurements and analysis of the
18 research to be carried out under the stra-
19 tegic plan;

20 (iii) the capabilities needed to support
21 direct, real-time communications between
22 astronauts working on research experi-
23 ments onboard the International Space
24 Station and the principal investigator on
25 the ground;

1 (iv) a process for involving the exter-
2 nal user community in research planning,
3 including planning for relevant flight hard-
4 ware and instrumentation, and for utiliza-
5 tion of the International Space Station,
6 free flyers, or other research platforms;

7 (v) the acquisition strategies the Ad-
8 ministration plans to use to acquire any
9 new capabilities which are not operational
10 on the International Space Station as of
11 the date of enactment of this Act and
12 which have an estimated total life cycle
13 cost of \$10,000,000 or more, along with a
14 justification of any anticipated use of less
15 than full and open competition and written
16 approval therefor from the Administra-
17 tion's Assistant Administrator for Procure-
18 ment; and

19 (vi) defined metrics for success of the
20 research plan.

21 (3) REPORT.—

22 (A) IN GENERAL.—Not later than 1 year
23 after the date of enactment of this Act, the
24 Comptroller General of the United States shall
25 transmit to the Committee on Science, Space,

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

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

16 **SEC. 212. COMMERCIAL CREW PROGRAM.**

17 (a) SENSE OF CONGRESS.—It is the sense of Con-
18 gress that once developed and certified to meet NASA’s
19 safety and reliability requirements, United States commer-
20 cially provided crew transportation systems offer the po-
21 tential of serving as the primary means of transporting
22 American astronauts and international partner astronauts
23 to and from the ISS and serving as ISS emergency crew
24 rescue vehicles. At the same time, the budgetary assump-
25 tions used by NASA in its planning for the Commercial

1 Crew Program have consistently assumed significantly
2 higher funding levels than have historically been author-
3 ized and appropriated by Congress. It is the sense of Con-
4 gress that credibility in the Administration's budgetary es-
5 timates for the Commercial Crew Program can be en-
6 hanced by an independently developed cost estimate. Such
7 credibility in budgetary estimates is an important factor
8 in understanding program risk.

9 (b) OBJECTIVE.—The objective of NASA's Commer-
10 cial Crew Program shall be to assist the development of
11 at least one crew transportation system to carry NASA
12 astronauts safely, reliably, and affordably to and from the
13 ISS and to serve as an emergency crew rescue vehicle as
14 soon as practicable within the funding levels authorized
15 in this Act. The Administration shall not use any consider-
16 ations beyond this objective in the overall acquisition strat-
17 egy.

18 (c) SAFETY.—Consistent with the findings and rec-
19 ommendations of the Columbia Accident Investigation
20 Board, the Administration shall—

21 (1) ensure that in its evaluation and selection
22 of contracts for the development of commercial crew
23 transportation capabilities, that safety is the highest
24 priority; and

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

5 (d) COST MINIMIZATION.—The Administrator shall
6 strive through the competitive selection process to mini-
7 mize the life cycle cost to NASA through the planned pe-
8 riod of commercially provided crew transportation serv-
9 ices.

10 (e) TRANSPARENCY.—Transparency is the corner-
11 stone of ensuring a safe and reliable commercial crew
12 transportation service to the International Space Station.
13 The Administrator shall, to the greatest extent prac-
14 ticable, ensure that every commercial crew transportation
15 services provider has provided evidence based support for
16 their costs and schedule.

17 (f) INDEPENDENT COST AND SCHEDULE ESTI-
18 MATE.—

19 (1) REQUIREMENT.—Not later than 30 days
20 after the Federal Acquisition Regulation-based con-
21 tract for the Commercial Crew Transportation Capa-
22 bility Contract is awarded, the Administrator shall
23 arrange for the initiation of an Independent Cost
24 and Schedule Estimate for—

1 (A) all activities associated with the devel-
2 opment, test, demonstration, and certification
3 of commercial crew transportation systems;

4 (B) transportation and rescue services re-
5 quired by NASA for ISS operations through
6 calendar year 2020 or later if NASA require-
7 ments so dictate; and

8 (C) the estimated date of operational read-
9 iness for the program each assumption listed in
10 paragraph (2) of this subsection.

11 (2) ASSUMPTIONS.—The Independent Cost and
12 Schedule Estimate shall provide an estimate for each
13 of the following scenarios:

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

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

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

20 (D) The funding level assumptions over
21 the next 3 fiscal years that are included as part
22 of commercial crew transportation capability
23 contract awards.

24 (3) TRANSMITTAL.—Not later than 180 days
25 after initiation of the Independent Cost and Sched-

1 ule Estimate under paragraph (1), the Adminis-
2 trator shall transmit the results of the Independent
3 Cost and Schedule Estimate to the Committee on
4 Science, Space, and Technology of the House of
5 Representatives and the Committee on Commerce,
6 Science, and Transportation of the Senate.

7 (g) IMPLEMENTATION STRATEGIES.—

8 (1) REPORT.—Not later than 60 days after the
9 completion of the Independent Cost and Schedule
10 Estimate under subsection (f), the Administrator
11 shall transmit to the Committee on Science, Space,
12 and Technology of the House of Representatives and
13 the Committee on Commerce, Science, and Trans-
14 portation of the Senate a report containing 4 dis-
15 tinct implementation strategies based on such Inde-
16 pendent Cost and Schedule Estimate for the final
17 stages of the commercial crew program.

18 (2) REQUIREMENTS.—These options shall in-
19 clude—

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

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

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

4 (D) a strategy that has yet to be consid-
5 ered previously in any budget submission but
6 that the Administration believes could ensure
7 the flight readiness date of 2017 for at least
8 one provider.

9 (3) INCLUSIONS.—Each strategy shall include
10 the contracting instruments the Administration will
11 employ to acquire the services in each phase of de-
12 velopment or acquisition and the number of commer-
13 cial providers the Administration will include in the
14 program.

15 **TITLE III—SCIENCE**

16 **Subtitle A—General**

17 **SEC. 301. SCIENCE PORTFOLIO.**

18 (a) BALANCED AND ADEQUATELY FUNDED ACTIVI-
19 TIES.—Section 803 of the National Aeronautics and Space
20 Administration Authorization Act of 2010 (124 Stat.
21 2832) is amended to read as follows:

22 **“SEC. 803. OVERALL SCIENCE PORTFOLIO; SENSE OF CON-
23 GRESS.**

24 “Congress reaffirms its sense, expressed in the Na-
25 tional Aeronautics and Space Administration Authoriza-

1 tion Act of 2010, that a balanced and adequately funded
2 set of activities, consisting of research and analysis grants
3 programs, technology development, small, medium, and
4 large space missions, and suborbital research activities,
5 contributes to a robust and productive science program
6 and serves as a catalyst for innovation and discovery.”.

7 (b) DECADAL SURVEYS.—In proposing the funding
8 of programs and activities for the National Aeronautics
9 and Space Administration for each fiscal year, the Admin-
10 istrator shall to the greatest extent practicable follow guid-
11 ance provided in the current decadal surveys from the Na-
12 tional Academies’ Space Studies Board.

13 **SEC. 302. RADIOISOTOPE POWER SYSTEMS.**

14 (a) SENSE OF CONGRESS.—It is the sense of Con-
15 gress that conducting deep space exploration requires ra-
16 dioisotope power systems, and establishing continuity in
17 the production of the material needed to power these sys-
18 tems is paramount to the success of these future deep
19 space missions. It is further the sense of Congress that
20 Federal agencies supporting NASA through the produc-
21 tion of such material should do so in a cost effective man-
22 ner so as not to impose excessive reimbursement require-
23 ments on NASA.

24 (b) ANALYSIS OF REQUIREMENTS AND RISKS.—The
25 Director of the Office of Science and Technology Policy

1 and the Administrator, in consultation with other Federal
2 agencies, shall conduct an analysis of—

3 (1) the requirements of the Administration for
4 radioisotope power system material that is needed to
5 carry out planned, high priority robotic missions in
6 the solar system and other surface exploration activi-
7 ties beyond low-Earth orbit; and

8 (2) the risks to missions of the Administration
9 in meeting those requirements, or any additional re-
10 quirements, due to a lack of adequate radioisotope
11 power system material.

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

14 (1) detail the Administration's current pro-
15 jected mission requirements and associated time-
16 frames for radioisotope power system material;

17 (2) explain the assumptions used to determine
18 the Administration's requirements for the material,
19 including—

20 (A) the planned use of advanced thermal
21 conversion technology such as advanced
22 thermocouples and Stirling generators and con-
23 verters;

24 (B) the risks and implications of, and con-
25 tingencies for, any delays or unanticipated tech-

1 nical challenges affecting or related to the Ad-
2 ministration's mission plans for the anticipated
3 use of advanced thermal conversion technology;

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

8 (4) outline a process for meeting any additional
9 Administration requirements for the material;

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

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

20 (7) specify the steps the Administration will
21 take, in consultation with the Department of En-
22 ergy, to preserve the infrastructure and workforce
23 necessary for production of radioisotope power sys-
24 tems and ensure that its reimbursements to the De-

1 partment of Energy associated with such preserva-
2 tion are equitable and justified; and

3 (8) detail how the Administration has imple-
4 mented or rejected the recommendations from the
5 National Research Council's 2009 report titled "Ra-
6 dioisotope Power Systems: An Imperative for Main-
7 taining U.S. Leadership in Space Exploration".

8 (d) TRANSMITTAL.—Not later than 180 days after
9 the date of enactment of this Act, the Administrator shall
10 transmit the results of the analysis 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.

14 **SEC. 303. CONGRESSIONAL DECLARATION OF POLICY AND**
15 **PURPOSE.**

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

19 “(10) The direction of the unique competence
20 of the Administration to the search for life's origin,
21 evolution, distribution, and future in the Universe.
22 In carrying out this objective, the Administration
23 may use any practicable ground-based, airborne, or
24 space-based technical means and spectra of electro-
25 magnetic radiation.”.

1 **Subtitle B—Astrophysics**

2 **SEC. 311. DECADAL CADENCE.**

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

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

7 (a) STRATEGY.—The Administrator shall enter into
8 an arrangement with the National Academies to develop
9 a science strategy for the study and exploration of
10 extrasolar planets, including the use of TESS, the James
11 Webb Space Telescope, a potential WFIRST mission, or
12 any other telescope, spacecraft, or instrument as appro-
13 priate. Such strategy shall—

14 (1) outline key scientific questions;

15 (2) identify the most promising research in the
16 field;

17 (3) indicate the extent to which the mission pri-
18 orities in existing decadal surveys address the key
19 extrasolar planet research goals;

20 (4) make recommendations with respect to opti-
21 mal coordination with international partners, com-
22 mercial partners, and other not-for-profit partners;
23 and

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

1 (b) USE OF STRATEGY.—The Administrator shall use
2 the strategy to—

3 (1) inform roadmaps, strategic plans, and other
4 activities of the Administration as they relate to
5 extrasolar planet research and exploration; and

6 (2) provide a foundation for future activities
7 and initiatives.

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

15 **SEC. 313. JAMES WEBB TELESCOPE.**

16 It is the sense of Congress that—

17 (1) the James Webb Space Telescope (JWST)
18 will revolutionize our understanding of star and
19 planet formation and how galaxies evolved, and ad-
20 vance the search for the origins of the universe;

21 (2) the JWST will enable American scientists to
22 maintain their leadership in astrophysics and other
23 disciplines;

24 (3) the JWST program is making steady
25 progress towards a launch in 2018;

1 (4) the on-time and on-budget delivery of
2 JWST is a high congressional priority; and

3 (5) maintaining this progress will require the
4 Administrator to ensure that integrated testing is
5 appropriately timed and sufficiently comprehensive
6 to enable potential issues to be identified and ad-
7 dressed early enough to be handled within JWST's
8 development schedule prior to launch.

9 **SEC. 314. NATIONAL RECONNAISSANCE OFFICE TELESCOPE**
10 **DONATION.**

11 Not later than 90 days after the date of enactment
12 of this Act, the Administrator shall transmit a report to
13 the Committee on Science, Space, and Technology of the
14 House of Representatives and the Committee on Com-
15 merce, Science, and Transportation of the Senate out-
16 lining the cost of the Administration's potential plan for
17 developing the Wide-Field Infrared Survey Telescope as
18 described in the 2010 National Academies' astronomy and
19 astrophysics decadal survey, including an alternative plan
20 for the Wide-Field Infrared Survey Telescope 2.4, which
21 includes the donated 2.4-meter aperture National Recon-
22 naissance Office telescope. Due to the budget constraints
23 on the Administration's science programs, this report shall
24 include—

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

3 (2) a comparison to the development of mission
4 concepts that exclude the utilization of the donated
5 asset;

6 (3) an assessment of how the Administration's
7 existing science missions will be affected by the utili-
8 zation of the donated asset described in this section;
9 and

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

12 **Subtitle C—Planetary Science**

13 **SEC. 321. DECADAL CADENCE.**

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

20 (1) a Discovery-class mission at least once every
21 24 months;

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

1 (3) at least one Flagship-class mission per
2 decadal survey period, starting with a Europa mis-
3 sion with a goal of launching by 2021.

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

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

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

13 (2) Similar objects have struck the Earth or
14 passed through the Earth's atmosphere several times
15 in the Earth's history and pose a similar threat in
16 the future.

17 (3) Several such near-Earth objects have only
18 been discovered within days of the objects' closest
19 approach to Earth, and recent discoveries of such
20 large objects indicate that many large near-Earth
21 objects remain to be discovered.

22 (4) The efforts undertaken by the Administra-
23 tion for detecting and characterizing the hazards of
24 near-Earth objects should continue to seek to fully

1 determine the threat posed by such objects to cause
2 widespread destruction and loss of life.

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

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

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

23 (e) PROGRAM REPORT.—The Director of the Office
24 of Science and Technology Policy and the Administrator
25 shall transmit to the Committee on Science, Space, and

1 Technology of the House of Representatives and the Com-
2 mittee on Commerce, Science, and Transportation of the
3 Senate, not later than 1 year after the date of enactment
4 of this Act, an initial report that provides—

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

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

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

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

22 (1) a summary of all activities carried out pur-
23 suant to subsection (c) since the date of enactment
24 of this Act, including the progress towards achieving

1 90 percent completion of the survey in subsection
2 (c); and

3 (2) a summary of expenditures for all activities
4 carried out pursuant to subsection (c) since the date
5 of enactment of this Act.

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

10 (1) accelerate the survey in subsection (c) and;

11 (2) expand NASA’s Near-Earth Object Pro-
12 gram to include the detection, tracking, cataloguing,
13 and characterization of potentially hazardous near-
14 Earth objects less than 140 meters in diameter.

15 (h) TRANSMITTAL.—Not later than 270 days after
16 the date of enactment of this Act, the Administrator shall
17 transmit the results of the assessment to the Committee
18 on Science, Space, and Technology of the House of Rep-
19 resentatives and the Committee on Commerce, Science,
20 and Transportation of the Senate.

21 **SEC. 323. NEAR-EARTH OBJECTS PUBLIC-PRIVATE PART-**
22 **NERSHIPS.**

23 (a) SENSE OF CONGRESS.—It is the sense of Con-
24 gress that the Administration should seek to leverage the
25 capabilities of the private sector and philanthropic organi-

1 zations to the maximum extent practicable in carrying out
2 the Near-Earth Object Survey program in order to meet
3 the goal of the Survey program.

4 (b) REPORT.—Not later than 180 days after the date
5 of enactment of this Act, the Administrator shall transmit
6 to the Committee on Science, Space, and Technology of
7 the House of Representatives and the Committee on Com-
8 merce, Science, Transportation of the Senate a report de-
9 scribing how the Administration can expand collaborative
10 partnerships to detect, catalogue, and categorize near-
11 Earth asteroids.

12 **SEC. 324. ASTROBIOLOGY STRATEGY.**

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

22 (b) USE OF STRATEGY.—The Administrator shall use
23 the strategy developed under subsection (a) in planning
24 and funding research and other activities and initiatives
25 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. 325. 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. 326. 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) NASA's revised post-2016 Mars exploration
22 architecture and its responsiveness to the strategies,
23 priorities, and guidelines put forward by the Na-
24 tional Academies' planetary science decadal surveys

1 and other relevant National Academies Mars-related
2 reports;

3 (2) the long-term goals of NASA's Mars Explo-
4 ration Program and such program's ability to opti-
5 mize the science return, given the current fiscal pos-
6 ture 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.

1 **Subtitle E—Earth Science**

2 **SEC. 341. REIMBURSEMENT FOR ADDITIONAL RESPON-**
3 **SIBILITIES.**

4 It is the sense of Congress that NASA is being asked
5 to undertake important Earth science activities in an envi-
6 ronment of increasingly constrained fiscal resources, and
7 that any transfer of additional responsibilities to NASA,
8 such as climate instrument development and measure-
9 ments that are currently part of the portfolio of the Na-
10 tional Oceanic and Atmospheric Administration, should be
11 accompanied by the provision of additional resources to
12 allow NASA to carry out the increased responsibilities
13 without adversely impacting its implementation of its ex-
14 isting Earth science programs and priorities.

15 **TITLE IV—AERONAUTICS**

16 **SEC. 401. SENSE OF CONGRESS.**

17 It is the sense of Congress that—

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

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

1 core element of NASA's mission and should be sup-
2 ported;

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 NASA's research results to be
9 transitioned to the users, whether private or public
10 sector, is critical to their eventual adoption.

11 **SEC. 402. AERONAUTICS RESEARCH GOALS.**

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

17 (1) **ENHANCE AIRSPACE OPERATIONS AND**
18 **SAFETY.**—NASA's Aeronautics Research Mission
19 Directorate shall address research needs of the Next
20 Generation Air Transportation System and identify
21 critical gaps in technology which must be bridged to
22 enable the implementation of the Next Generation
23 Air Transportation System so that safety and pro-
24 ductivity improvements can be achieved as soon as
25 possible.

1 (2) IMPROVE AIR VEHICLE PERFORMANCE.—

2 Such Directorate shall conduct research to improve
3 aircraft performance and minimize environmental
4 impacts. The Director shall consider and pursue
5 concepts to reduce noise, emissions and fuel con-
6 sumption while maintaining high safety standards,
7 and conduct research related to the impact of alter-
8 native fuels on the safety, reliability and maintain-
9 ability of current and new air vehicles.

10 (3) STRENGTHEN AVIATION SAFETY.—Such Di-
11 rectorate shall proactively address safety challenges
12 associated with current and new air vehicles and
13 with operations in the Nation’s current and future
14 air transportation system.

15 (4) DEMONSTRATE CONCEPTS AT THE SYSTEM
16 LEVEL.—Such Directorate shall mature the most
17 promising technologies to the point at which they
18 can be demonstrated in a relevant environment and
19 shall integrate individual components and tech-
20 nologies as appropriate to ensure that they perform
21 in an integrated manner as well as they do when op-
22 erated individually.

1 **SEC. 403. UNMANNED AERIAL SYSTEMS RESEARCH AND DE-**
2 **VELOPMENT.**

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

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

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

21 (c) COOPERATIVE UNMANNED AERIAL VEHICLE AC-
22 TIVITIES.—Section 31504 of title 51, United States Code,
23 is amended by inserting “Operational flight data derived
24 from these cooperative agreements shall be made available,
25 in appropriate and usable formats, to the Administration

1 and the Federal Aviation Administration for the develop-
2 ment of regulatory standards.” after “in remote areas.”.

3 **SEC. 404. RESEARCH PROGRAM ON COMPOSITE MATERIALS**
4 **USED IN AERONAUTICS.**

5 (a) PURPOSE OF RESEARCH.—The Administrator
6 shall continue NASA’s cooperative research program with
7 industry to identify and demonstrate more effective and
8 safe ways of developing, manufacturing, and maintaining
9 composite materials for use in airframes, subsystems, and
10 propulsion components.

11 (b) CONSULTATION.—The Administrator, in over-
12 seeing the Administration’s work on composite materials,
13 shall consult with relevant Federal agencies and partners
14 in industry to accelerate safe development and certifi-
15 cation processes for new composite materials and design
16 methods while maintaining rigorous inspection of new
17 composite materials.

18 (c) REPORT.—Not later than 1 year after the date
19 of enactment of this Act, the Administrator shall transmit
20 a report to the Committee on Science, Space, and Tech-
21 nology of the House of Representatives and the Committee
22 on Commerce, Science, and Transportation of the Senate
23 detailing the Administration’s work on new composite ma-
24 terials and the coordination efforts among Federal agen-
25 cies.

1 **SEC. 405. HYPERSONIC RESEARCH.**

2 Not later than 1 year after the date of enactment
3 of this Act, the Administrator, in consultation with other
4 Federal agencies, shall develop and transmit to the Com-
5 mittee on Science, Space, and Technology of the House
6 of Representatives and the Committee on Commerce,
7 Science, and Transportation of the Senate a research and
8 development roadmap for hypersonic aircraft research
9 with the objective of exploring hypersonic science and
10 technology using air-breathing propulsion concepts,
11 through a mix of theoretical work, basic and applied re-
12 search, and development of flight research demonstration
13 vehicles. The roadmap shall prescribe appropriate agency
14 contributions, coordination efforts, and technology mile-
15 stones.

16 **SEC. 406. SUPERSONIC RESEARCH.**

17 (a) FINDINGS.—Congress finds that—

18 (1) the ability to fly commercial aircraft over
19 land at supersonic speeds without adverse impacts
20 on the environment or on local communities could
21 open new global markets and enable new transpor-
22 tation capabilities; and

23 (2) continuing NASA's research program is
24 necessary to assess the impact in a relevant environ-
25 ment of commercial supersonic flight operations and

1 provide the basis for establishing appropriate sonic
2 boom standards for such flight operations.

3 (b) ROADMAP FOR SUPERSONIC RESEARCH.—Not
4 later than 1 year after the date of enactment of this Act,
5 the Administrator shall develop and transmit to the Com-
6 mittee on Science, Space, and Technology of the House
7 of Representatives and the Committee on Commerce,
8 Science, and Transportation of the Senate a roadmap that
9 allows for flexible funding profiles, for supersonic aero-
10 nautics research and development with the objective of de-
11 veloping and demonstrating, in a relevant environment,
12 airframe and propulsion technologies to minimize the envi-
13 ronmental impact, including noise, of supersonic overland
14 flight in an efficient and economical manner. The roadmap
15 shall include—

16 (1) the baseline research as embodied by the
17 Administration's existing research on supersonic
18 flight;

19 (2) a list of specific technological, environ-
20 mental, and other challenges that must be overcome
21 to minimize the environmental impact, including
22 noise, of supersonic overland flight;

23 (3) a research plan to address such challenges,
24 as well as a project timeline for accomplishing rel-
25 evant research goals;

1 (4) a plan for coordination with stakeholders,
2 including relevant government agencies and indus-
3 try; and

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

7 **SEC. 407. RESEARCH ON NEXTGEN AIRSPACE MANAGE-**
8 **MENT CONCEPTS AND TOOLS.**

9 (a) **IN GENERAL.**—The Administrator shall, in con-
10 sultation with other Federal agencies, review at least an-
11 nually the alignment and timing of the Administration’s
12 research and development activities in support of the
13 NextGen airspace management modernization initiative,
14 and shall make any necessary adjustments by
15 reprioritizing or retargeting the Administration’s research
16 and development activities in support of the NextGen ini-
17 tiative.

18 (b) **ANNUAL REPORTS.**—The Administrator shall re-
19 port to the Committee on Science, Space, and Technology
20 of the House of Representatives and the Committee on
21 Commerce, Science, and Transportation of the Senate an-
22 nually regarding the progress of the Administration’s re-
23 search and development activities in support of the
24 NextGen airspace management modernization initiative,
25 including details of technologies transferred to relevant

1 Federal agencies for eventual operation implementation,
2 consultation with other Federal agencies, and any adjust-
3 ments made to research activities.

4 **SEC. 408. ROTORCRAFT RESEARCH.**

5 Not later than 1 year after the date of enactment
6 of this Act, the Administrator, in consultation with other
7 Federal agencies, shall prepare and transmit to the Com-
8 mittee on Science, Space, and Technology of the House
9 of Representatives and the Committee on Commerce,
10 Science, and Transportation of the Senate a roadmap for
11 research relating to rotorcraft and other runway-inde-
12 pendent air vehicles, with the objective of developing and
13 demonstrating improved safety, noise, and environmental
14 impact in a relevant environment. The roadmap shall in-
15 clude specific goals for the research, a timeline for imple-
16 mentation, metrics for success, and guidelines for collabo-
17 ration and coordination with industry and other Federal
18 agencies.

19 **SEC. 409. TRANSFORMATIVE AERONAUTICS RESEARCH.**

20 It is the sense of Congress that the Administrator,
21 in looking strategically into the future and ensuring that
22 NASA's Center personnel are at the leading edge of aero-
23 nautics research, should encourage investigations into the
24 early-stage advancement of new processes, novel concepts,
25 and innovative technologies that have the potential to meet

1 national aeronautics needs. The Administrator shall con-
2 tinue to ensure that awards for the investigation of these
3 concepts and technologies are open for competition among
4 NASA civil servants at its Centers, separate from other
5 awards open only to non-NASA sources.

6 **SEC. 410. STUDY OF UNITED STATES LEADERSHIP IN AERO-**
7 **NAUTICS RESEARCH.**

8 (a) STUDY.—The Administrator shall enter into an
9 arrangement with the National Academies for a study to
10 benchmark the position of the United States in civil aero-
11 nautics research compared to the rest of the world. The
12 study shall—

13 (1) seek to define metrics by which relative
14 leadership in civil aeronautics research can be deter-
15 mined;

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

19 (3) provide recommendations on what can be
20 done to regain or retain global leadership, includ-
21 ing—

22 (A) identifying research areas where
23 United States expertise has been or is at risk
24 of being overtaken;

25 (B) defining appropriate roles for NASA;

1 (C) identifying public-private partnerships
2 that could be formed; and

3 (D) estimating the impact on NASA's
4 budget should such recommendations be imple-
5 mented.

6 (b) REPORT.—Not later than 18 months after the
7 date of enactment of this Act, the Administrator shall pro-
8 vide the results of the study 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.

12 **TITLE V—SPACE TECHNOLOGY**

13 **SEC. 501. SENSE OF CONGRESS.**

14 It is the sense of Congress that space technology is
15 critical to—

16 (1) enabling a new class of NASA missions be-
17 yond low-Earth orbit;

18 (2) developing technologies and capabilities that
19 will make NASA's missions more affordable and
20 more reliable; and

21 (3) improving technological capabilities and pro-
22 moting innovation for NASA and the Nation.

23 **SEC. 502. SPACE TECHNOLOGY PROGRAM.**

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

1 **“§ 70507. Space technology program authorized**

2 “(a) PROGRAM AUTHORIZED.—The Administrator
3 shall establish a Space Technology Program to pursue the
4 research and development of advanced space technologies
5 that have the potential of delivering innovative solutions
6 and to support human exploration of the solar system or
7 advanced space science. The program established by the
8 Administrator shall take into consideration the rec-
9 ommendations of the National Academies’ review of
10 NASA Space Technology Roadmaps and Priorities, as well
11 as applicable enabling aspects of the roadmap specified in
12 section 70504. In conducting the space technology pro-
13 gram established under this section, the Administrator
14 shall—

15 “(1) to the maximum extent practicable, use a
16 competitive process to select projects to be supported
17 as part of the program;

18 “(2) make use of small satellites and NASA
19 suborbital and ground-based platforms, to the extent
20 practicable and appropriate, to demonstrate space
21 technology concepts and developments; and

22 “(3) undertake partnerships with other Federal
23 agencies, universities, private industry, and other
24 spacefaring nations, as appropriate.

25 “(b) SMALL BUSINESS PROGRAMS.—The Adminis-
26 trator shall organize and manage the Administration’s

1 Small Business Innovation Research program and Small
2 Business Technology Transfer program within the Space
3 Technology Program.

4 “(c) NONDUPLICATION CERTIFICATION.—The Ad-
5 ministrator shall include in the budget for each fiscal year,
6 as transmitted to Congress under section 1105(a) of title
7 31 a certification that no project, program, or mission un-
8 dertaken by the Space Technology Program is duplicative
9 of any other project, program, or mission conducted by
10 another office or directorate of the Administration.”.

11 (b) COLLABORATION, COORDINATION, AND ALIGN-
12 MENT.—The Administrator shall ensure that the Adminis-
13 tration’s projects, programs, and activities in support of
14 technology research and development of advanced space
15 technologies are fully coordinated and aligned and that re-
16 sults from such work are shared and leveraged within the
17 Administration. Projects, programs, and activities cur-
18 rently being conducted by the Human Exploration and
19 Operations Mission Directorate in support of research and
20 development of advanced space technologies and systems
21 focusing on human space exploration should continue. The
22 Administrator shall ensure that organizational responsi-
23 bility for research and development activities in support
24 of human space exploration not initiated as of the date
25 of enactment is established on the basis of a sound ration-

1 ale. The Administrator shall provide the rationale in the
2 report specified in subsection (d).

3 (c) REPORT.—Not later than 180 days after the date
4 of enactment of this Act, the Administrator shall provide
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 comparing NASA’s space technology investments with the
9 high-priority technology areas identified by the National
10 Academies in the National Research Council’s report on
11 NASA’s Space Technology Roadmaps. The Administrator
12 shall identify how NASA will address any gaps between
13 the agency’s investments and the recommended technology
14 areas, including a projection of funding requirements.

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

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

“70507. Space Technology Program authorized.”.

1 **SEC. 503. UTILIZATION OF THE INTERNATIONAL SPACE**
2 **STATION FOR TECHNOLOGY DEMONSTRA-**
3 **TIONS.**

4 The Administrator shall utilize the International
5 Space Station and commercial services for Space Tech-
6 nology Demonstration missions in low-Earth orbit when-
7 ever it is practical and cost effective to do so.

8 **TITLE VI—POLICY PROVISIONS**

9 **SEC. 601. ASTEROID RETRIEVAL MISSION.**

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

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

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

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

1 (4) a description of the technologies and capa-
2 bilities anticipated to be gained from the proposed
3 mission that will enable future planetary defense
4 missions, against impact threats from near-Earth
5 objects equal to or greater than 140 meters in di-
6 ameter, which could not be gained by robotic mis-
7 sions; and

8 (5) a complete assessment by the Small Bodies
9 Assessment Group and the NASA Advisory Council
10 of how the proposed mission is in the strategic inter-
11 ests of the United States in space exploration.

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

23 (1) a technical development, test, fielding, and
24 operations plan using the Space Launch System and

1 other systems to successfully mount a Mars Flyby
2 mission by 2021;

3 (2) a description of the benefits in scientific
4 knowledge and technologies demonstrated by a Mars
5 Flyby mission to be launched in 2021 suitable for
6 future Mars missions; and

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

13 (c) ASSESSMENT.—Not later than 60 days after
14 transmittal of the report specified in subsection (b), the
15 Administrator shall transmit 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 an assessment by the NASA Advisory
19 Council of whether the proposal for a Mars Flyby Mission
20 to be launched in 2021 is in the strategic interests of the
21 United States in space exploration.

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

1 **SEC. 602. TERMINATION LIABILITY.**

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

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

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

23 (3) According to the Government Accountability
24 Office, the Administration procures most of its
25 goods and services through contracts, and it termi-
26 nates very few of them. In fiscal year 2010, the Ad-

1 ministration terminated 28 of 16,343 active con-
2 tracts and orders—a termination rate of about 0.17
3 percent.

4 (4) Providing processes requiring congressional
5 notification on termination of these high-priority
6 programs would enable contractors to apply taxpayer
7 dollars to making maximum progress in meeting the
8 established technical goals and schedule milestones
9 of these programs.

10 (b) NASA TERMINATION LIABILITY.—

11 (1) GENERAL RULE.—Termination liability
12 costs for a covered program shall be provided only
13 pursuant to this subsection.

14 (2) PROHIBITION ON RESERVING FUNDS.—The
15 Administrator may not reserve funds from amounts
16 appropriated for a covered program, or require the
17 reservation of funds by the prime contractor, for po-
18 tential termination liability costs with respect to a
19 covered program.

20 (3) INTENT OF CONGRESS.—It is the intent of
21 Congress that funds authorized to be appropriated
22 for covered programs be applied in meeting estab-
23 lished technical goals and schedule milestones.

24 (4) APPLICATION OF PRIOR RESERVED
25 FUNDS.—Funds that have been reserved before the

1 date of enactment of this Act for potential termi-
2 nation liability shall be promptly used to make max-
3 imum progress in meeting the established goals and
4 milestones of the covered program.

5 (5) NOTIFICATION.—The Administrator shall
6 notify the Committee on Science, Space, and Tech-
7 nology of the House of Representatives and the
8 Committee on Commerce, Science, and Transpor-
9 tation of the Senate at least 12 months in advance
10 of initiating termination for convenience or termi-
11 nation for cause of a prime contract on a covered
12 program.

13 (6) SUPPLEMENTAL APPROPRIATION RE-
14 QUEST.—

15 (A) REQUEST.—If the Administrator initi-
16 ates termination of a prime contract on a cov-
17 ered program pursuant to paragraph (5), and
18 sufficient unobligated appropriations are not
19 available to cover termination liability costs in
20 the appropriations account that is funding the
21 prime contract being terminated, the Adminis-
22 trator shall provide to Congress a notification
23 that an authorization of appropriations is nec-
24 essary not later than 120 days in advance of

1 the proposed contract termination settlement
2 for the covered program.

3 (B) INTENT OF CONGRESS.—It is the in-
4 tent of Congress to provide additional author-
5 ization for appropriations as may be necessary
6 to pay termination liability costs on prime con-
7 tracts for covered programs if Congress deems
8 it appropriate that the Administration termi-
9 nate such prime contracts. The Administration
10 shall be responsible for applying these addi-
11 tional funds for payment of all allowable and
12 reasonable negotiated termination liability costs
13 if the Administration terminates a prime con-
14 tract for a covered program. If the Administra-
15 tion terminates a prime contract for a covered
16 program for the convenience of the Federal
17 Government, then the Federal Government is
18 responsible for payment of all allowable and
19 reasonable negotiated termination liability costs
20 on the prime contract.

21 (c) REPORTING.—Not later than 6 months after the
22 date of enactment of this Act, and every 6 months there-
23 after for the duration of the prime contracts on covered
24 programs, the Administrator shall transmit to the Com-
25 mittee on Science, Space, and Technology of the House

1 of Representatives and the Committee on Commerce,
2 Science, and Transportation of the Senate a report that
3 provides—

4 (1) the estimated termination liability costs for
5 each of the prime contracts; and

6 (2) the basis for how such estimate was deter-
7 mined.

8 (d) DEFINITIONS.—For purposes of this section:

9 (1) COVERED PROGRAM.—The term “covered
10 program” means the International Space Station,
11 the Space Launch System, the Orion crew capsule,
12 and the James Webb Space Telescope.

13 (2) PRIME CONTRACT.—The term “prime con-
14 tract” means a contract entered directly between a
15 person or entity and the Federal Government for the
16 performance of all or the majority of the responsibil-
17 ities for developing, integrating, fielding, operating,
18 or sustaining a covered program.

19 (3) PRIME CONTRACTOR.—The term “prime
20 contractor” means a person or entity contracting di-
21 rectly with the Federal Government on a covered
22 program.

23 (4) TERMINATION LIABILITY COSTS.—The term
24 “termination liability costs” means any costs in-
25 curred by a prime contractor, or by any subcon-

1 tractor of a prime contractor, for which the Federal
2 Government is liable as a result of termination of a
3 prime contract by the Administrator.

4 **SEC. 603. BASELINE AND COST CONTROLS.**

5 Section 30104 of title 51, United States Code, is
6 amended—

7 (1) in subsection (a), by striking “Procedural
8 Requirements 7120.5c, dated March 22, 2005” and
9 inserting “Procedural Requirements 7120.5E, dated
10 August 14, 2012”; and

11 (2) in subsection (f), by striking “beginning 18
12 months after the date the Administrator transmits a
13 report under subsection (e)(1)(A)” and inserting
14 “beginning 18 months after the Administrator
15 makes such determination”.

16 **SEC. 604. PROJECT AND PROGRAM RESERVES.**

17 (a) SENSE OF CONGRESS.—It is the sense of Con-
18 gress that the judicious use of program and project re-
19 serves provides NASA project and program managers with
20 the flexibility needed to manage projects and programs to
21 ensure that the impacts of contingencies can be mitigated.

22 (b) REPORT.—Not later than 180 days after the date
23 of enactment of this Act the Administrator 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 describing—

3 (1) NASA's criteria for establishing the amount
4 of reserves held at the project and program levels;

5 (2) how such criteria relate to the agency's pol-
6 icy of budgeting at a 70-percent confidence level;
7 and

8 (3) NASA's criteria for waiving the policy of
9 budgeting at a 70-percent confidence level and alter-
10 native strategies and mechanisms aimed at control-
11 ling program and project costs when a waiver is
12 granted.

13 **SEC. 605. INDEPENDENT REVIEWS.**

14 Not later than 270 days after the date of enactment
15 of this Act, the Administrator shall transmit to the Com-
16 mittee on Science, Space, and Technology of the House
17 of Representatives and the Committee on Commerce,
18 Science, and Transportation of the Senate a report de-
19 scribing—

20 (1) the Administration's procedures for con-
21 ducting independent reviews of projects and pro-
22 grams at lifecycle milestones and how the Adminis-
23 tration ensures the independence of the individuals
24 who conduct those reviews prior to their assignment;

1 (2) the internal and external entities inde-
2 pendent of project and program management that
3 conduct reviews of projects and programs at life
4 cycle milestones; and

5 (3) how NASA ensures the independence of
6 such entities and their members.

7 **SEC. 606. COMMERCIAL TECHNOLOGY TRANSFER PRO-**
8 **GRAM.**

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

12 **SEC. 607. NASA ADVISORY COUNCIL.**

13 (a) **STUDY.**—The Administrator shall enter into an
14 arrangement with the National Academy of Public Admin-
15 istration for an assessment of the effectiveness of the
16 NASA Advisory Council, any organizational or other
17 issues that the Academy determines need to be addressed,
18 and any recommendations for improving the Council’s ef-
19 fectiveness.

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

23 (c) **SUNSET.**—Subsection (b) shall expire on Sep-
24 tember 30, 2014.

1 **SEC. 608. COST ESTIMATION.**

2 (a) SENSE OF CONGRESS.—It is the sense of Con-
3 gress that realistic cost estimating is critically important
4 to the ultimate success of major space development
5 projects. NASA has devoted significant efforts over the
6 past five years to improving its cost estimating capabili-
7 ties, but it is important that NASA continue its efforts
8 to develop and implement guidance in establishing realistic
9 cost estimates.

10 (b) GUIDANCE AND CRITERIA.—The Administrator
11 shall provide to programs and projects and in a manner
12 consistent with NASA Space Flight Program and Project
13 Management Requirements—

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

17 (2) the criteria to be used to make such a de-
18 termination.

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

25 (1) describing efforts to enhance internal cost
26 estimation and assessment expertise;

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

4 (3) listing the steps the Administration is un-
5 dertaking to advance consistent implementation of
6 the joint cost and schedule (JCL) process;

7 (4) identifying criteria used by programs and
8 projects in determining when to conduct an Inde-
9 pendent Cost Estimate and Independent Cost As-
10 sessment; and

11 (5) listing—

12 (A) the costs of each individual Inde-
13 pendent Cost Estimate or Independent Cost As-
14 sessment activity conducted in fiscal year 2011,
15 fiscal year 2012, and fiscal year 2013;

16 (B) the purpose of the activity;

17 (C) identification of the primary NASA
18 unit or outside body that conducted the activity;

19 and

20 (D) key findings and recommendations.

21 (d) UPDATED REPORT.—Subsequent to submission
22 of the report under subsection (c), for each subsequent
23 year, the Administrator shall provide an update of listed
24 elements in conjunction with subsequent congressional
25 budget justifications.

1 **SEC. 609. AVOIDING ORGANIZATIONAL CONFLICTS OF IN-**
2 **TEREST IN MAJOR NASA ACQUISITION PRO-**
3 **GRAMS.**

4 (a) REVISED REGULATIONS REQUIRED.—Not later
5 than 270 days after the date of enactment of this Act,
6 the Administrator shall revise the NASA Supplement to
7 the Federal Acquisition Regulation to provide uniform
8 guidance and recommend revised requirements for organi-
9 zational conflicts of interest by contractors in major acqui-
10 sition programs in order to address elements identified in
11 subsection (b).

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

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

16 (A) lead system integrator contracts on
17 major acquisition programs and contracts that
18 follow lead system integrator contracts on such
19 programs, particularly contracts for production;

20 (B) the ownership of business units per-
21 forming systems engineering and technical as-
22 sistance functions, professional services, or
23 management support services in relation to
24 major acquisition programs by contractors who
25 simultaneously own business units competing to
26 perform as either the prime contractor or the

1 supplier of a major subsystem or component for
2 such programs;

3 (C) the award of major subsystem con-
4 tracts by a prime contractor for a major acqui-
5 sition program to business units or other affili-
6 ates of the same parent corporate entity, and
7 particularly the award of subcontracts for soft-
8 ware integration or the development of a pro-
9 prietary software system architecture; or

10 (D) the performance by, or assistance of,
11 contractors in technical evaluations on major
12 acquisition programs;

13 (2) ensure that NASA receives advice on sys-
14 tems architecture and systems engineering matters
15 with respect to major acquisition programs from ob-
16 jective sources independent of the prime contractor;

17 (3) require that a contract for the performance
18 of systems engineering and technical assistance
19 functions for a major acquisition program contains
20 a provision prohibiting the contractor or any affiliate
21 of the contractor from participating as a prime con-
22 tractor or a major subcontractor in the development
23 of a system under the program; and

24 (4) establish such limited exceptions to the re-
25 quirement in paragraphs (2) and (3) as may be nec-

1 essary to ensure that NASA has continued access to
2 advice on systems architecture and systems engi-
3 neering matters from highly-qualified contractors
4 with domain experience and expertise, while ensuring
5 that such advice comes from sources that are objec-
6 tive and unbiased.

7 **SEC. 610. FACILITIES AND INFRASTRUCTURE.**

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

10 (1) NASA must reverse the deteriorating condi-
11 tion of its facilities and infrastructure, as this condi-
12 tion is hampering the effectiveness and efficiency of
13 research performed by both NASA and industry par-
14 ticipants making use of NASA facilities, thus reduc-
15 ing the competitiveness of the United States aero-
16 space industry;

17 (2) NASA has a role in providing laboratory ca-
18 pabilities to industry participants that are economi-
19 cally viable as commercial entities and thus are not
20 available elsewhere;

21 (3) to ensure continued access to reliable and
22 efficient world-class facilities by researchers, NASA
23 should seek to establish strategic partnerships with
24 other Federal agencies, academic institutions, and
25 industry, as appropriate; and

1 (4) decisions on whether to dispose of, main-
2 tain, or modernize existing facilities must be made
3 in the context of meeting future NASA and other
4 Federal agencies' laboratory needs, including those
5 required to meet the activities supporting the Explo-
6 ration Roadmap required by section 202(c).

7 (b) POLICY.—It is the policy of the United States
8 that NASA maintain reliable and efficient facilities and
9 that decisions on whether to dispose of, maintain, or mod-
10 ernize existing facilities be made in the context of meeting
11 future NASA needs.

12 (c) PLAN.—The Administrator shall develop a plan
13 that has the goal of positioning NASA to have the facili-
14 ties, laboratories, tools, and approaches necessary to ad-
15 dress future NASA requirements. Such plan shall iden-
16 tify—

17 (1) future NASA research and development and
18 testing needs;

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

22 (A) the current National Space Policy;

23 (B) the National Aeronautics Research,
24 Development, Test and Evaluation (RDT&E)
25 Infrastructure Plan;

1 (C) NASA Authorization Acts; and

2 (D) the Roadmap specified in section
3 202(c);

4 (3) a strategy for the maintenance, repair, up-
5 grading, and modernization of NASA's laboratories,
6 facilities, and equipment;

7 (4) criteria for prioritizing deferred mainte-
8 nance tasks and also for upgrading or modernizing
9 laboratories, facilities, and equipment and imple-
10 menting processes, plans, and policies for guiding
11 Centers on whether to maintain, repair, upgrade, or
12 modernize a facility and for determining the type of
13 instrument to be used;

14 (5) an assessment of modifications needed to
15 maximize usage of facilities that offer unique and
16 highly specialized benefits to the aerospace industry
17 and the American public; and

18 (6) implementation steps, including a timeline,
19 milestones, and an estimate of resources required for
20 carrying out the plan.

21 (d) POLICY.—Not later than 180 days after enact-
22 ment of this Act, the Administrator shall establish and
23 make publically available a policy that guides the agency's
24 use of existing authorities to out-grant, lease, excess to
25 the General Services Administration, sell, decommission,

1 demolish, or otherwise transfer property, facilities, or in-
2 frastructure. This policy shall establish criteria for the use
3 of authorities, best practices, standardized procedures,
4 and guidelines for how to appropriately manage property,
5 infrastructure, and facilities.

6 (e) TRANSMITTAL.—Not later than one year after the
7 date of enactment of this Act, the Administrator shall
8 transmit the plan to the Committee on Science, Space, and
9 Technology of the House of Representatives and the Com-
10 mittee on Commerce, Science, and Transportation of the
11 Senate.

12 (f) ESTABLISHMENT OF CAPITAL FUND.—The Ad-
13 ministrator shall establish a capital fund for the mod-
14 ernization of facilities and laboratories. The Administrator
15 shall ensure to the maximum extent practicable that all
16 financial savings achieved by closing outdated or surplus
17 facilities at a NASA field center shall be made available
18 to that center for the purpose of modernizing the field cen-
19 ter's facilities and laboratories and for upgrading the in-
20 frastructure at the field center.

21 (g) REPORT ON CAPITAL FUND.—This fund shall re-
22 quire review and approval by the Administrator and the
23 status, including the amounts held in the Working Capital
24 Fund, shall be reported 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 in conjunction with annual budget
3 justifications.

4 **SEC. 612. DETECTION AND AVOIDANCE OF COUNTERFEIT**
5 **ELECTRONIC PARTS.**

6 (a) REGULATIONS.—

7 (1) IN GENERAL.—Not later than 270 days
8 after the date of the enactment of this Act, the Ad-
9 ministrator shall revise the NASA Supplement to
10 the Federal Acquisition Regulation to address the
11 detection and avoidance of counterfeit electronic
12 parts.

13 (2) CONTRACTOR RESPONSIBILITIES.—The re-
14 vised regulations issued pursuant to paragraph (1)
15 shall provide that—

16 (A) Administration contractors who supply
17 electronic parts or products that include elec-
18 tronic parts are responsible for detecting and
19 avoiding the use or inclusion of counterfeit elec-
20 tronic parts or suspect counterfeit electronic
21 parts in such products and for any rework or
22 corrective action that may be required to rem-
23 edy the use or inclusion of such parts; and

24 (B) the cost of counterfeit electronic parts
25 and suspect counterfeit electronic parts and the

1 cost of rework or corrective action that may be
2 required to remedy the use or inclusion of such
3 parts are not allowable costs under Agency con-
4 tracts, unless—

5 (i) the covered contractor has an oper-
6 ational system to detect and avoid counter-
7 feit parts and suspect counterfeit electronic
8 parts that has been reviewed and approved
9 by the Administration or the Department
10 of Defense;

11 (ii) the covered contractor provides
12 timely notice to the Administration pursu-
13 ant to paragraph (4); or

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

19 (3) SUPPLIERS OF ELECTRONIC PARTS.—The
20 revised regulations issued pursuant to paragraph (1)
21 shall—

22 (A) require that the Administration and
23 Administration contractors and subcontractors
24 at all tiers—

1 (i) obtain electronic parts that are in
2 production or currently available in stock
3 from the original manufacturers of the
4 parts or their authorized dealers, or from
5 suppliers who obtain such parts exclusively
6 from the original manufacturers of the
7 parts or their authorized dealers; and

8 (ii) obtain electronic parts that are
9 not in production or currently available in
10 stock from suppliers that meet qualifica-
11 tion requirements established pursuant to
12 subparagraph (C);

13 (B) establish documented requirements
14 consistent with published industry standards or
15 Government contract requirements for—

16 (i) notification of the Administration;
17 and

18 (ii) inspection, testing, and authen-
19 tication of electronic parts that the Admin-
20 istration or an Administration contractor
21 or subcontractor obtains from any source
22 other than a source described in subpara-
23 graph (A);

24 (C) establish qualification requirements,
25 consistent with the requirements of section

1 2319 of title 10, United States Code, pursuant
2 to which the Administration may identify sup-
3 pliers that have appropriate policies and proce-
4 dures in place to detect and avoid counterfeit
5 electronic parts and suspect counterfeit elec-
6 tronic parts; and

7 (D) authorize Administration contractors
8 and subcontractors to identify and use addi-
9 tional suppliers beyond those identified pursu-
10 ant to subparagraph (C), provided that—

11 (i) the standards and processes for
12 identifying such suppliers comply with es-
13 tablished industry standards;

14 (ii) the contractor or subcontractor
15 assumes responsibility for the authenticity
16 of parts provided by such suppliers as pro-
17 vided in paragraph (2); and

18 (iii) the selection of such suppliers is
19 subject to review and audit by appropriate
20 Administration officials.

21 (4) **TIMELY NOTIFICATION.**—The revised regu-
22 lations issued pursuant to paragraph (1) shall re-
23 quire that any Administration contractor or subcon-
24 tractor who becomes aware, or has reason to sus-
25 pect, that any end item, component, part, or mate-

1 rial contained in supplies purchased by the Adminis-
2 tration, or purchased by a contractor or subcon-
3 tractor for delivery to, or on behalf of, the Adminis-
4 tration, contains counterfeit electronic parts or sus-
5 pect counterfeit electronic parts, shall provide notifi-
6 cation to the applicable Administration contracting
7 officer within 30 calendar days.

8 (b) DEFINITIONS.—In this section, the term “elec-
9 tronic part” means a discrete electronic component, in-
10 cluding a microcircuit, transistor, capacitor, resistor, or
11 diode that is intended for use in a safety or mission critical
12 application.

13 **SEC. 613. SPACE ACT AGREEMENTS.**

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

19 (b) NEED.—A funded Space Act Agreement may be
20 used only when the use of a standard contract, grant, or
21 cooperative agreement is not feasible or appropriate, as
22 determined by the Associate Administrator for Procure-
23 ment.

24 (c) PUBLIC NOTICE AND COMMENT.—The Adminis-
25 trator shall make available for public notice and comment

1 each proposed Space Act Agreement at least 30 days be-
2 fore entering into such agreement, with appropriate
3 redactions for proprietary, sensitive, or classified informa-
4 tion.

5 (d) TRANSPARENCY.—The Administrator shall pub-
6 licly disclose on the Administration’s website and make
7 available in a searchable format all Space Act Agreements,
8 with appropriate redactions for proprietary, sensitive, or
9 classified information, not later than 60 days after such
10 agreement is signed.

11 (e) ANNUAL REPORT.—

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

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

23 (A) an indication of whether the agreement
24 is a reimbursable, nonreimbursable, or funded
25 Space Act Agreement;

- 1 (B) a description of—
- 2 (i) the subject and terms;
- 3 (ii) the parties;
- 4 (iii) the responsible—
- 5 (I) mission directorate;
- 6 (II) center; or
- 7 (III) headquarters element;
- 8 (iv) the value;
- 9 (v) the extent of the cost sharing
- 10 among Federal Government and non-Fed-
- 11 eral sources;
- 12 (vi) the time period or schedule; and
- 13 (vii) all milestones; and
- 14 (C) an indication of whether the agreement
- 15 was renewed during the previous fiscal year.
- 16 (3) ANTICIPATED AGREEMENTS.—The report
- 17 shall also include a list of all anticipated reimburs-
- 18 able, nonreimbursable, and funded Space Act Agree-
- 19 ments for the upcoming fiscal year.
- 20 (4) CUMULATIVE PROGRAM BENEFITS.—The
- 21 report shall also include, with respect to the Space
- 22 Act Agreements covered by the report, a summary
- 23 of—
- 24 (A) the technology areas in which research
- 25 projects were conducted under such agreements;

1 (B) the extent to which the use of the
2 Space Act Agreements—

3 (i) has contributed to a broadening of
4 the technology and industrial base avail-
5 able for meeting Administration needs; and

6 (ii) has fostered within the technology
7 and industrial base new relationships and
8 practices that support the United States;
9 and

10 (C) the total amount of value received by
11 the Federal Government during the fiscal year
12 pursuant to such Space Act Agreements.

