

**AMENDMENT IN THE NATURE OF A SUBSTITUTE
TO H.R. 2687
OFFERED BY 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 2013”.

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. Sense of Congress.
Sec. 102. Fiscal year 2014.
Sec. 103. Fiscal year 2015.
Sec. 104. Fiscal year 2016.

TITLE II—HUMAN EXPLORATION AND OPERATIONS

Subtitle A—Exploration

Sec. 201. Goal.
Sec. 202. Roadmap.
Sec. 203. Sense of Congress on international participation.
Sec. 204. Exploration systems development.
Sec. 205. Space radiation.
Sec. 206. Participatory exploration.
Sec. 207. Sense of Congress on science and exploration.
Sec. 208. Planetary protection for human exploration missions.

Subtitle B—International Space Station

Sec. 211. Objectives and policy.

- Sec. 212. Sense of Congress regarding operation and utilization of the ISS beyond 2020.
- Sec. 213. Prohibition on precluding ISS operations beyond 2020.
- Sec. 214. Criteria for extending ISS operations beyond 2020.
- Sec. 215. ISS cargo resupply services lessons learned.
- Sec. 216. Crew transportation to and from the ISS.
- Sec. 217. Commercial crew transportation development independent review.
- Sec. 218. Integrated plan to effect maximum utilization of the ISS.
- Sec. 219. Centrifuge.
- Sec. 220. Management of the ISS National Laboratory.
- Sec. 221. Barriers impeding enhanced utilization of the ISS's National Laboratory by commercial companies.

Subtitle C—Other Operations

- Sec. 231. Integrated space communications network and infrastructure.

TITLE III—SCIENCE

Subtitle A—Space Science

- Sec. 301. Sense of Congress regarding a balanced space science program.
- Sec. 302. Sense of Congress regarding integrated testing of James Webb Space Telescope.
- Sec. 303. Sense of Congress regarding WFIRST mission.
- Sec. 304. Astrobiology science strategy.
- Sec. 305. Assessment of Mars architecture.
- Sec. 306. Radioisotope thermoelectric generators.
- Sec. 307. University class science missions.

Subtitle B—Earth Science

- Sec. 311. Sense of Congress.
- Sec. 312. Comprehensive Earth observation systems and research program.
- Sec. 313. Study on sustained, long-term measurements.
- Sec. 314. Assessment.
- Sec. 315. Continuity of moderate resolution land imaging remote sensing data.
- Sec. 316. Venture class missions.

TITLE IV—AERONAUTICS

- Sec. 401. Sense of Congress.
- Sec. 402. Aeronautics research goals.
- Sec. 403. Strategic planning for aeronautics research.
- Sec. 404. Research program to determine perceived impact of sonic booms.
- Sec. 405. Research program to facilitate greater use of composite materials in aircraft.
- Sec. 406. Transformative aeronautics research.
- Sec. 407. United States leadership in aeronautics research.

TITLE V—SPACE TECHNOLOGY PROGRAM

- Sec. 501. Sense of Congress.
- Sec. 502. Space technology program.

TITLE VI—ACQUISITION MANAGEMENT

- Sec. 601. Project and program reserves.

- Sec. 602. Cost estimation.
- Sec. 603. Independent reviews.
- Sec. 604. Avoiding organizational conflicts of interest in major NASA acquisition programs.
- Sec. 605. Managing termination liability.

TITLE VII—OTHER PROVISIONS

- Sec. 701. Facilities and infrastructure.
- Sec. 702. NASA education program.
- Sec. 703. Independent review of the National Space Grant College and Fellowship Program.
- Sec. 704. Review of practices to detect and prevent the use of counterfeit parts.
- Sec. 705. Remote satellite servicing demonstrations.
- Sec. 706. Astronaut occupational healthcare.
- Sec. 707. Use of operational commercial suborbital vehicles for research, development, and education.
- Sec. 708. Fundamental space life and physical sciences research.
- Sec. 709. Restoring NASA's commitment to engineering research.
- Sec. 710. Near-Earth objects detection.
- Sec. 711. Research on near-Earth object tsunami effects.
- Sec. 712. Review of orbital debris removal concepts.

1 **SEC. 2. DEFINITIONS.**

2 In this Act:

3 (1) ADMINISTRATOR.—The term “Adminis-
4 trator” means the Administrator of the National
5 Aeronautics and Space Administration.

6 (2) COVERED PROGRAM.—The term “covered
7 program” means the International Space Station,
8 the Space Launch System, the Orion multipurpose
9 crew vehicle, and the James Webb Space Telescope.

10 (3) DOE.—The term “DOE” means the De-
11 partment of Energy.

12 (4) ISS.—The term “ISS” means the Inter-
13 national Space Station.

14 (5) NASA.—The term “NASA” means the Na-
15 tional Aeronautics and Space Administration.

1 (6) NOAA.—The term “NOAA” means the Na-
2 tional Oceanic and Atmospheric Administration.

3 (7) PRIME CONTRACTOR.—The term “prime
4 contractor” means a person or entity contracting di-
5 rectly with the Federal Government on a covered
6 program.

7 (8) SAFETY, SECURITY, AND WORKFORCE SUP-
8 PORT PROGRAMS.—The term “Safety, Security, and
9 Workforce Support Programs” means the programs
10 and activities accounted for in the “Cross-Agency
11 Support Programs” accounts in the National Aero-
12 nautics and Space Administration Authorization Act
13 of 2010, and subsequent appropriations Acts.

14 (9) SECRETARY.—The term “Secretary” means
15 the Secretary of the Interior.

16 **TITLE I—AUTHORIZATION OF** 17 **APPROPRIATIONS**

18 **SEC. 101. SENSE OF CONGRESS.**

19 It is the sense of Congress that a strong, robust
20 NASA program is in the national interest. Ensuring that
21 NASA can continue to pursue cutting-edge space and
22 aeronautical research and development activities and push
23 back the frontier of space exploration requires a sustained
24 and adequate commitment in resources. However, NASA’s
25 share of the Federal discretionary budgetary authority has

1 declined significantly relative to even its post-Apollo his-
2 torical average. Challenging goals cannot be reached and
3 multimission responsibilities cannot be fulfilled with the
4 consistent erosion of purchasing power and unstable fund-
5 ing, which NASA has experienced in recent years. It
6 should be a national goal to restore NASA's funding to
7 a level of one percent of the annual Federal budget.

8 **SEC. 102. FISCAL YEAR 2014.**

9 There are authorized to be appropriated to NASA for
10 fiscal year 2014, \$18,100,000,000, as follows:

11 (1) For Exploration, \$4,220,800,000, of
12 which—

13 (A) \$1,650,000,000 shall be for the Space
14 Launch System, \$1,230,000,000 shall be for
15 the Orion multipurpose crew vehicle, and
16 \$318,200,000 shall be for Exploration Ground
17 Systems;

18 (B) \$322,600,000 shall be for Exploration
19 Research and Development; and

20 (C) \$700,000,000 shall be for Commercial
21 Spaceflight.

22 (2) For Space Operations, \$3,761,700,000, of
23 which—

1 (A) \$2,927,900,000 shall be for the ISS
2 program, of which \$230,900,000 shall be for
3 ISS research; and

4 (B) \$833,800,000 shall be for Space and
5 Flight Support.

6 (3) For Science, \$5,300,300,000, of which—

7 (A) \$1,846,100,000 shall be for Earth
8 Sciences;

9 (B) \$1,500,000,000 shall be for Planetary
10 Science;

11 (C) \$642,300,000 shall be for Astro-
12 physics;

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

15 (E) \$653,700,000 shall be for
16 Heliophysics.

17 (4) For Aeronautics, \$569,400,000.

18 (5) For Space Technology, \$615,000,000.

19 (6) For Education, \$136,100,000.

20 (7) For Safety, Security, and Workforce Sup-
21 port Programs, \$2,850,300,000.

22 (8) For Construction and Environmental Com-
23 pliance and Restoration, \$609,400,000, of which
24 \$142,300,000 shall be for Exploration Construction
25 of Facilities.

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

2 **SEC. 103. FISCAL YEAR 2015.**

3 There are authorized to be appropriated to NASA for
4 fiscal year 2015, \$18,462,000,000, as follows:

5 (1) For Exploration, \$4,436,200,000, of
6 which—

7 (A) \$1,750,000,000 shall be for the Space
8 Launch System, \$1,235,000,000 shall be for
9 the Orion multipurpose crew vehicle, and
10 \$408,400,000 shall be for Exploration Ground
11 Systems;

12 (B) \$342,800,000 shall be for Exploration
13 Research and Development; and

14 (C) \$700,000,000 shall be for Commercial
15 Spaceflight.

16 (2) For Space Operations, \$4,042,400,000, of
17 which—

18 (A) \$3,197,300,000 shall be for the ISS
19 program, of which \$244,300,000 shall be for
20 ISS research; and

21 (B) \$845,100,000 shall be for Space and
22 Flight Support.

23 (3) For Science, \$5,293,100,000, of which—

24 (A) \$1,854,600,000 shall be for Earth
25 Sciences;

1 (B) \$1,500,000,000 shall be for Planetary
2 Science;

3 (C) \$660,000,000 shall be for Astro-
4 physics;

5 (D) \$645,400,000 shall be for the James
6 Webb Space Telescope; and

7 (E) \$633,100,000 shall be for
8 Heliophysics.

9 (4) For Aeronautics, \$581,000,000.

10 (5) For Space Technology, \$645,000,000.

11 (6) For Education, \$136,100,000.

12 (7) For Safety, Security, and Workforce Sup-
13 port Programs, \$2,850,300,000.

14 (8) For Construction and Environmental Com-
15 pliance and Restoration, \$440,900,000.

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

17 **SEC. 104. FISCAL YEAR 2016.**

18 There are authorized to be appropriated to NASA for
19 fiscal year 2016, \$18,868,000,000, as follows:

20 (1) For Exploration, \$4,534,200,000, of
21 which—

22 (A) \$1,800,000,000 shall be for the Space
23 Launch System; \$1,260,000,000 shall be for
24 the Orion multipurpose crew vehicle; and

1 \$414,200,000 shall be for Exploration Ground
2 Systems;

3 (B) \$360,000,000 shall be for Exploration
4 Research and Development; and

5 (C) \$700,000,000 shall be for Commercial
6 Spaceflight.

7 (2) For Space Operations, \$4,133,300,000, of
8 which—

9 (A) \$3,319,500,000 shall be for the ISS
10 program, of which \$272,200,000 shall be for
11 ISS research; and

12 (B) \$813,800,000 shall be for Space and
13 Flight Support.

14 (3) For Science, \$5,305,600,000 of which—

15 (A) \$1,848,800,000 shall be for Earth
16 Sciences;

17 (B) \$1,500,000,000 shall be for Planetary
18 Science;

19 (C) \$700,000,000 shall be for Astro-
20 physics;

21 (D) \$620,000,000 shall be for the James
22 Webb Space Telescope; and

23 (E) \$636,800,000 shall be for
24 Heliophysics.

25 (4) For Aeronautics, \$593,800,000.

1 (5) For Space Technology, \$720,000,000.

2 (6) For Education, \$136,100,000.

3 (7) For Safety, Security, and Workforce Sup-
4 port Programs, \$2,937,000,000.

5 (8) For Construction and Environmental Com-
6 pliance and Restoration, \$471,000,000.

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

8 **TITLE II—HUMAN EXPLORATION**
9 **AND OPERATIONS**

10 **Subtitle A—Exploration**

11 **SEC. 201. GOAL.**

12 The goal of NASA's Exploration program shall be to
13 successfully conduct a crewed mission to the surface of
14 Mars to begin the human exploration of that planet as
15 part of a broader national goal of human and robotic ex-
16 ploration of the solar system. NASA's exploration activi-
17 ties and investments shall be organized towards the
18 achievement of that goal. Potential exploration and utiliza-
19 tion of the Moon, cis-lunar space, near-Earth asteroids,
20 Lagrangian points, and Martian moons may be pursued
21 as interim destinations to the extent that they make sig-
22 nificant contributions to the achievement of that goal.

1 **SEC. 202. ROADMAP.**

2 (a) IN GENERAL.—The Administrator shall establish
3 a roadmap to guide NASA’s planning for the achievement
4 of the goal established in section 201.

5 (b) REQUIREMENTS.—

6 (1) IN GENERAL.—The roadmap shall include
7 information on the phasing of planned intermediate
8 destinations, Mars mission risk areas and potential
9 risk mitigation approaches, technology requirements
10 and phasing of required technology development ac-
11 tivities, the management strategy to be followed, re-
12 lated ISS activities, any planned international col-
13 laborative activities, potential commercial contribu-
14 tions, and other activities relevant to the achieve-
15 ment of the goal established in section 201.

16 (2) INITIAL ROADMAP REQUIREMENT.—The
17 first roadmap transmitted under subsection (c)(1)
18 shall also include an explicit analysis of—

19 (A) the technical requirements for pur-
20 suing a roadmap to Mars that includes a
21 human and robotic return to the lunar surface;

22 (B) the extent to which inclusion of that
23 intermediate destination would assist in the
24 achievement of the goal established in section
25 201; and

1 (C) the scope of international participation
2 that might be anticipated and the potential ben-
3 efits from such participation if such an inter-
4 mediate destination were to be selected.

5 (3) PARTICIPATION.—The development of the
6 roadmap shall, to the maximum extent practicable,
7 involve the participation of the ISS partnership in
8 its preparation.

9 (c) TRANSMITTAL.—

10 (1) INITIAL ROADMAP DEADLINE.—The first
11 roadmap shall be transmitted to the Committee on
12 Science, Space, and Technology of the House of
13 Representatives and the Committee on Commerce,
14 Science, and Transportation of the Senate concu-
15 rrently with its submission to the Office of Manage-
16 ment and Budget and prior to when the budget for
17 fiscal year 2015 is transmitted to Congress under
18 section 1105(a) of title 31, United States Code.

19 (2) ANNUAL UPDATE.—The roadmap shall be
20 updated annually and transmitted to the Committee
21 on Science, Space, and Technology of the House of
22 Representatives and the Committee on Commerce,
23 Science, and Transportation of the Senate with the
24 budget for that fiscal year transmitted to Congress

1 under section 1105(a) of title 31, United States
2 Code.

3 **SEC. 203. SENSE OF CONGRESS ON INTERNATIONAL PAR-**
4 **TICIPATION.**

5 It is the sense of Congress that the President should
6 invite the United States partners in the ISS program and
7 other nations, as appropriate, to participate in an inter-
8 national initiative under the leadership of the United
9 States to achieve the goal of successfully conducting a
10 crewed mission to the surface of Mars.

11 **SEC. 204. EXPLORATION SYSTEMS DEVELOPMENT.**

12 (a) IN GENERAL.—Given the critical importance of
13 a heavy-lift launch vehicle and crewed spacecraft to enable
14 the achievement of the goal established in section 201, as
15 well as to the accomplishment of intermediate exploration
16 milestones and the provision of a backup capability to
17 transfer crew and cargo to the ISS, the Administrator
18 shall make the expeditious development, test, and achieve-
19 ment of operational readiness of the Space Launch System
20 and the Orion multipurpose crew vehicle the highest pri-
21 ority of the Exploration program. In order to promote
22 safety and reduce programmatic risk, the Administrator
23 shall budget for and undertake a robust ground test and
24 uncrewed and crewed flight test and demonstration pro-
25 gram for the Space Launch System and the Orion multi-

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

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

18 (c) SENSE OF CONGRESS.—It is the sense of Con-
19 gress that the President’s annual budget requests for the
20 Space Launch System and Orion multipurpose crew vehi-
21 cle development, test, and operational phases should strive
22 to accurately reflect the resource requirements of each of
23 those phases, consistent with subsection (a).

24 **SEC. 205. SPACE RADIATION.**

25 (a) STRATEGY AND PLAN.—

1 (1) IN GENERAL.—The Administrator shall de-
2 velop a space radiation mitigation and management
3 strategy and implementation plan to enable the
4 achievement of the goal established in section 201
5 that includes key research and monitoring require-
6 ments, milestones, a timetable, and an estimate of
7 facility and budgetary requirements.

8 (2) COORDINATION.—The strategy shall include
9 a mechanism for coordinating NASA research, tech-
10 nology, facilities, engineering, operations, and other
11 functions required to support the strategy and plan.

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

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

1 **SEC. 206. PARTICIPATORY EXPLORATION.**

2 The Administrator shall identify opportunities to—

3 (1) leverage technologies in NASA's Explo-
4 ration program to deliver a rich, multimedia experi-
5 ence to the public; and

6 (2) facilitate participation by the public, the
7 private sector, nongovernmental organizations, and
8 international partners in outreach efforts related to
9 the Exploration program.

10 **SEC. 207. SENSE OF CONGRESS ON SCIENCE AND EXPLORATION.**

11 It is the sense of Congress that the Administrator
12 should strive to make use of the synergies between science
13 and human exploration in ways that maximize the benefits
14 to both sets of activities.

15 **SEC. 208. PLANETARY PROTECTION FOR HUMAN EXPLORATION MISSIONS.**

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

22 (b) SCOPE.—The study shall—

23 (1) collate and summarize what has been done
24 to date with respect to planetary protection meas-

1 ures to be applied to human missions to the lunar
2 polar regions, near-Earth asteroids, the moons of
3 Mars, and the surface of Mars;

4 (2) identify and document planetary protection
5 concerns associated with human missions to the
6 lunar polar regions, near-Earth asteroids, the moons
7 of Mars, and the surface of Mars;

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

11 (4) assess likely methodologies for addressing
12 planetary protection concerns; and

13 (5) identify areas for future research to reduce
14 current uncertainties.

15 (c) COMPLETION DATE.—Not later than 2 years
16 after the date of enactment of this Act, the Administrator
17 shall provide the results of the study 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 **Subtitle B—International Space** 22 **Station**

23 **SEC. 211. OBJECTIVES AND POLICY.**

24 The United States ISS program shall have two pri-
25 mary objectives: supporting achievement of the goal estab-

1 lished in section 201 and pursuing a research program
2 that advances knowledge and provides benefits to society.
3 It shall continue to be the policy of the United States to,
4 in consultation with its international partners in the ISS
5 program, support full and complete utilization of the ISS
6 through at least 2020.

7 **SEC. 212. SENSE OF CONGRESS REGARDING OPERATION**
8 **AND UTILIZATION OF THE ISS BEYOND 2020.**

9 It is the sense of Congress that the operation and
10 utilization of the ISS beyond 2020 should be considered
11 if the Administrator determines that the ISS is func-
12 tioning as a productive research facility in the years prior
13 to 2020 or that operation and utilization of the ISS past
14 2020 is essential for the achievement of the goal estab-
15 lished in section 201, and the Administrator's determina-
16 tion is validated by an independent external review.

17 **SEC. 213. PROHIBITION ON PRECLUDING ISS OPERATIONS**
18 **BEYOND 2020.**

19 The Administrator shall take no steps that would pre-
20 clude continued United States operation and utilization of
21 the ISS after 2020.

22 **SEC. 214. CRITERIA FOR EXTENDING ISS OPERATIONS BE-**
23 **YOND 2020.**

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

1 (1) establish specific criteria for determining
2 how long the ISS can and should continue oper-
3 ations; and

4 (2) identify the actions needed to deorbit the
5 ISS once a decision is made to deorbit the labora-
6 tory.

7 (b) REPORT.—The Administrator shall transmit a re-
8 port to the Committee on Science, Space, and Technology
9 of the House of Representatives and the Committee on
10 Commerce, Science, and Transportation of the Senate doc-
11 umenting such criteria and deorbit actions not later than
12 180 days after the date of enactment of this Act.

13 **SEC. 215. ISS CARGO RESUPPLY SERVICES LESSONS**
14 **LEARNED.**

15 Not later than 120 days after the date of enactment
16 of this Act, the Administrator shall transmit a report to
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 that—

20 (1) identifies the lessons learned to date from
21 the Commercial Resupply Services contract;

22 (2) indicates whether changes are needed to the
23 manner in which NASA procures and manages simi-
24 lar services upon the expiration of the existing Com-
25 mercial Resupply Services contract; and

1 (3) identifies any lessons learned from the Com-
2 mercial Resupply Services contract that should be
3 applied to the procurement and management of com-
4 mercially provided crew transfer services to and
5 from the ISS.

6 **SEC. 216. CREW TRANSPORTATION TO AND FROM THE ISS.**

7 (a) OBJECTIVE.—The objective of NASA’s Commer-
8 cial Crew Program shall be to assist the development of
9 at least one crew transportation system to carry NASA
10 astronauts safely, reliably, and affordably to and from the
11 ISS and to serve as an emergency crew rescue vehicle as
12 soon as practicable within the funding levels authorized
13 in this Act.

14 (b) SENSE OF CONGRESS.—It is the sense of Con-
15 gress that once developed and certified to meet NASA’s
16 safety and reliability requirements, United States commer-
17 cially provided crew transportation systems offer the po-
18 tential of serving as the primary means of transporting
19 American astronauts and international partner astronauts
20 to and from the ISS and serving as ISS emergency crew
21 rescue vehicles. At the same time, the budgetary assump-
22 tions used by NASA in its planning for the Commercial
23 Crew Program have consistently assumed significantly
24 higher funding levels than have historically been author-
25 ized and appropriated by Congress. It is the sense of Con-

1 gress that credibility in the Administration’s budgetary es-
2 timates for the Commercial Crew Program can be en-
3 hanced by an independently developed cost estimate. It is
4 further the sense of Congress that this lack of budgetary
5 realism in the planning process creates unnecessary ineffi-
6 ciencies and increased programmatic risk, and NASA
7 should thus adjust its planning process to realistically re-
8 flect the levels of funding authorized in this Act. NASA’s
9 plans indicate that it will not be able to begin contracted-
10 for crew transportation resupply operational flights until
11 fiscal year 2018 even under its optimistic funding assump-
12 tions, which means that NASA is not likely to have a re-
13 quirement for more than a total of 8 commercially pro-
14 vided crew rotation flights prior to the expiration of the
15 current Congressional commitment to continued operation
16 of the ISS in 2020. Thus, it is also the sense of Congress
17 that the highest priority of the Commercial Crew Program
18 should be assisting the development of a safe, reliable, and
19 affordable crew transportation system for transporting
20 NASA astronauts to and from the ISS as soon as prac-
21 ticable within the funding levels authorized in this Act
22 rather than making a specific date for the initiation of
23 operational service drive the program planning.

24 (c) INDEPENDENT COST ESTIMATE.—

1 (1) REQUIREMENT.—Not later than 30 days
2 after the Federal Acquisition Regulation-based con-
3 tract described in subsection (d)(2) is awarded, the
4 Administrator shall arrange for the initiation of an
5 Independent Cost Estimate for—

6 (A) all activities associated with the devel-
7 opment, test, demonstration, and certification
8 of commercial crew transportation systems; and

9 (B) transportation and rescue services re-
10 quired by NASA for ISS operations through
11 calendar year 2020 or later if NASA require-
12 ments so dictate.

13 (2) TRANSMITTAL.—Not later than one year
14 after initiation of the Independent Cost Estimate
15 under paragraph (1), the Administrator shall trans-
16 mit the results of the Independent Cost Estimate to
17 the Committee on Science, Space, and Technology of
18 the House of Representatives and the Committee on
19 Commerce, Science, and Transportation of the Sen-
20 ate.

21 (d) ACQUISITION APPROACH.—

22 (1) RESTRICTION.—The Administrator shall
23 not exercise any optional milestones beyond the base
24 period of the Space Act Agreements established

1 under the Commercial Crew Integrated Capability
2 initiative.

3 (2) SOURCE SELECTION.—To cover all develop-
4 ment, test, demonstration, and certification activities
5 not included in the base period of the Commercial
6 Crew Integrated Capability Space Act Agreements,
7 the Administrator shall conduct a Federal Acquisi-
8 tion Regulation-based competitive source selection
9 for a cost plus incentive fee contract for all activities
10 related to the development, test, demonstration, and
11 certification of one or more commercially provided
12 crew transportation systems to transport NASA as-
13 tronauts to and from the ISS and serve as an emer-
14 gency crew rescue vehicle as soon as practicable
15 under the authorized funding and while ensuring
16 that all safety requirements are met. The number of
17 systems selected shall be consistent with the funding
18 levels authorized in this Act. The Administrator
19 shall identify a methodology by which NASA will en-
20 sure that the Government is not charged for con-
21 tractor costs incurred during development, testing,
22 demonstration, and certification activities by an
23 awardee of the Federal Acquisition Regulation-based
24 contract for operational commercial crew transpor-
25 tation services.

1 (3) COST MINIMIZATION.—The Administrator
2 shall strive through the competitive selection process
3 to minimize the life cycle cost to NASA through the
4 planned period of commercially provided crew trans-
5 portation services.

6 (e) SAFETY.—Consistent with the findings and rec-
7 ommendations of the Columbia Accident Investigation
8 Board, the Administrator shall seek to ensure that mini-
9 mization of the probability of loss of crew shall be an im-
10 portant selection criterion in the competitive selection de-
11 scribed in subsection (d).

12 (f) DETERMINATION OF COST-EFFECTIVENESS OF
13 SERVICES.—NASA, prior to contracting for commercial
14 crew transportation services, shall identify the manner by
15 which it will establish whether such transportation services
16 provide an equally or more cost-effective alternative to
17 current services.

18 (g) OPERATIONAL SERVICES CONTRACT.—

19 (1) IN GENERAL.—The Administrator may not
20 enter into a contract for commercially provided crew
21 transportation services developed and certified as de-
22 scribed in subsection (b) in which the price per seat
23 or total amount charged per year shall be greater
24 than the amount charged per seat or on an annual

1 basis for Soyuz crew transfer services agreed to on
2 April 22, 2013.

3 (2) REPORT.—Not later than 60 days before
4 entering into a contract for commercial crew trans-
5 portation services, the Administrator shall provide a
6 report to the Committee on Science, Space, and
7 Technology of the House of Representatives and the
8 Committee on Commerce, Science, and Transpor-
9 tation of the Senate identifying the methodology and
10 criteria by which the Administrator determined that
11 the price per seat or total annual amount charged
12 per year of procured commercial transportation serv-
13 ices is not greater than the amount charged per seat
14 for Soyuz crew transfer services agreed to on April
15 22, 2013. The Administrator shall also certify, using
16 the methodology identified pursuant to subsection
17 (d)(2), that the service transportation costs con-
18 tracted for do not include contractor costs incurred
19 during development, testing, demonstration, and cer-
20 tification activities. If the Administrator determines
21 that NASA is unable to enter into a contract under
22 the terms specified in paragraph (1), the Adminis-
23 trator shall report that determination to the Com-
24 mittee on Science, Space, and Technology of the
25 House of Representatives and the Committee on

1 Commerce, Science, and Transportation of the Sen-
2 ate, and shall also report what alternative contract
3 arrangement the Administrator will seek to enter
4 into at least 60 days before entering into such an al-
5 ternative contract.

6 **SEC. 217. COMMERCIAL CREW TRANSPORTATION DEVELOP-**
7 **MENT INDEPENDENT REVIEW.**

8 (a) IN GENERAL.—The congressionally established
9 Aerospace Safety Advisory Panel (ASAP) shall conduct a
10 review to determine whether NASA has—

11 (1) adequate assurance that the requirements,
12 standards, and processes for commercial transpor-
13 tation systems developed with NASA funding are
14 held to the same safety standards as Government
15 human spaceflight missions; and

16 (2) developed a procedure to provide inde-
17 pendent assurance of flight safety and flight readi-
18 ness before the authorization of United States Gov-
19 ernment personnel to participate as crew onboard
20 any commercial space transportation system.

21 (b) REPORT.—Not later than 1 year after the date
22 of enactment of this Act, the Aerospace Safety Advisory
23 Panel shall transmit to the Committee on Science, Space,
24 and Technology of the House of Representatives and the

1 Committee on Commerce, Science, and Transportation of
2 the Senate a report describing—

3 (1) the Panel’s assessment of NASA’s certifi-
4 cation strategy, specifications, and guidance;

5 (2) the Panel’s view of the mandatory safety re-
6 quirements that must be met; and

7 (3) the steps NASA and the commercial space
8 industry need to take to ensure that commercial
9 crew transportation and rescue vehicles have require-
10 ments, standards, and processes equivalent to those
11 of NASA.

12 (c) PROHIBITION AGAINST FINANCIAL COMMITMENT
13 PRIOR TO ASAP REPORT.—The Administrator may not
14 enter into any financially-binding contract with a commer-
15 cial space transportation services provider for crew trans-
16 portation services until 30 days after the Committees’ re-
17 ceipt of the report under subsection (b).

18 (d) CERTIFICATION.—The Administrator may not
19 enter into any financially binding contract with a commer-
20 cial space transportation services provider for crew trans-
21 portation services until—

22 (1) the Administrator has transmitted to the
23 Committee on Science, Space, and Technology of the
24 House of Representatives and the Committee on

1 Commerce, Science, and Transportation of the Sen-
2 ate a certification that—

3 (A) the provider with which a contract is
4 planned has demonstrated the safety and reli-
5 ability of its systems for crew transportation
6 and crew rescue to be equivalent to NASA-pro-
7 mulgated safety and reliability policies, proce-
8 dures, and standards for human spaceflight;
9 and

10 (B) successful flight experience accrued
11 has provided NASA with sufficient safety-re-
12 lated and reliability-related data and informa-
13 tion to make an informed assessment about the
14 flight readiness; and

15 (2) all indemnification and liability issues asso-
16 ciated with the use of such systems by the United
17 States Government have been addressed, and the
18 Administrator has transmitted to the Committee on
19 Science, Space, and Technology of the House of
20 Representatives and the Committee on Commerce,
21 Science, and Transportation of the Senate a report
22 describing the indemnification and liability provi-
23 sions that are planned to be included in such con-
24 tracts.

1 **SEC. 218. INTEGRATED PLAN TO EFFECT MAXIMUM UTILI-**
2 **ZATION OF THE ISS.**

3 (a) PURPOSE.—NASA shall seek to maximize the
4 productivity and use of the ISS with respect to scientific
5 and technological research and development, advancement
6 of space exploration, and international collaboration.

7 (b) PLAN.—NASA shall develop an up-to-date, com-
8 prehensive, and integrated plan to achieve the purpose
9 stated in subsection (a) that includes—

10 (1) a list of planned activities, including any ac-
11 tivities in support of the goal established in section
12 201, that the Administrator believes require exten-
13 sion of the ISS beyond 2020 to carry out, along with
14 the rationale for carrying out those activities;

15 (2) funding requirements;

16 (3) research or technology objectives to be
17 achieved, including those established to enable the
18 achievement of the goal established in section 201;

19 (4) success criteria; and

20 (5) the details of—

21 (A) the specific objectives for using the
22 ISS through 2020;

23 (B) priorities attributed to these objectives;

24 (C) resources required to achieve these ob-
25 jectives on an annual basis;

1 (D) how NASA will achieve those objec-
2 tives and how Congress can measure NASA's
3 progress on those objectives;

4 (E) key assumptions driving the plan; and

5 (F) what NASA will do with the unused
6 capacity and capabilities of the ISS if potential
7 users of the National Laboratory decide not to
8 make significant use of it.

9 (c) REPORT.—Not later than 180 days after the date
10 of enactment of this Act, the Administrator shall provide
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, and
14 concurrently to the Office of Management and Budget, the
15 plan developed under subsection (b).

16 **SEC. 219. CENTRIFUGE.**

17 If a commitment is made to extend ISS operation and
18 utilization past 2020, the Administrator shall take all nec-
19 essary steps to provide for the inclusion on the ISS of a
20 variable gravity centrifuge of sufficient size and capability
21 to support both plant and animal research, along with nec-
22 essary support facilities, as soon as practicable.

1 **SEC. 220. MANAGEMENT OF THE ISS NATIONAL LABORA-**
2 **TORY.**

3 (a) **ASSESSMENT.**—The Administrator shall enter
4 into an arrangement with the National Academies for an
5 independent assessment of the status of and performance
6 under the cooperative agreement with the Center for the
7 Advancement of Science in Space (CASIS) for the man-
8 agement of the portion of the ISS that operates as a
9 United States National Laboratory.

10 (b) **REPORT.**—Not later than 1 year after the date
11 of enactment of this Act, the Administrator shall transmit
12 to the Committee on Science, Space, and Technology of
13 the House of Representatives and the Committee on Com-
14 merce, Science, and Transportation of the Senate a report
15 containing the independent assessment conducted pursu-
16 ant to subsection (a). The report shall address—

17 (1) the extent to which CASIS is helping to en-
18 sure that the ISS's unique capabilities are available
19 to the broadest possible cross section of United
20 States scientific, technological, and industrial com-
21 munities;

22 (2) the status of CASIS's development and
23 management of a varied research and development
24 portfolio based on United States national needs;

1 (3) progress in establishing a marketplace to fa-
2 cilitate matching research pathways with qualified
3 funding sources;

4 (4) efforts to stimulate interest in using the
5 National Laboratory for research and technology
6 demonstrations and as a platform for science, tech-
7 nology, engineering, and mathematics (STEM) edu-
8 cation; and

9 (5) the status of NASA’s efforts to transition
10 responsibilities to CASIS for managing the National
11 Laboratory research portfolio, including planning
12 and coordinating ground and on-orbit research ac-
13 tivities.

14 **SEC. 221. BARRIERS IMPEDING ENHANCED UTILIZATION OF**
15 **THE ISS’S NATIONAL LABORATORY BY COM-**
16 **MERCIAL COMPANIES.**

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

19 (1) enhanced utilization of the ISS’s National
20 Laboratory requires a full understanding of the bar-
21 riers impeding such utilization and actions needed to
22 be taken to remove or mitigate them to the max-
23 imum extent practicable; and

1 (2) doing so will allow NASA to encourage com-
2 mercial companies to invest in microgravity research
3 using National Laboratory research facilities.

4 (b) ASSESSMENT.—The Administrator shall enter
5 into an arrangement with the National Academies for an
6 assessment to—

7 (1) identify barriers impeding enhanced utiliza-
8 tion of the ISS’s National Laboratory;

9 (2) recommend ways to encourage commercial
10 companies to make greater use of the ISS’s National
11 Laboratory, including corporate investment in micro-
12 gravity research; and

13 (3) identify any legislative changes that may be
14 required.

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

21 **Subtitle C—Other Operations**

22 **SEC. 231. INTEGRATED SPACE COMMUNICATIONS NET-** 23 **WORK AND INFRASTRUCTURE.**

24 (a) PLAN.—The Administrator shall prepare an up-
25 dated plan for NASA’s near-Earth, space, and deep space

1 communications network and infrastructure. The plan
2 shall—

3 (1) identify steps to sustain the existing net-
4 work and infrastructure;

5 (2) assess the capabilities, including any up-
6 grades, needed to support NASA's programs;

7 (3) identify priorities for how resources should
8 be used to implement the plan; and

9 (4) assess the impact on missions if resources
10 are not secured at the level needed.

11 (b) TRANSMITTAL.—Not later than 270 days after
12 the date of enactment of this Act, the Administrator shall
13 transmit the plan to the Committee on Science, Space, and
14 Technology of the House of Representatives and the Com-
15 mittee on Commerce, Science, and Transportation of the
16 Senate.

17 **TITLE III—SCIENCE**

18 **Subtitle A—Space Science**

19 **SEC. 301. SENSE OF CONGRESS REGARDING A BALANCED** 20 **SPACE SCIENCE PROGRAM.**

21 It is the sense of Congress that a balanced and ade-
22 quately funded set of activities consistent with the prior-
23 ities identified in the National Academies' decadal surveys
24 constitutes a robust and productive space science program

1 that will advance knowledge and serve as a catalyst for
2 innovation, with such activities consisting of—

- 3 (1) research and analysis grants programs;
- 4 (2) technology development;
- 5 (3) small, medium, and large space missions;
- 6 and
- 7 (4) suborbital research activities.

8 **SEC. 302. SENSE OF CONGRESS REGARDING INTEGRATED**
9 **TESTING OF JAMES WEBB SPACE TELE-**
10 **SCOPE.**

11 It is the sense of Congress that—

- 12 (1) the James Webb Space Telescope (JWST)
13 will revolutionize our understanding of star and
14 planet formation and how galaxies evolved, and ad-
15 vance the search for the origins of our universe;
- 16 (2) the JWST will enable American scientists to
17 maintain their leadership in astrophysics and other
18 disciplines;
- 19 (3) the JWST program is making steady
20 progress towards a launch in 2018;
- 21 (4) the on-time and on-budget delivery of
22 JWST is a high congressional priority; and
- 23 (5) maintaining this progress will require the
24 Administrator to ensure that integrated testing is
25 appropriately timed and sufficiently comprehensive

1 to enable potential issues to be identified and ad-
2 dressed early enough to be handled within JWST's
3 development schedule.

4 **SEC. 303. SENSE OF CONGRESS REGARDING WFIRST MIS-**
5 **SION.**

6 It is the sense of Congress that the Administrator,
7 to the extent practicable, should make progress on the
8 technologies and capabilities needed to position NASA to
9 meet the objectives of the Wide-Field Infrared Survey Tel-
10 escope (WFIRST) mission, as outlined in the 2010 Na-
11 tional Academies' astronomy and astrophysics decadal
12 survey, in a way that maximizes the scientific productivity
13 of meeting those objectives for the resources invested. It
14 is further the sense of Congress that the WFIRST mission
15 has the potential to enable scientific discoveries that will
16 transform our understanding of the universe.

17 **SEC. 304. ASTROBIOLOGY SCIENCE STRATEGY.**

18 (a) FINDING.—Both the National Academies' astron-
19 omy and astrophysics decadal survey of 2010 and the
20 planetary science decadal survey of 2011 discuss scientific
21 objectives related to astrobiology. However, a comprehen-
22 sive, independent science strategy for astrobiology has not
23 been carried out.

24 (b) SCIENCE STRATEGY.—Building on the work of
25 the Astrobiology Roadmap process, the Administrator

1 shall enter into an arrangement with the National Acad-
2 emies for a comprehensive assessment of the state of
3 science in astrobiology and development of a strategy for
4 astrobiology science research and activities. The strategy
5 shall take into account the National Academies' planetary
6 science and astronomy and astrophysics decadal surveys
7 as well as other relevant National Academies studies on
8 NASA's astrobiology program.

9 (c) TRANSMITTAL.—Not later than 20 months after
10 the date of enactment of this Act, the Administrator shall
11 transmit the results of the study to the Committee on
12 Science, Space, and Technology of the House of Rep-
13 resentatives and to the Committee on Commerce, Science,
14 and Transportation of the Senate.

15 **SEC. 305. ASSESSMENT OF MARS ARCHITECTURE.**

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

19 (1) NASA's revised post-2016 Mars exploration
20 architecture and its responsiveness to the strategies,
21 priorities, and guidelines put forward by National
22 Academies' planetary science decadal surveys and
23 other relevant National Academies Mars-related re-
24 ports;

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

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

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

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

16 **SEC. 306. RADIOISOTOPE THERMOELECTRIC GENERATORS.**

17 (a) SENSE OF CONGRESS.—It is the sense of Con-
18 gress that conducting deep space exploration requires ra-
19 dioisotope thermoelectric generators, and establishing con-
20 tinuity in the production of the material needed to power
21 these generators is paramount to the success of these fu-
22 ture deep space missions. It is further the sense of Con-
23 gress that Federal agencies supporting NASA in the pro-
24 duction of such material should do so in a cost effective

1 manner so as not to impose excessive reimbursement re-
2 quirements on NASA.

3 (b) ANALYSIS OF REQUIREMENTS AND RISKS.—The
4 Administrator, in consultation with other Federal agen-
5 cies, shall conduct an analysis of NASA requirements for
6 radioisotope power system material. The analysis shall—

7 (1) detail NASA’s current projected mission re-
8 quirements, and associated timeframes, for radioiso-
9 tope power system material;

10 (2) identify the assumptions used to determine
11 NASA’s requirements for the material, including—

12 (A) the planned use of Advanced Stirling
13 Radioisotope Generator technology;

14 (B) the status of and timeline for com-
15 pleting development and demonstration of the
16 Advanced Stirling Radioisotope Generator tech-
17 nology, including the development of flight
18 readiness requirements; and

19 (C) the risks, implications, and contin-
20 gencies for NASA mission plans of any delays
21 or unanticipated technical challenges related to
22 the anticipated use of Advanced Stirling Radio-
23 isotope Generator technology;

24 (3) assess the risk to NASA programs of any
25 potential delays in achieving the schedule and mile-

1 stones for planned domestic production of radioiso-
2 tope power system material;

3 (4) describe the process for meeting any addi-
4 tional NASA requirements for the material;

5 (5) provide an estimate of the incremental costs
6 required to increase the amount of material pro-
7 duced each year, if such an increase is needed to
8 support additional NASA requirements for the mate-
9 rial;

10 (6) provide details on—

11 (A) what costs NASA will incur that are
12 associated with the radioisotope power systems
13 used by NASA and other Government entities;
14 and

15 (B) how NASA will ensure that its reim-
16 bursements to DOE are equitable and justified;

17 (7) identify what steps, if any, NASA will take
18 with DOE to preserve the infrastructure and work-
19 force necessary for production of radioisotope power
20 systems; and

21 (8) identify the extent to which NASA's strat-
22 egy is responsive to the recommendations and find-
23 ings from the National Research Council's 2009 re-
24 port titled "Radioisotope Power Systems: An Imper-

1 ative for Maintaining U.S. Leadership in Space Ex-
2 ploration”.

3 (c) TRANSMITTAL.—Not later than 180 days after
4 the date of enactment of this Act, the Administrator shall
5 transmit the results of the analysis to the Committee on
6 Science, Space, and Technology of the House of Rep-
7 resentatives and the Committee on Commerce, Science,
8 and Transportation of the Senate.

9 **SEC. 307. UNIVERSITY CLASS SCIENCE MISSIONS.**

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

21 (b) REVIEW OF PRINCIPAL INVESTIGATOR-LED
22 SMALL ORBITAL SCIENCE MISSIONS.—The Administrator
23 shall conduct a review of the science missions described
24 in subsection (a). The review shall include—

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

5 (2) the opportunities such mission programs
6 provide for scientific research;

7 (3) the opportunities such mission programs
8 provide for training and education, including sci-
9 entific and engineering workforce development, in-
10 cluding for the NASA scientific and engineering
11 workforce; and

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

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

1 orbital science missions conducted by NASA in accordance
2 with the results of the review under subsection (b).

3 **Subtitle B—Earth Science**

4 **SEC. 311. SENSE OF CONGRESS.**

5 It is the sense of Congress that, as recognized in the
6 National Academy of Sciences' report, "America's Future
7 in Space", "the United States, as a global leader, bears
8 a special responsibility to share its expertise and the
9 knowledge and understanding it develops on how best to
10 care for the planet". It is the further sense of Congress
11 that the Earth's climate and systems create vulnerabilities
12 against which the United States, in cooperation with other
13 countries, must develop resilience. A commitment to a
14 comprehensive space-based Earth observing system is nec-
15 essary to provide the data to understand Earth's changing
16 climate and to predict the impacts at the regional level.
17 It also the sense of Congress that NASA's capabilities and
18 skills play a critical role in carrying out Earth science ob-
19 servations and conducting basic and applied research in
20 coordination with other relevant Federal agencies. It is the
21 further sense of Congress that NASA is being asked to
22 undertake important Earth science activities in an envi-
23 ronment of increasingly constrained fiscal resources, and
24 that any transfer of additional responsibilities to NASA,
25 such as climate instrument development and measure-

1 ments that are currently part of the NOAA portfolio,
2 should be accompanied by the provision of additional re-
3 sources to allow NASA to carry out the increased respon-
4 sibilities without adversely impacting its implementation
5 of its existing Earth science programs and priorities.

6 **SEC. 312. COMPREHENSIVE EARTH OBSERVATION SYSTEMS**
7 **AND RESEARCH PROGRAM.**

8 (a) IN GENERAL.—The Administrator shall continue
9 to carry out a balanced Earth science program that in-
10 cludes Earth science research, Earth systematic missions,
11 competitive Venture class missions, other missions and
12 data analysis, mission operations, technology development,
13 and applied sciences, consistent with the recommendations
14 and priorities established in the National Academies'
15 Earth Science Decadal Survey.

16 (b) COLLABORATION.—The Administrator shall col-
17 laborate with other Federal agencies, including NOAA,
18 non-Government entities, and international partners, as
19 appropriate, in carrying out NASA's Earth science pro-
20 gram.

21 **SEC. 313. STUDY ON SUSTAINED, LONG-TERM MEASURE-**
22 **MENTS.**

23 (a) STUDY.—The Administrator shall enter into an
24 arrangement with the National Academies for a study to
25 develop a framework for—

1 (1) analyzing the needs for continuity of envi-
2 ronmental and climate measurements of the Earth
3 from space;

4 (2) establishing methodologies and metrics for
5 determining whether measurements should be col-
6 lected for extended periods and for prioritizing those
7 measurements;

8 (3) determining a prioritized list of measure-
9 ments if appropriate;

10 (4) assessing the feasibility of achieving con-
11 tinuity or near-continuity of measurements; and

12 (5) considering issues related to the balance
13 among cost, risk, and performance regarding the
14 sustainment of measurements.

15 (b) REPORT.—Not later than 20 months after the
16 date of enactment of this Act, the Administrator shall
17 transmit the results of the study to the Committee on
18 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. 314. ASSESSMENT.**

22 The Administrator shall carry out a scientific assess-
23 ment of NASA's Earth science global datasets for the pur-
24 pose of identifying those datasets that are useful for un-
25 derstanding regional changes and variability, and for in-

1 forming the societal benefit areas identified in the Na-
2 tional Global Change Research Plan 2012-2021. The Ad-
3 ministrator shall complete and transmit the assessment to
4 the Committee on Science, Space, and Technology of the
5 House of Representatives and the Committee on Com-
6 merce, Science, and Transportation of the Senate not later
7 than 180 days after the date of enactment of this Act.

8 **SEC. 315. CONTINUITY OF MODERATE RESOLUTION LAND**
9 **IMAGING REMOTE SENSING DATA.**

10 (a) **POLICY.**—Congress reaffirms the finding in sec-
11 tion 2(1) of the Land Remote Sensing Policy Act of 1992
12 (15 U.S.C. 5601(1)) which stated that “The continuous
13 collection and utilization of land remote sensing data from
14 space are of major benefit in studying and understanding
15 human impacts on the global environment, in managing
16 the Earth’s natural resources, in carrying out national se-
17 curity functions, and in planning and conducting many
18 other activities of scientific, economic, and social impor-
19 tance.”.

20 (b) **CONTINUOUS LAND REMOTE SENSING DATA**
21 **COLLECTION.**—The Director of the Office of Science and
22 Technology Policy shall take steps in consultation with
23 other relevant Federal agencies to ensure, to the maximum
24 extent practicable, the continuous collection of space-
25 based, medium-resolution observations of the Earth’s land

1 cover and to ensure that the data are made available in
2 such ways as to facilitate the widest possible use.

3 **SEC. 316. VENTURE CLASS MISSIONS.**

4 It is the sense of Congress that NASA's Venture class
5 missions provide opportunities for innovation in the Earth
6 sciences program, offer low-cost approaches for high-qual-
7 ity competitive science investigations, enable frequent
8 flight opportunities to engage the Earth science and appli-
9 cations community, and serve as a training ground for stu-
10 dents and young scientists. It is further the sense of Con-
11 gress that NASA should seek to increase the number of
12 Venture class projects to the extent practicable as part
13 of a balanced Earth science program.

14 **TITLE IV—AERONAUTICS**

15 **SEC. 401. SENSE OF CONGRESS.**

16 It is the sense of Congress that—

17 (1) aeronautics research continues to be an im-
18 portant core element of NASA's mission and should
19 be supported;

20 (2) technologies developed by NASA help to se-
21 cure the leadership role of the United States in glob-
22 al aviation, enhance the competitiveness of the
23 United States in the world economy, and improve
24 the quality of life of all our citizens;

1 (3) NASA's aeronautics research should be
2 guided by, and consistent with, the National Aero-
3 nautics Research and Development Policy;

4 (4) strategic planning conducted with stake-
5 holder input enhances both the focus and relevancy
6 of NASA's aeronautics research; and

7 (5) 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 NASA maintains
13 a strong aeronautics research portfolio ranging from fun-
14 damental research through integrated systems research
15 with specific research goals, including the following:

16 (1) AIRSPACE CAPACITY.—NASA's Aeronautics
17 Research Mission Directorate shall—

18 (A) address research needs of the Next
19 Generation Air Transportation System
20 (NextGen), including the ability of the National
21 Airspace System to handle up to 3 times the
22 current travel demand by 2025 and safely inte-
23 grate the operations of autonomous vehicles;
24 and

1 (B) identify critical gaps in technology
2 which must be bridged to enable the Federal
3 Aviation Administration to implement NextGen
4 so that safety and productivity improvements
5 can be achieved as soon as possible.

6 (2) ENVIRONMENTAL SUSTAINABILITY.—Such
7 Directorate shall consider and pursue concepts to re-
8 duce noise, emissions, and fuel consumption while
9 maintaining high safety standards, and conduct re-
10 search related to the impact of alternative fuels on
11 the safety, reliability, and maintainability of current
12 and new air vehicles.

13 (3) AVIATION SAFETY.—Such Directorate shall
14 proactively address safety challenges associated with
15 current and new air vehicles and with operations in
16 the Nation’s current and future air transportation
17 system.

18 (4) INTEGRATED SYSTEMS RESEARCH.—Such
19 Directorate shall mature the most promising tech-
20 nologies to the point at which they can be dem-
21 onstrated in a relevant environment and shall inte-
22 grate individual components and technologies as ap-
23 propriate to ensure that they perform in an inte-
24 grated manner as well as they do when operated in-
25 dividually.

1 **SEC. 403. STRATEGIC PLANNING FOR AERONAUTICS RE-**
2 **SEARCH.**

3 In pursuing the research and development initiatives
4 described in section 402, the Administrator shall ensure
5 that recommendations from reviews by the National Acad-
6 emies on NASA's aeronautics research-related activities
7 are fully considered as NASA performs a top-down plan-
8 ning process supported by analyses, expert opinion, and
9 community input, including input from other Federal Gov-
10 ernment agencies, industry, and academia. The Adminis-
11 trator shall continue to solicit input from the community
12 on high priority research and development needs through
13 periodic meetings of the National Research Council-en-
14 abled Aeronautics Research and Technology Roundtable.

15 **SEC. 404. RESEARCH PROGRAM TO DETERMINE PERCEIVED**
16 **IMPACT OF SONIC BOOMS.**

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 would
21 open new global markets and enable new transpor-
22 tation capabilities; and

23 (2) a research program is needed to assess the
24 impact in a relevant environment of commercial su-
25 peronic flight operations and provide the basis for

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

3 (b) FLIGHT DEMONSTRATIONS.—The Administrator
4 shall continue NASA’s cooperative research program with
5 industry and work with industry partners to design, build,
6 and fly a demonstrator to collect data on the perceived
7 impact of sonic booms that could enable the promulgation
8 of appropriate standards for overland commercial super-
9 sonic flight operations.

10 (c) COORDINATION.—The Administrator shall ensure
11 that sonic boom research is coordinated as appropriate
12 with the Administrator of the Federal Aviation Adminis-
13 tration.

14 **SEC. 405. RESEARCH PROGRAM TO FACILITATE GREATER**
15 **USE OF COMPOSITE MATERIALS IN AIR-**
16 **CRAFT.**

17 The Administrator shall continue NASA’s cooperative
18 research program with industry to identify and dem-
19 onstrate more effective and safe ways of developing, manu-
20 facturing, and maintaining composite materials for use in
21 airframes, subsystems, and propulsion components.

22 **SEC. 406. TRANSFORMATIVE AERONAUTICS RESEARCH.**

23 It is the sense of Congress that the Administrator,
24 in looking strategically into the future and ensuring that
25 NASA’s Center personnel are at the leading edge of aero-

1 nautics research, should continue building on NASA's In-
2 novative Concepts for Aviation project that supports the
3 early-stage advancement of new processes, novel concepts,
4 and innovative technologies that have the potential to meet
5 national aeronautics needs. The Administrator shall con-
6 tinue to ensure that awards for the investigation of these
7 concepts and technologies are open for competition among
8 NASA civil servants at its Centers, separate from other
9 awards open only to non-NASA sources, including the Jet
10 Propulsion Laboratory.

11 **SEC. 407. UNITED STATES LEADERSHIP IN AERONAUTICS**
12 **RESEARCH.**

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

15 (1) it is critical that the United States maintain
16 its leadership in civil aeronautics research;

17 (2) other countries are making concerted efforts
18 to reach and then surpass the United States in civil
19 aeronautics research; and

20 (3) it is critical that this challenge be met.

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

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

4 (2) ascertain whether other countries are catch-
5 ing up or have surpassed the United States in civil
6 aeronautics research;

7 (3) identify in what areas the United States is
8 losing ground; and

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

12 (A) defining the role NASA needs to play;

13 (B) identifying public-private partnerships
14 that could be formed; and

15 (C) estimating the impact on NASA's
16 budget should such recommendations be imple-
17 mented.

18 (c) REPORT.—Not later than 18 months after the
19 date of enactment of this Act, the Administrator shall pro-
20 vide the results of the study to the Committee on Science,
21 Space, and Technology of the House of Representatives
22 and the Committee on Commerce, Science, and Transpor-
23 tation of the Senate.

1 **TITLE V—SPACE TECHNOLOGY**
2 **PROGRAM**

3 **SEC. 501. SENSE OF CONGRESS.**

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

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

8 (2) developing technologies and capabilities that
9 will make NASA’s missions more affordable and
10 more reliable; and

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

13 **SEC. 502. SPACE TECHNOLOGY PROGRAM.**

14 (a) ESTABLISHMENT.—The Administrator shall es-
15 tablish a space technology program to enable research and
16 development on advanced space technologies and systems
17 that are independent of specific space mission flight
18 projects. The program shall support—

19 (1) early-stage concepts and innovation;

20 (2) development of innovative technologies in
21 areas such as in-space chemical and electrical pro-
22 pulsion, power generation and storage, liquid rocket
23 propulsion, avionics, structures, and materials that
24 may enable new approaches to human and robotic
25 space missions;

1 (3) flight demonstrations of technologies, in-
2 cluding those that have the potential to benefit mul-
3 tiple NASA mission directorates, other Federal Gov-
4 ernment agencies, and the commercial space indus-
5 try;

6 (4) NASA commitments to Small Business In-
7 novation Research (SBIR) and Small Business
8 Technology Transfer (STTR) programs and activi-
9 ties; and

10 (5) research, development, and demonstration
11 of enabling technologies in support of future explo-
12 ration missions.

13 (b) RESEARCH AND DEVELOPMENT PROGRAM.—In
14 conducting the space technology program established
15 under this section, the Administrator shall—

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

19 (2) make use of small satellites and NASA sub-
20 orbital platforms, to the extent practicable, to dem-
21 onstrate space technology concepts and develop-
22 ments; and

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

1 (c) REPORT.—Not later than 180 days after the date
2 of enactment of this Act, the Administrator shall provide
3 to the Committee on Science, Space, and Technology of
4 the House of Representatives and the Committee on Com-
5 merce, Science, and Transportation of the Senate a report
6 comparing NASA’s space technology investments with the
7 16 high-priority technology areas identified by the Na-
8 tional Academies in the National Research Council’s re-
9 port on NASA’s Space Technology Roadmaps. The Ad-
10 ministrator shall identify how NASA will address any gaps
11 between the agency’s investments and the recommended
12 technology areas, including a projection of funding re-
13 quirements.

14 **TITLE VI—ACQUISITION**
15 **MANAGEMENT**

16 **SEC. 601. 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) FINANCIAL DISCIPLINE.—To ensure that the es-
23 tablishment, maintenance, and allotment of project and
24 program reserves contribute to prudent management, not
25 later than 180 days after the date of enactment of this

1 Act the Administrator shall transmit to the Committee on
2 Science, Space, and Technology of the House of Rep-
3 resentatives and the Committee on Commerce, Science,
4 and Transportation of the Senate a report describing—

5 (1) NASA’s criteria for establishing the amount
6 of reserves held at the project and program levels;

7 (2) how such criteria relate to the agency’s poli-
8 cy of budgeting at a 70 percent confidence level;
9 and

10 (3) NASA’s criteria for waiving the policy of
11 budgeting at a 70 percent confidence level.

12 **SEC. 602. COST ESTIMATION.**

13 (a) SENSE OF CONGRESS.—It is the sense of Con-
14 gress that realistic cost estimating is critically important
15 to the ultimate success of major space development
16 projects. NASA has devoted significant efforts over the
17 past five years to improving its cost estimating capabili-
18 ties, but it is important that NASA continue its efforts
19 to develop and implement guidance in establishing realistic
20 cost estimates.

21 (b) GUIDANCE AND CRITERIA.—The Administrator
22 shall provide to programs and projects—

23 (1) guidance on whether and when an Inde-
24 pendent Cost Estimate and Independent Cost As-
25 sessment should be used; and

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

3 (c) REPORT.—Not later than 270 days after the date
4 of enactment of this Act, the Administrator shall transmit
5 to the Committee on Science, Space, and Technology of
6 the House of Representatives and the Committee on Com-
7 merce, Science, and Transportation of the Senate a re-
8 port—

9 (1) describing efforts to enhance internal cost
10 estimation and assessment expertise;

11 (2) identifying criteria used by programs and
12 projects in determining whether and when to con-
13 duct an Independent Cost Estimate or Independent
14 Cost Assessment; and

15 (3) listing the costs of each individual Inde-
16 pendent Cost Estimate or Independent Cost Assess-
17 ment activity conducted in fiscal year 2011, fiscal
18 year 2012, and fiscal year 2013, the purpose of the
19 activity, and key findings and recommendations.

20 **SEC. 603. INDEPENDENT REVIEWS.**

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

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

3 (1) the internal entities independent of project
4 and program management that conduct reviews of
5 projects and programs at life cycle milestones; and

6 (2) how NASA ensures the independence of
7 such entities and their members.

8 **SEC. 604. AVOIDING ORGANIZATIONAL CONFLICTS OF IN-**
9 **TEREST IN MAJOR NASA ACQUISITION PRO-**
10 **GRAMS.**

11 (a) REVISED REGULATIONS REQUIRED.—Not later
12 than 270 days after the date of enactment of this Act,
13 the Administrator shall revise the NASA Supplement to
14 the Federal Acquisition Regulation to provide uniform
15 guidance and tighten existing requirements for organiza-
16 tional conflicts of interest by contractors in major acqui-
17 sition programs.

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

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

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

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

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

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

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

24 (3) require that a contract for the performance
25 of systems engineering and technical assistance

1 functions for a major acquisition program contains
2 a provision prohibiting the contractor or any affiliate
3 of the contractor from participating as a prime con-
4 tractor or a major subcontractor in the development
5 of a system under the program; and

6 (4) establish such limited exceptions to the re-
7 quirement in paragraphs (2) and (3) as may be nec-
8 essary to ensure that NASA has continued access to
9 advice on systems architecture and systems engi-
10 neering matters from highly-qualified contractors
11 with domain experience and expertise, while ensuring
12 that such advice comes from sources that are objec-
13 tive and unbiased.

14 **SEC. 605. MANAGING TERMINATION LIABILITY.**

15 (a) RESERVATION OF FUNDS.—The Administrator
16 may not reserve funds or require the reservation of funds
17 for potential termination liability with respect to a covered
18 program. Funds that have been reserved before the date
19 of enactment of this Act for potential termination liability
20 shall be promptly used to make maximum progress in
21 meeting the established goals and milestones of the cov-
22 ered program.

23 (b) TERMINATION FOR CONVENIENCE.—The Admin-
24 istrator may not initiate the termination for the conven-

1 ience of the Government of a contract on a covered pro-
2 gram unless—

3 (1) the termination of such contract or program
4 is explicitly provided for by a law enacted after the
5 date of enactment of this Act; and

6 (2) either—

7 (A) the Administrator has provided a sup-
8 plemental appropriation request under sub-
9 section (c) with respect to associated termi-
10 nation liability costs; or

11 (B) sufficient funds are available to cover
12 such termination liability costs in the appro-
13 priations account that is funding the prime con-
14 tract being terminated.

15 (c) SUPPLEMENTAL APPROPRIATION REQUEST.—If
16 sufficient appropriations are not available to cover termi-
17 nation liability costs in the appropriations account that is
18 funding the prime contract being terminated, the Adminis-
19 trator shall provide to Congress a supplemental appropria-
20 tion request to cover such termination liability costs. Such
21 request shall be provided not later than 120 days in ad-
22 vance of the contract termination settlement for the cov-
23 ered program.

24 (d) INTENT OF CONGRESS.—It is the intent of Con-
25 gress to provide such additional appropriations as may be

1 necessary to provide for termination liability payments on
2 contracts for covered programs.

3 (e) REPORTING.—Not later than 6 months after the
4 date of enactment of this Act, and every 6 months there-
5 after for the duration of the prime contracts for the cov-
6 ered programs, the Administrator shall transmit to the
7 Committee on Science, Space, and Technology of the
8 House of Representatives and the Committee on Com-
9 merce, Science, and Transportation of the Senate a report
10 that—

11 (1) estimates termination liability costs for each
12 of the prime contracts on covered programs; and

13 (2) explains the basis on which the estimates
14 were determined.

15 **TITLE VII—OTHER PROVISIONS**

16 **SEC. 701. FACILITIES AND INFRASTRUCTURE.**

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

19 (1) NASA must reverse the deteriorating condi-
20 tion of its facilities and infrastructure, as this condi-
21 tion is hampering the effectiveness and efficiency of
22 research performed by both NASA and industry par-
23 ticipants making use of NASA facilities, thus reduc-
24 ing the competitiveness of the United States aero-
25 space industry;

1 (2) NASA has a role in providing laboratory ca-
2 pabilities that are not economically viable as com-
3 mercial entities and thus are not available elsewhere;

4 (3) to ensure continued access to reliable and
5 efficient world-class facilities by researchers, NASA
6 should seek to establish strategic partnerships with
7 other Federal agencies, academic institutions, and
8 industry, as appropriate; and

9 (4) decisions on whether to dispose of, main-
10 tain, or modernize existing facilities must be made
11 in the context of meeting future NASA and other
12 Federal agencies' laboratory needs.

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

18 (1) future NASA 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 National Space Policy;

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

1 (C) NASA Authorization Acts;

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

5 (4) criteria for prioritizing deferred mainte-
6 nance tasks and also for upgrading or modernizing
7 laboratories, facilities, and equipment;

8 (5) an assessment of modifications needed to
9 maximize usage of facilities that offer unique and
10 highly specialized benefits to the aerospace industry
11 and the American public; and

12 (6) implementation steps, including a timeline,
13 milestones, and an estimate of resources required for
14 carrying out the plan.

15 (c) TRANSMITTAL.—Not later than one year after the
16 date of enactment of this Act, the Administrator shall
17 transmit the plan to the Committee on Science, Space, and
18 Technology of the House of Representatives and the Com-
19 mittee on Commerce, Science, and Transportation of the
20 Senate.

21 (d) ESTABLISHMENT OF CAPITAL FUNDS.—The Ad-
22 ministrator shall establish a capital fund at each of
23 NASA's field centers for the modernization of facilities
24 and laboratories. The Administrator shall ensure to the
25 maximum extent practicable that all financial savings

1 achieved by closing outdated or surplus facilities at a
2 NASA field center shall be made available to that center's
3 capital fund for the purpose of modernizing the field cen-
4 ter's facilities and laboratories and for upgrading the in-
5 frastructure at the field center.

6 **SEC. 702. NASA EDUCATION PROGRAM.**

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

9 (1) NASA's missions are an inspiration for
10 Americans and in particular for the next generation
11 and that this inspiration has a powerful effect in
12 stimulating interest in science, technology, education
13 and mathematics (STEM) education and careers;

14 (2) NASA's Office of Education and mission di-
15 rectorates have been effective in delivering NASA
16 educational content because of the strong engage-
17 ment of NASA scientists and engineers in NASA's
18 education and outreach activities; and

19 (3) NASA should be a central partner in con-
20 tributing to the goals of the National Science and
21 Technology Council's Federal Science, Technology,
22 Engineering, and Mathematics (STEM) Education
23 5-Year Strategic Plan.

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

1 continue to carry out education and outreach programs
2 and activities through the Office of Education and the
3 NASA mission directorates and shall continue to engage,
4 to the maximum extent practicable, NASA and NASA-
5 supported researchers and engineers in carrying out those
6 programs and activities.

7 **SEC. 703. INDEPENDENT REVIEW OF THE NATIONAL SPACE**
8 **GRANT COLLEGE AND FELLOWSHIP PRO-**
9 **GRAM.**

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

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

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

9 (2) recommendations on measures, if needed, to
10 enhance the Program's effectiveness and mecha-
11 nisms by which any increases in funding appro-
12 priated by Congress can be applied.

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

19 **SEC. 704. REVIEW OF PRACTICES TO DETECT AND PRE-**
20 **VENT THE USE OF COUNTERFEIT PARTS.**

21 Not later than one year after the date of enactment
22 of this Act, the Comptroller General shall transmit to the
23 Committee on Science, Space, and Technology of the
24 House of Representatives and the Committee on Com-
25 merce, Science, and Transportation of the Senate a review

1 of NASA's processes and controls to detect and prevent
2 the use of counterfeit parts in NASA mission projects, in-
3 struments, and other mission-related assets. The review
4 shall examine—

5 (1) the trends in known and identified counter-
6 feit parts in NASA's supply chain;

7 (2) NASA's processes and controls to detect
8 counterfeit parts and prevent their incorporation
9 into NASA mission projects, instruments, and other
10 mission-related assets;

11 (3) key differences between how the Depart-
12 ment of Defense and NASA detect and prevent the
13 use of counterfeit parts, and lessons learned by the
14 Department of Defense that could be valuable to
15 NASA; and

16 (4) any gaps in NASA's controls and processes
17 for detecting counterfeit parts and preventing their
18 incorporation into NASA mission projects, instru-
19 ments, and other mission-related assets.

20 **SEC. 705. REMOTE SATELLITE SERVICING DEMONSTRA-**
21 **TIONS.**

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

24 (1) NASA plays a key role in demonstrating the
25 feasibility of using robotic technologies for a space-

1 craft that could access, repair, and refuel satellites
2 in geosynchronous Earth orbit;

3 (2) demonstrating this feasibility would both as-
4 sist NASA in its future missions and provide the
5 emerging commercial satellite-servicing industry the
6 confidence to robotically refuel, repair, and maintain
7 satellites in both near and distant orbits; and

8 (3) the capability to refuel, repair, and main-
9 tain geosynchronous satellites robotically could add
10 years of functional life to satellites.

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

17 (1) NASA’s activities, tools, and techniques as-
18 sociated with the ultimate goal of servicing satellites
19 using robotic spacecraft;

20 (2) accomplishments to date in demonstrating
21 various servicing technologies;

22 (3) major challenges encountered and mitiga-
23 tion measures taken; and

24 (4) demonstrations still needed for NASA and
25 industry acceptance of the technologies for oper-

1 ational missions, and the timeframe for these dem-
2 onstrations.

3 **SEC. 706. ASTRONAUT OCCUPATIONAL HEALTHCARE.**

4 (a) WORKSHOP.—Not later than 180 days after the
5 date of enactment of this Act, the Administrator shall con-
6 vene a workshop attended by both current and former
7 members of the astronaut corps, as well as other appro-
8 priate experts, to focus on the advantages and disadvan-
9 tages of granting NASA the specific authority to monitor
10 and treat current and former members of the astronaut
11 corps for medical conditions which are deemed by NASA
12 to be associated with human space flight conducted in fur-
13 therance of NASA requirements. The workshop shall also
14 address the implications of allowing NASA to retain ac-
15 cess to astronaut medical records.

16 (b) REPORT.—Not later than 90 days after comple-
17 tion of the workshop, the Administrator shall provide a
18 report summarizing the results of the workshop to the
19 Committee on Science, Space, and Technology of the
20 House of Representatives and the Committee on Com-
21 merce, Science, and Transportation of the Senate.

1 **SEC. 707. USE OF OPERATIONAL COMMERCIAL SUB-**
2 **ORBITAL VEHICLES FOR RESEARCH, DEVEL-**
3 **OPMENT, AND EDUCATION.**

4 (a) REPORT.—The Administrator shall prepare a re-
5 port with respect to the use of operational commercial re-
6 usable suborbital flight vehicles for carrying out scientific
7 and engineering investigations and educational activities.
8 The report shall—

9 (1) describe the purposes for which NASA in-
10 tends to use such vehicles;

11 (2) describe the processes required to support
12 such use;

13 (3) describe NASA, space flight operator, and
14 supporting contractor responsibilities for developing
15 standard payload interfaces and conducting payload
16 safety analyses, payload integration and processing,
17 payload operations, and safety assurance for NASA-
18 sponsored space flight participants, among other
19 functions required to fly NASA-sponsored payloads
20 and space flight participants on operational commer-
21 cial orbital vehicles;

22 (4) identify NASA-provided hardware, software,
23 or services that may be provided to space flight op-
24 erators on a cost-reimbursable basis, through agree-
25 ments or contracts entered into under section
26 20113(e) of title 51, United States Code; and

1 (5) describe the United States Government and
2 space flight operator responsibilities for liability and
3 indemnification with respect to commercial sub-
4 orbital vehicle flights that involve NASA-sponsored
5 payloads or activities, NASA-supported space flight
6 participants, or other NASA-related contributions.

7 (b) CAPABILITIES AND RISKS.—The Administrator
8 shall assess and characterize the potential capabilities and
9 performance of commercial reusable suborbital vehicles for
10 addressing scientific research, including research requiring
11 access to low-gravity and microgravity environments, for
12 carrying out technology demonstrations related to science,
13 exploration, or space operations requirements, and for pro-
14 viding opportunities for educating and training space sci-
15 entists and engineers, once those vehicles become oper-
16 ational. The assessment shall also characterize the risks
17 of using potential commercial reusable suborbital flights
18 to NASA-sponsored researchers and scientific investiga-
19 tions and flight hardware.

20 (c) TRANSMITTAL.—Not later than 1 year after the
21 date of enactment of this Act, the Administrator shall
22 transmit the plan and assessment described in subsections
23 (a) and (b) to the Committee on Science, Space, and Tech-
24 nology of the House of Representatives and the Committee
25 on Commerce, Science, and Transportation of the Senate.

1 (d) REPORTS.—

2 (1) ANNUAL PROGRESS REPORTS.—The Admin-
3 istrator shall transmit a report annually to the Com-
4 mittee on Science, Space, and Technology of the
5 House of Representatives and the Committee on
6 Commerce, Science, and Transportation of the Sen-
7 ate describing progress in carrying out the Commer-
8 cial Reusable Suborbital Research Program, includ-
9 ing the number and type of suborbital missions
10 planned in each fiscal year.

11 (2) INDEMNIFICATION AND LIABILITY.—The
12 Administrator shall not proceed with a request for
13 proposals, award any contract, commit any United
14 States Government funds, or enter into any other
15 agreement for the provision of a commercial reusable
16 suborbital vehicle launch service for a NASA-spon-
17 sored spaceflight participant until indemnification
18 and liability issues associated with the use of such
19 systems by the United States Government have been
20 addressed and the Administrator has provided to the
21 Committee on Science, Space, and Technology of the
22 House of Representatives and the Committee on
23 Commerce, Science, and Transportation of the Sen-
24 ate a report describing the indemnification and li-

1 ability provisions that are planned to be included in
2 such contracts and agreements.

3 **SEC. 708. FUNDAMENTAL SPACE LIFE AND PHYSICAL**
4 **SCIENCES RESEARCH.**

5 (a) SENSE OF CONGRESS.—It the sense of Congress
6 that fundamental, discovery-based space life and physical
7 sciences research is critical for enabling space exploration,
8 protecting humans in space, and providing societal bene-
9 fits, and that the space environment facilitates the ad-
10 vancement of understanding of the life sciences and phys-
11 ical sciences. Space life and physical science research con-
12 tributes to advancing science, technology, engineering, and
13 mathematics research, and provides careers and training
14 opportunities in academia, Federal laboratories, and com-
15 mercial industry. Congress encourages the Administrator
16 to augment discovery-based fundamental research and to
17 request funding reflecting the importance of such research
18 in keeping with the priorities established in the National
19 Academies’ decadal survey entitled “Recapturing a Future
20 for Space Exploration: Life and Physical Sciences Re-
21 search for a New Era”.

22 (b) BUDGET REQUEST.—The Administrator shall in-
23 clude as part of the annual NASA fiscal year budget re-
24 quest a budget line for fundamental space life and physical
25 sciences research, devoted to competitive, peer-reviewed

1 grants, that is separate from the International Space Sta-
2 tion Operations account.

3 (c) STRATEGIC PLAN.—

4 (1) DEVELOPMENT.—The Administrator, in
5 consultation with academia, other Federal agencies,
6 and other potential stakeholders, shall develop a
7 strategic plan for carrying out competitive, peer-re-
8 viewed fundamental space life science and physical
9 sciences and related technology research, among
10 other activities, consistent with the priorities in the
11 National Academies' decadal survey described in
12 subsection (a).

13 (2) TRANSMITTAL.—Not later than 270 days
14 after the date of enactment of this Act, the Adminis-
15 trator shall transmit the strategic plan developed
16 under paragraph (1) to the Committee on Science,
17 Space, and Technology of the House of Representa-
18 tives and the Committee on Commerce, Science, and
19 Transportation of the Senate.

20 **SEC. 709. RESTORING NASA'S COMMITMENT TO ENGINEER-**
21 **ING RESEARCH.**

22 (a) SENSE OF CONGRESS.—It is the sense of Con-
23 gress that engineering excellence has long been a hallmark
24 of NASA's ability to make significant advances in aero-
25 nautics and space exploration. However, as has been noted

1 in recent National Academies reports, increasingly con-
2 strained funding and competing priorities have led to an
3 erosion of NASA's commitment to basic engineering re-
4 search, the research that provides the basis for the tech-
5 nology development that enables NASA's many chal-
6 lenging missions to succeed. If current trends continue,
7 NASA's ability to attract and maintain the best and
8 brightest engineering workforce at the NASA Centers as
9 well as its ability to remain on the cutting edge of aero-
10 nautical and space technology will continue to erode and
11 will threaten NASA's ability to be a world leader in aero-
12 nautics research and development and space exploration.

13 (b) PLAN.—The Administrator shall develop a plan
14 for restoring a meaningful basic engineering research pro-
15 gram at the NASA Centers, including, as appropriate, col-
16 laborations with industry, universities, and other relevant
17 organizations. The plan shall identify the organizational
18 approach to be followed, an initial set of basic research
19 priorities, and a proposed budget.

20 (c) REPORT.—Not later than 180 days after the date
21 of enactment of this Act, the Administrator shall transmit
22 the plan to the Committee on Science, Space, and Tech-
23 nology of the House of Representatives and the Committee
24 on Commerce, Science, and Transportation of the Senate.

1 **SEC. 710. NEAR-EARTH OBJECTS DETECTION.**

2 (a) STUDY.—The Administrator, in collaboration
3 with other relevant Federal agencies, shall carry out a
4 technical and scientific assessment of the capabilities and
5 resources required to expand NASA’s Near-Earth Object
6 Program, to include the detection, tracking, cataloguing,
7 and characterizing of potentially hazardous near-Earth
8 objects 30-50 meters in diameter.

9 (b) TRANSMITTAL.—Not later than 270 days after
10 the date of enactment of this Act, the Administrator shall
11 transmit the results of the assessment to the Committee
12 on Science, Space, and Technology of the House of Rep-
13 resentatives and the Committee on Commerce, Science,
14 and Transportation of the Senate.

15 **SEC. 711. RESEARCH ON NEAR-EARTH OBJECT TSUNAMI**
16 **EFFECTS.**

17 (a) REPORT ON POTENTIAL TSUNAMI EFFECTS
18 FROM NEAR-EARTH OBJECT IMPACT.—The Adminis-
19 trator, in collaboration with the Administrator of NOAA
20 and other relevant Federal agencies, shall prepare a report
21 identifying and describing existing research activities and
22 further research objectives that would increase our under-
23 standing of the nature of the effects of potential tsunamis
24 that could occur if a near-Earth object were to impact an
25 ocean of Earth.

1 (b) TRANSMITTAL.—Not later than 180 days after
2 the date of enactment of this Act, the Administrator shall
3 transmit the report required prepared under subsection
4 (a) to the Committee on Science, Space, and Technology
5 of the House of Representatives and the Committee on
6 Commerce, Science, and Transportation of the Senate.

7 **SEC. 712. REVIEW OF ORBITAL DEBRIS REMOVAL CON-**
8 **CEPTS.**

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

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

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

- 1 mittee on Commerce, Science, and Transportation of the
- 2 Senate on the solicitation and review required under sub-
- 3 section (b).

