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(Original Signature of Member)

113TH CONGRESS
1ST SESSION

H. R. 2616

To authorize the programs of the National Aeronautics and Space Administration for fiscal years 2014, 2015, and 2016, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

Ms. EDWARDS introduced the following bill; which was referred to the Committee on _____

A BILL

To authorize the programs of the National Aeronautics and Space Administration for fiscal years 2014, 2015, and 2016, and for other purposes.

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

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

4 (a) **SHORT TITLE.**—This Act may be cited as the
5 “National Aeronautics and Space Administration Author-
6 ization Act of 2013”.

7 (b) **TABLE OF CONTENTS.**—The table of contents for
8 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:

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

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

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

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

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

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

16 (7) PRIME CONTRACTOR.—The term “prime
17 contractor” means a person or entity contracting di-
18 rectly with the Federal Government on a covered
19 program.

20 (8) SAFETY, SECURITY, AND WORKFORCE SUP-
21 PORT PROGRAMS.—The term “Safety, Security, and
22 Workforce Support Programs” means the programs
23 and activities accounted for in the “Cross-Agency
24 Support Programs” accounts in the National Aero-

1 nautics and Space Administration Authorization Act
2 of 2010, and subsequent appropriations Acts.

3 (9) SECRETARY.—The term “Secretary” means
4 the Secretary of the Interior.

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

7 **SEC. 101. SENSE OF CONGRESS.**

8 It is the sense of Congress that a strong, robust
9 NASA program is in the national interest. Ensuring that
10 NASA can continue to pursue cutting-edge space and
11 aeronautical research and development activities and push
12 back the frontier of space exploration requires a sustained
13 and adequate commitment in resources. However, NASA’s
14 share of the Federal discretionary budgetary authority has
15 declined significantly relative to even its post-Apollo his-
16 torical average. Challenging goals cannot be reached and
17 multimission responsibilities cannot be fulfilled with the
18 consistent erosion of purchasing power and unstable fund-
19 ing, which NASA has experienced in recent years. It
20 should be a national goal to restore NASA’s funding to
21 a level of one percent of the annual Federal budget.

22 **SEC. 102. FISCAL YEAR 2014.**

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

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

3 (A) \$1,650,000,000 shall be for the Space
4 Launch System, \$1,230,000,000 shall be for
5 the Orion multipurpose crew vehicle, and
6 \$318,200,000 shall be for Exploration Ground
7 Systems;

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

10 (C) \$700,000,000 shall be for Commercial
11 Spaceflight.

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

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

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

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

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

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

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

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

3 (E) \$653,700,000 shall be for
4 Heliophysics.

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

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

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

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

10 (8) For Construction and Environmental Com-
11 pliance and Restoration, \$609,400,000,000, of which
12 \$142,300,000 shall be for Exploration Construction
13 of Facilities.

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

15 **SEC. 103. FISCAL YEAR 2015.**

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

18 (1) For Exploration, \$4,436,200,000, of
19 which—

20 (A) \$1,750,000,000 shall be for the Space
21 Launch System, \$1,235,000,000 shall be for
22 the Orion multipurpose crew vehicle, and
23 \$408,400,000 shall be for Exploration Ground
24 Systems;

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

3 (C) \$700,000,000 shall be for Commercial
4 Spaceflight.

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

7 (A) \$3,197,300,000 shall be for the ISS
8 program, of which \$244,300,000 shall be for
9 ISS research; and

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

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

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

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

17 (C) \$660,000,000 shall be for Astro-
18 physics;

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

21 (E) \$633,100,000 shall be for
22 Heliophysics.

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

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

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

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

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

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

6 **SEC. 104. FISCAL YEAR 2016.**

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

9 (1) For Exploration, \$4,534,200,000, of
10 which—

11 (A) \$1,800,000,000 shall be for the Space
12 Launch System; \$1,260,000,000 shall be for
13 the Orion multipurpose crew vehicle; and
14 \$414,200,000 shall be for Exploration Ground
15 Systems;

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

18 (C) \$700,000,000 shall be for Commercial
19 Spaceflight.

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

22 (A) \$3,319,500,000 shall be for the ISS
23 program, of which \$272,200,000 shall be for
24 ISS research; and

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

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

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

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

8 (C) \$700,000,000 shall be for Astro-
9 physics;

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

12 (E) \$636,800,000 shall be for
13 Heliophysics.

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

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

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

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

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

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

1 **TITLE II—HUMAN EXPLORATION**
2 **AND OPERATIONS**
3 **Subtitle A—Exploration**

4 **SEC. 201. GOAL.**

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

16 **SEC. 202. ROADMAP.**

17 (a) **IN GENERAL.**—The Administrator shall establish
18 a roadmap to guide NASA's planning for the achievement
19 of the goal established in section 201.

20 (b) **REQUIREMENTS.**—

21 (1) **IN GENERAL.**—The roadmap shall include
22 information on the phasing of planned intermediate
23 destinations, Mars mission risk areas and potential
24 risk mitigation approaches, technology requirements
25 and phasing of required technology development ac-

1 activities, the management strategy to be followed, re-
2 lated ISS activities, any planned international col-
3 laborative activities, potential commercial contribu-
4 tions, and other activities relevant to the achieve-
5 ment of the goal established in section 201.

6 (2) INITIAL ROADMAP REQUIREMENT.—The
7 first roadmap transmitted under subsection (c)(1)
8 shall also include an explicit analysis of—

9 (A) the technical requirements for pur-
10 suing a roadmap to Mars that includes a
11 human and robotic return to the lunar surface;

12 (B) the extent to which inclusion of that
13 intermediate destination would assist in the
14 achievement of the goal established in section
15 201; and

16 (C) the scope of international participation
17 that might be anticipated and the potential ben-
18 efits from such participation if such an inter-
19 mediate destination were to be selected.

20 (3) PARTICIPATION.—The development of the
21 roadmap shall, to the maximum extent practicable,
22 involve the participation of the ISS partnership in
23 its preparation.

24 (c) TRANSMITTAL.—

1 (1) INITIAL ROADMAP DEADLINE.—The first
2 roadmap shall be transmitted to the Committee on
3 Science, Space, and Technology of the House of
4 Representatives and the Committee on Commerce,
5 Science, and Transportation of the Senate concur-
6 rently with its submission to the Office of Manage-
7 ment and Budget and prior to when the budget for
8 fiscal year 2015 is transmitted to Congress under
9 section 1105(a) of title 31, United States Code.

10 (2) ANNUAL UPDATE.—The roadmap shall be
11 updated annually and transmitted to the Committee
12 on Science, Space, and Technology of the House of
13 Representatives and the Committee on Commerce,
14 Science, and Transportation of the Senate with the
15 budget for that fiscal year transmitted to Congress
16 under section 1105(a) of title 31, United States
17 Code.

18 **SEC. 203. SENSE OF CONGRESS ON INTERNATIONAL PAR-**
19 **TICIPATION.**

20 It is the sense of Congress that the President should
21 invite the United States partners in the ISS program and
22 other nations, as appropriate, to participate in an inter-
23 national initiative under the leadership of the United
24 States to achieve the goal of successfully conducting a
25 crewed mission to the surface of Mars.

1 **SEC. 204. EXPLORATION SYSTEMS DEVELOPMENT.**

2 (a) IN GENERAL.—Given the critical importance of
3 a heavy-lift launch vehicle and crewed spacecraft to enable
4 the achievement of the goal established in section 201, as
5 well as to the accomplishment of intermediate exploration
6 milestones and the provision of a backup capability to
7 transfer crew and cargo to the ISS, the Administrator
8 shall make the expeditious development, test, and achieve-
9 ment of operational readiness of the Space Launch System
10 and the Orion multipurpose crew vehicle the highest pri-
11 ority of the Exploration program. In order to promote
12 safety and reduce programmatic risk, the Administrator
13 shall budget for and undertake a robust ground test and
14 uncrewed and crewed flight test and demonstration pro-
15 gram for the Space Launch System and the Orion multi-
16 purpose crew vehicle and shall budget for an operational
17 flight rate sufficient to maintain safety and operational
18 readiness.

19 (b) GOVERNMENT ACCOUNTABILITY OFFICE RE-
20 VIEW.—Not later than 270 days after the date of enact-
21 ment of this Act, the Comptroller General shall transmit
22 to the Committee on Science, Space, and Technology of
23 the House of Representatives and the Committee on Com-
24 merce, Science, and Transportation of the Senate a report
25 on NASA's acquisition of ground systems in support of
26 the Space Launch System. The report shall assess the ex-

1 tent to which NASA's exploration systems development of
2 ground systems is focused on the direct support of the
3 Space Launch System and shall identify any ground sup-
4 port projects or activities that NASA is undertaking that
5 do not solely or primarily support the Space Launch Sys-
6 tem.

7 (c) SENSE OF CONGRESS.—It is the sense of Con-
8 gress that the President's annual budget requests for the
9 Space Launch System and Orion multipurpose crew vehi-
10 cle development, test, and operational phases should strive
11 to accurately reflect the resource requirements of each of
12 those phases, consistent with subsection (a).

13 **SEC. 205. SPACE RADIATION.**

14 (a) STRATEGY AND PLAN.—

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

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

1 (3) TRANSMITTAL.—Not later than 1 year after
2 the date of enactment of this Act, the Administrator
3 shall transmit the strategy and plan 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.

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

14 **SEC. 206. PARTICIPATORY EXPLORATION.**

15 The Administrator shall identify opportunities to—

16 (1) leverage technologies in NASA’s Explo-
17 ration program to deliver a rich, multimedia experi-
18 ence to the public; and

19 (2) facilitate participation by the public, the
20 private sector, nongovernmental organizations, and
21 international partners in outreach efforts related to
22 the Exploration program.

1 **SEC. 207. SENSE OF CONGRESS ON SCIENCE AND EXPLO-**
2 **RATION.**

3 It is the sense of Congress that the Administrator
4 should strive to make use of the synergies between science
5 and human exploration in ways that maximize the benefits
6 to both sets of activities.

7 **SEC. 208. PLANETARY PROTECTION FOR HUMAN EXPLO-**
8 **RATION MISSIONS.**

9 (a) **STUDY.**—The Administrator shall enter into an
10 arrangement with the National Academies for a study to
11 explore the planetary protection ramifications of future
12 missions by astronauts to the lunar polar regions, near-
13 Earth asteroids, the moons of Mars, and the surface of
14 Mars.

15 (b) **SCOPE.**—The study shall—

16 (1) collate and summarize what has been done
17 to date with respect to planetary protection meas-
18 ures to be applied to human missions to the lunar
19 polar regions, near-Earth asteroids, the moons of
20 Mars, and the surface of Mars;

21 (2) identify and document planetary protection
22 concerns associated with human missions to the
23 lunar polar regions, near-Earth asteroids, the moons
24 of Mars, and the surface of Mars;

1 **SEC. 212. SENSE OF CONGRESS REGARDING OPERATION**
2 **AND UTILIZATION OF THE ISS BEYOND 2020.**

3 It is the sense of Congress that the operation and
4 utilization of the ISS beyond 2020 should be considered
5 if the Administrator determines that the ISS is func-
6 tioning as a productive research facility in the years prior
7 to 2020 or that operation and utilization of the ISS past
8 2020 is essential for the achievement of the goal estab-
9 lished in section 201, and the Administrator's determina-
10 tion is validated by an independent external review.

11 **SEC. 213. PROHIBITION ON PRECLUDING ISS OPERATIONS**
12 **BEYOND 2020.**

13 The Administrator shall take no steps that would pre-
14 clude continued United States operation and utilization of
15 the ISS after 2020.

16 **SEC. 214. CRITERIA FOR EXTENDING ISS OPERATIONS BE-**
17 **YOND 2020.**

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

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

22 (2) identify the actions needed to deorbit the
23 ISS once a decision is made to deorbit the labora-
24 tory.

25 (b) REPORT.—The Administrator shall transmit a re-
26 port to the Committee on Science, Space, and Technology

1 of the House of Representatives and the Committee on
2 Commerce, Science, and Transportation of the Senate doc-
3 umenting such criteria and deorbit actions not later than
4 180 days after the date of enactment of this Act.

5 **SEC. 215. ISS CARGO RESUPPLY SERVICES LESSONS**
6 **LEARNED.**

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

12 (1) identifies the lessons learned to date from
13 the Commercial Resupply Services contract;

14 (2) indicates whether changes are needed to the
15 manner in which NASA procures and manages simi-
16 lar services upon the expiration of the existing Com-
17 mercial Resupply Services contract; and

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

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

24 (a) **OBJECTIVE.**—The objective of NASA’s Commer-
25 cial Crew Program shall be to assist the development of

1 at least one crew transportation system to carry NASA
2 astronauts safely, reliably, and affordably to and from the
3 ISS and to serve as an emergency crew rescue vehicle as
4 soon as practicable within the funding levels authorized
5 in this Act.

6 (b) SENSE OF CONGRESS.—It is the sense of Con-
7 gress that once developed and certified to meet NASA’s
8 safety and reliability requirements, United States commer-
9 cially provided crew transportation systems offer the po-
10 tential of serving as the primary means of transporting
11 American astronauts and international partner astronauts
12 to and from the ISS and serving as ISS emergency crew
13 rescue vehicles. At the same time, the budgetary assump-
14 tions used by NASA in its planning for the Commercial
15 Crew Program have consistently assumed significantly
16 higher funding levels than have historically been author-
17 ized and appropriated by Congress. It is the sense of Con-
18 gress that credibility in the Administration’s budgetary es-
19 timates for the Commercial Crew Program can be en-
20 hanced by an independently developed cost estimate. It is
21 further the sense of Congress that this lack of budgetary
22 realism in the planning process creates unnecessary ineffi-
23 ciencies and increased programmatic risk, and NASA
24 should thus adjust its planning process to realistically re-
25 flect the levels of funding authorized in this Act. NASA’s

1 plans indicate that it will not be able to begin contracted-
2 for crew transportation resupply operational flights until
3 fiscal year 2018 even under its optimistic funding assump-
4 tions, which means that NASA is not likely to have a re-
5 quirement for more than a total of 8 commercially pro-
6 vided crew rotation flights prior to the expiration of the
7 current Congressional commitment to continued operation
8 of the ISS in 2020. Thus, it is also the sense of Congress
9 that the highest priority of the Commercial Crew Program
10 should be assisting the development of a safe, reliable, and
11 affordable crew transportation system for transporting
12 NASA astronauts to and from the ISS as soon as prac-
13 ticable within the funding levels authorized in this Act
14 rather than making a specific date for the initiation of
15 operational service drive the program planning.

16 (c) INDEPENDENT COST ESTIMATE.—

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

22 (A) all activities associated with the devel-
23 opment, test, demonstration, and certification
24 of commercial crew transportation systems; and

1 (B) transportation and rescue services re-
2 quired by NASA for ISS operations through
3 calendar year 2020 or later if NASA require-
4 ments so dictate.

5 (2) TRANSMITTAL.—Not later than one year
6 after initiation of the Independent Cost Estimate
7 under paragraph (1), the Administrator shall trans-
8 mit the results of the Independent Cost Estimate to
9 the Committee on Science, Space, and Technology of
10 the House of Representatives and the Committee on
11 Commerce, Science, and Transportation of the Sen-
12 ate.

13 (d) ACQUISITION APPROACH.—

14 (1) RESTRICTION.—The Administrator shall
15 not exercise any optional milestones beyond the base
16 period of the Space Act Agreements established
17 under the Commercial Crew Integrated Capability
18 initiative.

19 (2) SOURCE SELECTION.—To cover all develop-
20 ment, test, demonstration, and certification activities
21 not included in the base period of the Commercial
22 Crew Integrated Capability Space Act Agreements,
23 the Administrator shall conduct a Federal Acquisi-
24 tion Regulation-based competitive source selection
25 for a cost plus incentive fee contract for all activities

1 related to the development, test, demonstration, and
2 certification of one or more commercially provided
3 crew transportation systems to transport NASA as-
4 tronauts to and from the ISS and serve as an emer-
5 gency crew rescue vehicle as soon as practicable
6 under the authorized funding and while ensuring
7 that all safety requirements are met. The number of
8 systems selected shall be consistent with the funding
9 levels authorized in this Act. The Administrator
10 shall identify a methodology by which NASA will en-
11 sure that the Government is not charged for con-
12 tractor costs incurred during development, testing,
13 demonstration, and certification activities by an
14 awardee of the Federal Acquisition Regulation-based
15 contract for operational commercial crew transpor-
16 tation services.

17 (3) COST MINIMIZATION.—The Administrator
18 shall strive through the competitive selection process
19 to minimize the life cycle cost to NASA through the
20 planned period of commercially provided crew trans-
21 portation services.

22 (e) SAFETY.—Consistent with the findings and rec-
23 ommendations of the Columbia Accident Investigation
24 Board, the Administrator shall seek to ensure that mini-
25 mization of the probability of loss of crew shall be an im-

1 portant selection criterion in the competitive selection de-
2 scribed in subsection (d).

3 (f) DETERMINATION OF COST-EFFECTIVENESS OF
4 SERVICES.—NASA, prior to contracting for commercial
5 crew transportation services, shall identify the manner by
6 which it will establish whether such transportation services
7 provide an equally or more cost-effective alternative to
8 current services.

9 (g) OPERATIONAL SERVICES CONTRACT.—

10 (1) IN GENERAL.—The Administrator may not
11 enter into a contract for commercially provided crew
12 transportation services developed and certified as de-
13 scribed in subsection (b) in which the price per seat
14 or total amount charged per year shall be greater
15 than the amount charged per seat or on an annual
16 basis for Soyuz crew transfer services agreed to on
17 April 22, 2013.

18 (2) REPORT.—Not later than 60 days before
19 entering into a contract for commercial crew trans-
20 portation services, the Administrator shall provide a
21 report to the Committee on Science, Space, and
22 Technology of the House of Representatives and the
23 Committee on Commerce, Science, and Transpor-
24 tation of the Senate identifying the methodology and
25 criteria by which the Administrator determined that

1 the price per seat or total annual amount charged
2 per year of procured commercial transportation serv-
3 ices is not greater than the amount charged per seat
4 for Soyuz crew transfer services agreed to on April
5 22, 2013. The Administrator shall also certify, using
6 the methodology identified pursuant to subsection
7 (d)(2), that the service transportation costs con-
8 tracted for do not include contractor costs incurred
9 during development, testing, demonstration, and cer-
10 tification activities. If the Administrator determines
11 that NASA is unable to enter into a contract under
12 the terms specified in paragraph (1), the Adminis-
13 trator shall report that determination to the Com-
14 mittee on Science, Space, and Technology of the
15 House of Representatives and the Committee on
16 Commerce, Science, and Transportation of the Sen-
17 ate, and shall also report what alternative contract
18 arrangement the Administrator will seek to enter
19 into at least 60 days before entering into such an al-
20 ternative contract.

21 **SEC. 217. COMMERCIAL CREW TRANSPORTATION DEVELOP-**
22 **MENT INDEPENDENT REVIEW.**

23 (a) IN GENERAL.—The congressionally established
24 Aerospace Safety Advisory Panel (ASAP) shall conduct a
25 review to determine whether NASA has—

1 (1) adequate assurance that the requirements,
2 standards, and processes for commercial transpor-
3 tation systems developed with NASA funding are
4 held to the same safety standards as Government
5 human spaceflight missions; and

6 (2) developed a procedure to provide inde-
7 pendent assurance of flight safety and flight readi-
8 ness before the authorization of United States Gov-
9 ernment personnel to participate as crew onboard
10 any commercial space transportation system.

11 (b) REPORT.—Not later than 1 year after the date
12 of enactment of this Act, the Aerospace Safety Advisory
13 Panel shall transmit to the Committee on Science, Space,
14 and Technology of the House of Representatives and the
15 Committee on Commerce, Science, and Transportation of
16 the Senate a report describing—

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

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

21 (3) the steps NASA and the commercial space
22 industry need to take to ensure that commercial
23 crew transportation and rescue vehicles have require-
24 ments, standards, and processes equivalent to those
25 of NASA.

1 (c) PROHIBITION AGAINST FINANCIAL COMMITMENT
2 PRIOR TO ASAP REPORT.—The Administrator may not
3 enter into any financially-binding contract with a commer-
4 cial space transportation services provider for crew trans-
5 portation services until 30 days after the Committees' re-
6 ceipt of the report under subsection (b).

7 (d) CERTIFICATION.—The Administrator may not
8 enter into any financially binding contract with a commer-
9 cial space transportation services provider for crew trans-
10 portation services until—

11 (1) the Administrator has transmitted to the
12 Committee on Science, Space, and Technology of the
13 House of Representatives and the Committee on
14 Commerce, Science, and Transportation of the Sen-
15 ate a certification that—

16 (A) the provider with which a contract is
17 planned has demonstrated the safety and reli-
18 ability of its systems for crew transportation
19 and crew rescue to be equivalent to NASA-pro-
20 mulgated safety and reliability policies, proce-
21 dures, and standards for human spaceflight;
22 and

23 (B) successful flight experience accrued
24 has provided NASA with sufficient safety-re-
25 lated and reliability-related data and informa-

1 tion to make an informed assessment about the
2 flight readiness; and

3 (2) all indemnification and liability issues asso-
4 ciated with the use of such systems by the United
5 States Government have been addressed, and the
6 Administrator has transmitted to the Committee on
7 Science, Space, and Technology of the House of
8 Representatives and the Committee on Commerce,
9 Science, and Transportation of the Senate a report
10 describing the indemnification and liability provi-
11 sions that are planned to be included in such con-
12 tracts.

13 **SEC. 218. INTEGRATED PLAN TO EFFECT MAXIMUM UTILI-**
14 **ZATION OF THE ISS.**

15 (a) PURPOSE.—NASA shall seek to maximize the
16 productivity and use of the ISS with respect to scientific
17 and technological research and development, advancement
18 of space exploration, and international collaboration.

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

22 (1) a list of planned activities, including any ac-
23 tivities in support of the goal established in section
24 201, that the Administrator believes require exten-

1 sion of the ISS beyond 2020 to carry out, along with
2 the rationale for carrying out those activities;

3 (2) funding requirements;

4 (3) research or technology objectives to be
5 achieved, including those established to enable the
6 achievement of the goal established in section 201;

7 (4) success criteria; and

8 (5) the details of—

9 (A) the specific objectives for using the
10 ISS through 2020;

11 (B) priorities attributed to these objectives;

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

14 (D) how NASA will achieve those objec-
15 tives and how Congress can measure NASA's
16 progress on those objectives;

17 (E) key assumptions driving the plan; and

18 (F) what NASA will do with the unused
19 capacity and capabilities of the ISS if potential
20 users of the National Laboratory decide not to
21 make significant use of it.

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

1 merce, Science, and Transportation of the Senate, and
2 concurrently to the Office of Management and Budget, the
3 plan developed under subsection (b).

4 **SEC. 219. CENTRIFUGE.**

5 If a commitment is made to extend ISS operation and
6 utilization past 2020, the Administrator shall take all nec-
7 essary steps to provide for the inclusion on the ISS of a
8 variable gravity centrifuge of sufficient size and capability
9 to support both plant and animal research, along with nec-
10 essary support facilities, as soon as practicable.

11 **SEC. 220. MANAGEMENT OF THE ISS NATIONAL LABORA-**
12 **TORY.**

13 (a) **ASSESSMENT.**—The Administrator shall enter
14 into an arrangement with the National Academies for an
15 independent assessment of the status of and performance
16 under the cooperative agreement with the Center for the
17 Advancement of Science in Space (CASIS) for the man-
18 agement of the portion of the ISS that operates as a
19 United States National Laboratory.

20 (b) **REPORT.**—Not later than 1 year after the date
21 of enactment of this Act, the Administrator shall transmit
22 to the Committee on Science, Space, and Technology of
23 the House of Representatives and the Committee on Com-
24 merce, Science, and Transportation of the Senate a report

1 containing the independent assessment conducted pursu-
2 ant to subsection (a). The report shall address—

3 (1) the extent to which CASIS is helping to en-
4 sure that the ISS's unique capabilities are available
5 to the broadest possible cross section of United
6 States scientific, technological, and industrial com-
7 munities;

8 (2) the status of CASIS's development and
9 management of a varied research and development
10 portfolio based on United States national needs;

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

14 (4) efforts to stimulate interest in using the
15 National Laboratory for research and technology
16 demonstrations and as a platform for science, tech-
17 nology, engineering, and mathematics (STEM) edu-
18 cation; and

19 (5) the status of NASA's efforts to transition
20 responsibilities to CASIS for managing the National
21 Laboratory research portfolio, including planning
22 and coordinating ground and on-orbit research ac-
23 tivities.

1 **SEC. 221. BARRIERS IMPEDING ENHANCED UTILIZATION OF**
2 **THE ISS'S NATIONAL LABORATORY BY COM-**
3 **MERCIAL COMPANIES.**

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

6 (1) enhanced utilization of the ISS's National
7 Laboratory requires a full understanding of the bar-
8 riers impeding such utilization and actions needed to
9 be taken to remove or mitigate them to the max-
10 imum extent practicable; and

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

14 (b) ASSESSMENT.—The Administrator shall enter
15 into an arrangement with the National Academies for an
16 assessment to—

17 (1) identify barriers impeding enhanced utiliza-
18 tion of the ISS's National Laboratory;

19 (2) recommend ways to encourage commercial
20 companies to make greater use of the ISS's National
21 Laboratory, including corporate investment in micro-
22 gravity research; and

23 (3) identify any legislative changes that may be
24 required.

25 (c) TRANSMITTAL.—Not later than one year after the
26 date of enactment of this Act, the Administrator shall

1 transmit to the Committee on Science, Space, and Tech-
2 nology of the House of Representatives and the Committee
3 on Commerce, Science, and Transportation of the Senate
4 the results of the assessment described in subsection (b).

5 **Subtitle C—Other Operations**

6 **SEC. 231. INTEGRATED SPACE COMMUNICATIONS NET-** 7 **WORK AND INFRASTRUCTURE.**

8 (a) PLAN.—The Administrator shall prepare an up-
9 dated plan for NASA’s near-Earth, space, and deep space
10 communications network and infrastructure. The plan
11 shall—

12 (1) identify steps to sustain the existing net-
13 work and infrastructure;

14 (2) assess the capabilities, including any up-
15 grades, needed to support NASA’s programs;

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

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

20 (b) TRANSMITTAL.—Not later than 270 days after
21 the date of enactment of this Act, the Administrator shall
22 transmit the plan to the Committee on Science, Space, and
23 Technology of the House of Representatives and the Com-
24 mittee on Commerce, Science, and Transportation of the
25 Senate.

1 **TITLE III—SCIENCE**
2 **Subtitle A—Space Science**

3 **SEC. 301. SENSE OF CONGRESS REGARDING A BALANCED**
4 **SPACE SCIENCE PROGRAM.**

5 It is the sense of Congress that a balanced and ade-
6 quately funded set of activities consistent with the prior-
7 ities identified in the National Academies' decadal surveys
8 constitutes a robust and productive space science program
9 that will advance knowledge and serve as a catalyst for
10 innovation, with such activities consisting of—

- 11 (1) research and analysis grants programs;
12 (2) technology development;
13 (3) small, medium, and large space missions;
14 and
15 (4) suborbital research activities.

16 **SEC. 302. SENSE OF CONGRESS REGARDING INTEGRATED**
17 **TESTING OF JAMES WEBB SPACE TELE-**
18 **SCOPE.**

19 It is the sense of Congress that—

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

1 (2) the JWST will enable American scientists to
2 maintain their leadership in astrophysics and other
3 disciplines;

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

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

8 (5) maintaining this progress will require the
9 Administrator to ensure that integrated testing is
10 appropriately timed and sufficiently comprehensive
11 to enable potential issues to be identified and ad-
12 dressed early enough to be handled within JWST's
13 development schedule.

14 **SEC. 303. SENSE OF CONGRESS REGARDING WFIRST MIS-**
15 **SION.**

16 It is the sense of Congress that the Administrator,
17 to the extent practicable, should make progress on the
18 technologies and capabilities needed to position NASA to
19 meet the objectives of the Wide-Field Infrared Survey Tel-
20 escope (WFIRST) mission, as outlined in the 2010 Na-
21 tional Academies' astronomy and astrophysics decadal
22 survey, in a way that maximizes the scientific productivity
23 of meeting those objectives for the resources invested. It
24 is further the sense of Congress that the WFIRST mission

1 has the potential to enable scientific discoveries that will
2 transform our understanding of the universe.

3 **SEC. 304. ASTROBIOLOGY SCIENCE STRATEGY.**

4 (a) FINDING.—Both the National Academies’ astron-
5 omy and astrophysics decadal survey of 2010 and the
6 planetary science decadal survey of 2011 discuss scientific
7 objectives related to astrobiology. However, a comprehen-
8 sive, independent science strategy for astrobiology has not
9 been carried out.

10 (b) SCIENCE STRATEGY.—Building on the work of
11 the Astrobiology Roadmap process, the Administrator
12 shall enter into an arrangement with the National Acad-
13 emies for a comprehensive assessment of the state of
14 science in astrobiology and development of a strategy for
15 astrobiology science research and activities. The strategy
16 shall take into account the National Academies’ planetary
17 science and astronomy and astrophysics decadal surveys
18 as well as other relevant National Academies studies on
19 NASA’s astrobiology program.

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

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

2 (a) ASSESSMENT.—The Administrator shall enter
3 into an arrangement with the National Academies to as-
4 sess—

5 (1) NASA’s revised post-2016 Mars exploration
6 architecture and its responsiveness to the strategies,
7 priorities, and guidelines put forward by National
8 Academies’ planetary science decadal surveys and
9 other relevant National Academies Mars-related re-
10 ports;

11 (2) the long-term goals of NASA’s Mars Explo-
12 ration Program and such program’s ability to opti-
13 mize the science return, given the current fiscal pos-
14 ture of the program;

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

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

20 (b) TRANSMITTAL.—Not later than 18 months after
21 the date of enactment of this Act, the Administrator shall
22 transmit the results of the assessment to the Committee
23 on Science, Space, and Technology of the House of Rep-
24 resentatives and the Committee on Commerce, Science,
25 and Transportation of the Senate.

1 **SEC. 306. RADIOISOTOPE THERMOELECTRIC GENERATORS.**

2 (a) SENSE OF CONGRESS.—It is the sense of Con-
3 gress that conducting deep space exploration requires ra-
4 dioisotope thermoelectric generators, and establishing con-
5 tinuity in the production of the material needed to power
6 these generators is paramount to the success of these fu-
7 ture deep space missions. It is further the sense of Con-
8 gress that Federal agencies supporting NASA in the pro-
9 duction of such material should do so in a cost effective
10 manner so as not to impose excessive reimbursement re-
11 quirements on NASA.

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

16 (1) detail NASA's current projected mission re-
17 quirements, and associated timeframes, for radioiso-
18 tope power system material;

19 (2) identify the assumptions used to determine
20 NASA's requirements for the material, including—

21 (A) the planned use of Advanced Stirling
22 Radioisotope Generator technology;

23 (B) the status of and timeline for com-
24 pleting development and demonstration of the
25 Advanced Stirling Radioisotope Generator tech-

1 nology, including the development of flight
2 readiness requirements; and

3 (C) the risks, implications, and contin-
4 gencies for NASA mission plans of any delays
5 or unanticipated technical challenges related to
6 the anticipated use of Advanced Stirling Radio-
7 isotope Generator technology;

8 (3) assess the risk to NASA programs of any
9 potential delays in achieving the schedule and mile-
10 stones for planned domestic production of radioiso-
11 tope power system material;

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

14 (5) provide an estimate of the incremental costs
15 required to increase the amount of material pro-
16 duced each year, if such an increase is needed to
17 support additional NASA requirements for the mate-
18 rial;

19 (6) provide details on—

20 (A) what costs NASA will incur that are
21 associated with the radioisotope power systems
22 used by NASA and other Government entities;
23 and

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

1 (7) identify what steps, if any, NASA will take
2 with DOE to preserve the infrastructure and work-
3 force necessary for production of radioisotope power
4 systems; and

5 (8) identify the extent to which NASA's strat-
6 egy is responsive to the recommendations and find-
7 ings from the National Research Council's 2009 re-
8 port titled "Radioisotope Power Systems: An Imper-
9 ative for Maintaining U.S. Leadership in Space Ex-
10 ploration".

11 (c) TRANSMITTAL.—Not later than 180 days after
12 the date of enactment of this Act, the Administrator shall
13 transmit the results of the analysis to the Committee on
14 Science, Space, and Technology of the House of Rep-
15 resentatives and the Committee on Commerce, Science,
16 and Transportation of the Senate.

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

18 (a) SENSE OF CONGRESS.—It is the sense of Con-
19 gress that principal investigator-led small orbital science
20 missions, including CubeSat class, University Explorer
21 (UNEX) class, Small Explorer (SMEX) class, and Ven-
22 ture class, offer valuable opportunities to advance science
23 at low cost, train the next generation of scientists and en-
24 gineers, and enable participants in the program to acquire
25 skills in systems engineering and systems integration that

1 are critical to maintaining the Nation's leadership in space
2 and to enhancing the United States' innovation and com-
3 petitiveness agendas.

4 (b) REVIEW OF PRINCIPAL INVESTIGATOR-LED
5 SMALL ORBITAL SCIENCE MISSIONS.—The Administrator
6 shall conduct a review of the science missions described
7 in subsection (a). The review shall include—

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

12 (2) the opportunities such mission programs
13 provide for scientific research;

14 (3) the opportunities such mission programs
15 provide for training and education, including sci-
16 entific and engineering workforce development, in-
17 cluding for the NASA scientific and engineering
18 workforce; and

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

1 (c) REPORT.—Not later than 270 days after the date
2 of enactment of this Act, the Administrator shall transmit
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 on the review required under subsection (b) and on rec-
7 ommendations to enhance principal investigator-led small
8 orbital science missions conducted by NASA in accordance
9 with the results of the review under subsection (b).

10 **Subtitle B—Earth Science**

11 **SEC. 311. SENSE OF CONGRESS.**

12 It is the sense of Congress that, as recognized in the
13 National Academy of Sciences’ report, “America’s Future
14 in Space”, “the United States, as a global leader, bears
15 a special responsibility to share its expertise and the
16 knowledge and understanding it develops on how best to
17 care for the planet”. It is the further sense of Congress
18 that the Earth’s climate and systems create vulnerabilities
19 against which the United States, in cooperation with other
20 countries, must develop resilience. A commitment to a
21 comprehensive space-based Earth observing system is nec-
22 essary to provide the data to understand Earth’s changing
23 climate and to predict the impacts at the regional level.
24 It also the sense of Congress that NASA’s capabilities and
25 skills play a critical role in carrying out Earth science ob-

1 servations and conducting basic and applied research in
2 coordination with other relevant Federal agencies. It is the
3 further sense of Congress that NASA is being asked to
4 undertake important Earth science activities in an envi-
5 ronment of increasingly constrained fiscal resources, and
6 that any transfer of additional responsibilities to NASA,
7 such as climate instrument development and measure-
8 ments that are currently part of the NOAA portfolio,
9 should be accompanied by the provision of additional re-
10 sources to allow NASA to carry out the increased respon-
11 sibilities without adversely impacting its implementation
12 of its existing Earth science programs and priorities.

13 **SEC. 312. COMPREHENSIVE EARTH OBSERVATION SYSTEMS**
14 **AND RESEARCH PROGRAM.**

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

23 (b) COLLABORATION.—The Administrator shall col-
24 laborate with other Federal agencies, including NOAA,
25 non-Government entities, and international partners, as

1 appropriate, in carrying out NASA's Earth science pro-
2 gram.

3 **SEC. 313. STUDY ON SUSTAINED, LONG-TERM MEASURE-**
4 **MENTS.**

5 (a) STUDY.—The Administrator shall enter into an
6 arrangement with the National Academies for a study to
7 develop a framework for—

8 (1) analyzing the needs for continuity of envi-
9 ronmental and climate measurements of the Earth
10 from space;

11 (2) establishing methodologies and metrics for
12 determining whether measurements should be col-
13 lected for extended periods and for prioritizing those
14 measurements;

15 (3) determining a prioritized list of measure-
16 ments if appropriate;

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

19 (5) considering issues related to the balance
20 among cost, risk, and performance regarding the
21 sustainment of measurements.

22 (b) REPORT.—Not later than 20 months after the
23 date of enactment of this Act, the Administrator shall
24 transmit the results of the study to the Committee on
25 Science, Space, and Technology of the House of Rep-

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

3 **SEC. 314. ASSESSMENT.**

4 The Administrator shall carry out a scientific assess-
5 ment of NASA's Earth science global datasets for the pur-
6 pose of identifying those datasets that are useful for un-
7 derstanding regional changes and variability, and for in-
8 forming the societal benefit areas identified in the Na-
9 tional Global Change Research Plan 2012-2021. The Ad-
10 ministrator shall complete and transmit the assessment to
11 the Committee on Science, Space, and Technology of the
12 House of Representatives and the Committee on Com-
13 merce, Science, and Transportation of the Senate not later
14 than 180 days after the date of enactment of this Act.

15 **SEC. 315. CONTINUITY OF MODERATE RESOLUTION LAND**

16 **IMAGING REMOTE SENSING DATA.**

17 (a) **POLICY.**—Congress reaffirms the finding in sec-
18 tion 2(1) of the Land Remote Sensing Policy Act of 1992
19 (15 U.S.C. 5601(1)) which stated that “The continuous
20 collection and utilization of land remote sensing data from
21 space are of major benefit in studying and understanding
22 human impacts on the global environment, in managing
23 the Earth's natural resources, in carrying out national se-
24 curity functions, and in planning and conducting many

1 other activities of scientific, economic, and social impor-
2 tance.”.

3 (b) CONTINUOUS LAND REMOTE SENSING DATA
4 COLLECTION.—The Director of the Office of Science and
5 Technology Policy shall take steps in consultation with
6 other relevant Federal agencies to ensure, to the maximum
7 extent practicable, the continuous collection of space-
8 based, medium-resolution observations of the Earth’s land
9 cover and to ensure that the data are made available in
10 such ways as to facilitate the widest possible use.

11 **SEC. 316. VENTURE CLASS MISSIONS.**

12 It is the sense of Congress that NASA’s Venture class
13 missions provide opportunities for innovation in the Earth
14 sciences program, offer low-cost approaches for high-qual-
15 ity competitive science investigations, enable frequent
16 flight opportunities to engage the Earth science and appli-
17 cations community, and serve as a training ground for stu-
18 dents and young scientists. It is further the sense of Con-
19 gress that NASA should seek to increase the number of
20 Venture class projects to the extent practicable as part
21 of a balanced Earth science program.

22 **TITLE IV—AERONAUTICS**

23 **SEC. 401. SENSE OF CONGRESS.**

24 It is the sense of Congress that—

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

4 (2) technologies developed by NASA help to se-
5 cure the leadership role of the United States in glob-
6 al aviation, enhance the competitiveness of the
7 United States in the world economy, and improve
8 the quality of life of all our citizens;

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

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

15 (5) carrying aeronautics research to a level of
16 maturity that allows NASA's research results to be
17 transitioned to the users, whether private or public
18 sector, is critical to their eventual adoption.

19 **SEC. 402. AERONAUTICS RESEARCH GOALS.**

20 The Administrator shall ensure that NASA maintains
21 a strong aeronautics research portfolio ranging from fun-
22 damental research through integrated systems research
23 with specific research goals, including the following:

24 (1) AIRSPACE CAPACITY.—NASA's Aeronautics
25 Research Mission Directorate shall—

1 (A) address research needs of the Next
2 Generation Air Transportation System
3 (NextGen), including the ability of the National
4 Airspace System to handle up to 3 times the
5 current travel demand by 2025 and safely inte-
6 grate the operations of autonomous vehicles;
7 and

8 (B) identify critical gaps in technology
9 which must be bridged to enable the Federal
10 Aviation Administration to implement NextGen
11 so that safety and productivity improvements
12 can be achieved as soon as possible.

13 (2) ENVIRONMENTAL SUSTAINABILITY.—Such
14 Directorate shall consider and pursue concepts to re-
15 duce noise, emissions, and fuel consumption while
16 maintaining high safety standards, and conduct re-
17 search related to the impact of alternative fuels on
18 the safety, reliability, and maintainability of current
19 and new air vehicles.

20 (3) AVIATION SAFETY.—Such Directorate shall
21 proactively address safety challenges associated with
22 current and new air vehicles and with operations in
23 the Nation’s current and future air transportation
24 system.

1 (4) INTEGRATED SYSTEMS RESEARCH.—Such
2 Directorate shall mature the most promising tech-
3 nologies to the point at which they can be dem-
4 onstrated in a relevant environment and shall inte-
5 grate individual components and technologies as ap-
6 propriate to ensure that they perform in an inte-
7 grated manner as well as they do when operated in-
8 dividually.

9 **SEC. 403. STRATEGIC PLANNING FOR AERONAUTICS RE-**
10 **SEARCH.**

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

23 **SEC. 404. RESEARCH PROGRAM TO DETERMINE PERCEIVED**
24 **IMPACT OF SONIC BOOMS.**

25 (a) FINDINGS.—Congress finds that—

1 (1) the ability to fly commercial aircraft over
2 land at supersonic speeds without adverse impacts
3 on the environment or on local communities would
4 open new global markets and enable new transpor-
5 tation capabilities; and

6 (2) a research program is needed to assess the
7 impact in a relevant environment of commercial su-
8 perersonic flight operations and provide the basis for
9 establishing appropriate sonic boom standards for
10 such flight operations.

11 (b) FLIGHT DEMONSTRATIONS.—The Administrator
12 shall continue NASA’s cooperative research program with
13 industry and work with industry partners to design, build,
14 and fly a demonstrator to collect data on the perceived
15 impact of sonic booms that could enable the promulgation
16 of appropriate standards for overland commercial super-
17 sonic flight operations.

18 (c) COORDINATION.—The Administrator shall ensure
19 that sonic boom research is coordinated as appropriate
20 with the Administrator of the Federal Aviation Adminis-
21 tration.

1 **SEC. 405. RESEARCH PROGRAM TO FACILITATE GREATER**
2 **USE OF COMPOSITE MATERIALS IN AIR-**
3 **CRAFT.**

4 The Administrator shall continue NASA's cooperative
5 research program with industry to identify and dem-
6 onstrate more effective and safe ways of developing, manu-
7 facturing, and maintaining composite materials for use in
8 airframes, subsystems, and propulsion components.

9 **SEC. 406. TRANSFORMATIVE AERONAUTICS RESEARCH.**

10 It is the sense of Congress that the Administrator,
11 in looking strategically into the future and ensuring that
12 NASA's Center personnel are at the leading edge of aero-
13 nautics research, should continue building on NASA's In-
14 novative Concepts for Aviation project that supports the
15 early-stage advancement of new processes, novel concepts,
16 and innovative technologies that have the potential to meet
17 national aeronautics needs. The Administrator shall con-
18 tinue to ensure that awards for the investigation of these
19 concepts and technologies are open for competition among
20 NASA civil servants at its Centers, separate from other
21 awards open only to non-NASA sources, including the Jet
22 Propulsion Laboratory.

23 **SEC. 407. UNITED STATES LEADERSHIP IN AERONAUTICS**
24 **RESEARCH.**

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

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

3 (2) other countries are making concerted efforts
4 to reach and then surpass the United States in civil
5 aeronautics research; and

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

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

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

15 (2) ascertain whether other countries are catch-
16 ing up or have surpassed the United States in civil
17 aeronautics research;

18 (3) identify in what areas the United States is
19 losing ground; and

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

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

24 (B) identifying public-private partnerships
25 that could be formed; and

1 that are independent of specific space mission flight
2 projects. The program shall support—

3 (1) early-stage concepts and innovation;

4 (2) development of innovative technologies in
5 areas such as in-space chemical and electrical pro-
6 pulsion, power generation and storage, liquid rocket
7 propulsion, avionics, structures, and materials that
8 may enable new approaches to human and robotic
9 space missions;

10 (3) flight demonstrations of technologies, in-
11 cluding those that have the potential to benefit mul-
12 tiple NASA mission directorates, other Federal Gov-
13 ernment agencies, and the commercial space indus-
14 try;

15 (4) NASA commitments to Small Business In-
16 novation Research (SBIR) and Small Business
17 Technology Transfer (STTR) programs and activi-
18 ties; and

19 (5) research, development, and demonstration
20 of enabling technologies in support of future explo-
21 ration missions.

22 (b) RESEARCH AND DEVELOPMENT PROGRAM.—In
23 conducting the space technology program established
24 under this section, the Administrator shall—

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

4 (2) make use of small satellites and NASA sub-
5 orbital platforms, to the extent practicable, to dem-
6 onstrate space technology concepts and develop-
7 ments; and

8 (3) undertake partnerships with other Federal
9 agencies, universities, private industry, and other
10 spacefaring nations, as appropriate.

11 (c) REPORT.—Not later than 180 days after the date
12 of enactment of this Act, the Administrator shall provide
13 to the Committee on Science, Space, and Technology of
14 the House of Representatives and the Committee on Com-
15 merce, Science, and Transportation of the Senate a report
16 comparing NASA’s space technology investments with the
17 16 high-priority technology areas identified by the Na-
18 tional Academies in the National Research Council’s re-
19 port on NASA’s Space Technology Roadmaps. The Ad-
20 ministrator shall identify how NASA will address any gaps
21 between the agency’s investments and the recommended
22 technology areas, including a projection of funding re-
23 quirements.

1 **TITLE VI—ACQUISITION**
2 **MANAGEMENT**

3 **SEC. 601. PROJECT AND PROGRAM RESERVES.**

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

9 (b) FINANCIAL DISCIPLINE.—To ensure that the es-
10 tablishment, maintenance, and allotment of project and
11 program reserves contribute to prudent management, not
12 later than 180 days after the date of enactment of this
13 Act the Administrator shall transmit to the Committee on
14 Science, Space, and Technology of the House of Rep-
15 resentatives and the Committee on Commerce, Science,
16 and Transportation of the Senate a report describing—

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

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

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

1 **SEC. 602. COST ESTIMATION.**

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

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

12 (1) guidance on whether and when an Inde-
13 pendent Cost Estimate and Independent Cost As-
14 sessment should be used; and

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

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

23 (1) describing efforts to enhance internal cost
24 estimation and assessment expertise;

25 (2) identifying criteria used by programs and
26 projects in determining whether and when to con-

1 duct an Independent Cost Estimate or Independent
2 Cost Assessment; and

3 (3) listing the costs of each individual Inde-
4 pendent Cost Estimate or Independent Cost Assess-
5 ment activity conducted in fiscal year 2011, fiscal
6 year 2012, and fiscal year 2013, the purpose of the
7 activity, and key findings and recommendations.

8 **SEC. 603. INDEPENDENT REVIEWS.**

9 Not later than 270 days after the date of enactment
10 of this Act, the Administrator shall transmit to the Com-
11 mittee on Science, Space, and Technology of the House
12 of Representatives and the Committee on Commerce,
13 Science, and Transportation of the Senate a report de-
14 scribing—

15 (1) the internal entities independent of project
16 and program management that conduct reviews of
17 projects and programs at life cycle milestones; and

18 (2) how NASA ensures the independence of
19 such entities and their members.

20 **SEC. 604. AVOIDING ORGANIZATIONAL CONFLICTS OF IN-**
21 **TEREST IN MAJOR NASA ACQUISITION PRO-**
22 **GRAMS.**

23 (a) **REVISED REGULATIONS REQUIRED.**—Not later
24 than 270 days after the date of enactment of this Act,
25 the Administrator shall revise the NASA Supplement to

1 the Federal Acquisition Regulation to provide uniform
2 guidance and tighten existing requirements for organiza-
3 tional conflicts of interest by contractors in major acquisi-
4 tion programs.

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

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

9 (A) lead system integrator contracts on
10 major acquisition programs and contracts that
11 follow lead system integrator contracts on such
12 programs, particularly contracts for production;

13 (B) the ownership of business units per-
14 forming systems engineering and technical as-
15 sistance functions, professional services, or
16 management support services in relation to
17 major acquisition programs by contractors who
18 simultaneously own business units competing to
19 perform as either the prime contractor or the
20 supplier of a major subsystem or component for
21 such programs;

22 (C) the award of major subsystem con-
23 tracts by a prime contractor for a major acqui-
24 sition program to business units or other affili-
25 ates of the same parent corporate entity, and

1 particularly the award of subcontracts for soft-
2 ware integration or the development of a pro-
3 prietary software system architecture; or

4 (D) the performance by, or assistance of,
5 contractors in technical evaluations on major
6 acquisition programs;

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

11 (3) require that a contract for the performance
12 of systems engineering and technical assistance
13 functions for a major acquisition program contains
14 a provision prohibiting the contractor or any affiliate
15 of the contractor from participating as a prime con-
16 tractor or a major subcontractor in the development
17 of a system under the program; and

18 (4) establish such limited exceptions to the re-
19 quirement in paragraphs (2) and (3) as may be nec-
20 essary to ensure that NASA has continued access to
21 advice on systems architecture and systems engi-
22 neering matters from highly-qualified contractors
23 with domain experience and expertise, while ensuring
24 that such advice comes from sources that are objec-
25 tive and unbiased.

1 **SEC. 605. MANAGING TERMINATION LIABILITY.**

2 (a) RESERVATION OF FUNDS.—The Administrator
3 may not reserve funds or require the reservation of funds
4 for potential termination liability with respect to a covered
5 program. Funds that have been reserved before the date
6 of enactment of this Act for potential termination liability
7 shall be promptly used to make maximum progress in
8 meeting the established goals and milestones of the cov-
9 ered program.

10 (b) TERMINATION FOR CONVENIENCE.—The Admin-
11 istrator may not initiate the termination for the conven-
12 ience of the Government of a contract on a covered pro-
13 gram unless—

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

17 (2) either—

18 (A) the Administrator has provided a sup-
19 plemental appropriation request under sub-
20 section (c) with respect to associated termi-
21 nation liability costs; or

22 (B) sufficient funds are available to cover
23 such termination liability costs in the appro-
24 priations account that is funding the prime con-
25 tract being terminated.

1 (c) SUPPLEMENTAL APPROPRIATION REQUEST.—If
2 sufficient appropriations are not available to cover termi-
3 nation liability costs in the appropriations account that is
4 funding the prime contract being terminated, the Adminis-
5 trator shall provide to Congress a supplemental appropria-
6 tion request to cover such termination liability costs. Such
7 request shall be provided not later than 120 days in ad-
8 vance of the contract termination settlement for the cov-
9 ered program.

10 (d) INTENT OF CONGRESS.—It is the intent of Con-
11 gress to provide such additional appropriations as may be
12 necessary to provide for termination liability payments on
13 contracts for covered programs.

14 (e) REPORTING.—Not later than 6 months after the
15 date of enactment of this Act, and every 6 months there-
16 after for the duration of the prime contracts for the cov-
17 ered programs, the Administrator shall transmit to the
18 Committee on Science, Space, and Technology of the
19 House of Representatives and the Committee on Com-
20 merce, Science, and Transportation of the Senate a report
21 that—

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

24 (2) explains the basis on which the estimates
25 were determined.

1 **TITLE VII—OTHER PROVISIONS**

2 **SEC. 701. FACILITIES AND INFRASTRUCTURE.**

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

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

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

15 (3) to ensure continued access to reliable and
16 efficient world-class facilities by researchers, NASA
17 should seek to establish strategic partnerships with
18 other Federal agencies, academic institutions, and
19 industry, as appropriate; and

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

24 (b) PLAN.—The Administrator shall develop a plan
25 that has the goal of positioning NASA to have the facili-

1 ties, laboratories, tools, and approaches necessary to ad-
2 dress future NASA requirements. Such plan shall iden-
3 tify—

4 (1) future NASA testing needs;

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

8 (A) the National Space Policy;

9 (B) the National Aeronautics Research,
10 Development, Test and Evaluation (RDT&E)
11 Infrastructure Plan; and

12 (C) NASA Authorization Acts;

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

16 (4) criteria for prioritizing deferred mainte-
17 nance tasks and also for upgrading or modernizing
18 laboratories, facilities, and equipment;

19 (5) an assessment of modifications needed to
20 maximize usage of facilities that offer unique and
21 highly specialized benefits to the aerospace industry
22 and the American public; and

23 (6) implementation steps, including a timeline,
24 milestones, and an estimate of resources required for
25 carrying out the plan.

1 (c) TRANSMITTAL.—Not later than one year after the
2 date of enactment of this Act, the Administrator shall
3 transmit the plan to the Committee on Science, Space, and
4 Technology of the House of Representatives and the Com-
5 mittee on Commerce, Science, and Transportation of the
6 Senate.

7 (d) ESTABLISHMENT OF CAPITAL FUNDS.—The Ad-
8 ministrator shall establish a capital fund at each of
9 NASA’s field centers for the modernization of facilities
10 and laboratories. The Administrator shall ensure to the
11 maximum extent practicable that all financial savings
12 achieved by closing outdated or surplus facilities at a
13 NASA field center shall be made available to that center’s
14 capital fund for the purpose of modernizing the field cen-
15 ter’s facilities and laboratories and for upgrading the in-
16 frastructure at the field center.

17 **SEC. 702. NASA EDUCATION PROGRAM.**

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

20 (1) NASA’s missions are an inspiration for
21 Americans and in particular for the next generation
22 and that this inspiration has a powerful effect in
23 stimulating interest in science, technology, education
24 and mathematics (STEM) education and careers;

1 1988 (42 U.S.C. 2486 et seq.), has been an important
2 program by which the Federal Government has partnered
3 with State and local governments, universities, private in-
4 dustry, and other organizations to enhance the under-
5 standing and use of space and aeronautics activities and
6 their benefits through education, fostering of interdiscipli-
7 nary and multidisciplinary space research and training,
8 and supporting Federal funding for graduate fellowships
9 in space-related fields, among other purposes.

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

12 (1) a review of the National Space Grant Col-
13 lege and Fellowship Program, including its structure
14 and capabilities for supporting science, technology,
15 engineering, and mathematics education and train-
16 ing consistent with the National Science and Tech-
17 nology Council’s Federal Science, Technology, Engi-
18 neering, and Mathematics (STEM) Education 5-
19 Year Strategic Plan; and

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

24 (c) TRANSMITTAL.—Not later than 18 months after
25 the date of enactment of this Act, the Administrator shall

1 transmit the results of the review 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.

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

7 Not later than one year after the date of enactment
8 of this Act, the Comptroller General shall transmit to the
9 Committee on Science, Space, and Technology of the
10 House of Representatives and the Committee on Com-
11 merce, Science, and Transportation of the Senate a review
12 of NASA's processes and controls to detect and prevent
13 the use of counterfeit parts in NASA mission projects, in-
14 struments, and other mission-related assets. The review
15 shall examine—

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

18 (2) NASA's processes and controls to detect
19 counterfeit parts and prevent their incorporation
20 into NASA mission projects, instruments, and other
21 mission-related assets;

22 (3) key differences between how the Depart-
23 ment of Defense and NASA detect and prevent the
24 use of counterfeit parts, and lessons learned by the

1 Department of Defense that could be valuable to
2 NASA; and

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

7 **SEC. 705. REMOTE SATELLITE SERVICING DEMONSTRA-**
8 **TIONS.**

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

11 (1) NASA plays a key role in demonstrating the
12 feasibility of using robotic technologies for a space-
13 craft that could access, repair, and refuel satellites
14 in geosynchronous Earth orbit;

15 (2) demonstrating this feasibility would both as-
16 sist NASA in its future missions and provide the
17 emerging commercial satellite-servicing industry the
18 confidence to robotically refuel, repair, and maintain
19 satellites in both near and distant orbits; and

20 (3) the capability to refuel, repair, and main-
21 tain geosynchronous satellites robotically could add
22 years of functional life to satellites.

23 (b) REPORT.—Not later than 120 days after the date
24 of enactment of this Act, the Administrator shall transmit
25 a report to the Committee on Science, Space, and Tech-

1 nology of the House of Representatives and the Committee
2 on Commerce, Science, and Transportation of the Senate
3 describing—

4 (1) NASA's activities, tools, and techniques as-
5 sociated with the ultimate goal of servicing satellites
6 using robotic spacecraft;

7 (2) accomplishments to date in demonstrating
8 various servicing technologies;

9 (3) major challenges encountered and mitiga-
10 tion measures taken; and

11 (4) demonstrations still needed for NASA and
12 industry acceptance of the technologies for oper-
13 ational missions, and the timeframe for these dem-
14 onstrations.

15 **SEC. 706. ASTRONAUT OCCUPATIONAL HEALTHCARE.**

16 (a) WORKSHOP.—Not later than 180 days after the
17 date of enactment of this Act, the Administrator shall con-
18 vene a workshop attended by both current and former
19 members of the astronaut corps, as well as other appro-
20 priate experts, to focus on the advantages and disadvan-
21 tages of granting NASA the specific authority to monitor
22 and treat current and former members of the astronaut
23 corps for medical conditions which are deemed by NASA
24 to be associated with human space flight conducted in fur-
25 therance of NASA requirements. The workshop shall also

1 address the implications of allowing NASA to retain ac-
2 cess to astronaut medical records.

3 (b) REPORT.—Not later than 90 days after comple-
4 tion of the workshop, the Administrator shall provide a
5 report summarizing the results of the workshop to the
6 Committee on Science, Space, and Technology of the
7 House of Representatives and the Committee on Com-
8 merce, Science, and Transportation of the Senate.

9 **SEC. 707. USE OF OPERATIONAL COMMERCIAL SUB-**
10 **ORBITAL VEHICLES FOR RESEARCH, DEVEL-**
11 **OPMENT, AND EDUCATION.**

12 (a) REPORT.—The Administrator shall prepare a re-
13 port with respect to the use of operational commercial re-
14 usable suborbital flight vehicles for carrying out scientific
15 and engineering investigations and educational activities.

16 The report shall—

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

19 (2) describe the processes required to support
20 such use;

21 (3) describe NASA, space flight operator, and
22 supporting contractor responsibilities for developing
23 standard payload interfaces and conducting payload
24 safety analyses, payload integration and processing,
25 payload operations, and safety assurance for NASA-

1 sponsored space flight participants, among other
2 functions required to fly NASA-sponsored payloads
3 and space flight participants on operational commer-
4 cial orbital vehicles;

5 (4) identify NASA-provided hardware, software,
6 or services that may be provided to space flight op-
7 erators on a cost-reimbursable basis, through agree-
8 ments or contracts entered into under section
9 20113(e) of title 51, United States Code; and

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

16 (b) CAPABILITIES AND RISKS.—The Administrator
17 shall assess and characterize the potential capabilities and
18 performance of commercial reusable suborbital vehicles for
19 addressing scientific research, including research requiring
20 access to low-gravity and microgravity environments, for
21 carrying out technology demonstrations related to science,
22 exploration, or space operations requirements, and for pro-
23 viding opportunities for educating and training space sci-
24 entists and engineers, once those vehicles become oper-
25 ational. The assessment shall also characterize the risks

1 of using potential commercial reusable suborbital flights
2 to NASA-sponsored researchers and scientific investiga-
3 tions and flight hardware.

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

10 (d) REPORTS.—

11 (1) ANNUAL PROGRESS REPORTS.—The Admin-
12 istrator shall transmit a report annually to the Com-
13 mittee on Science, Space, and Technology of the
14 House of Representatives and the Committee on
15 Commerce, Science, and Transportation of the Sen-
16 ate describing progress in carrying out the Commer-
17 cial Reusable Suborbital Research Program, includ-
18 ing the number and type of suborbital missions
19 planned in each fiscal year.

20 (2) INDEMNIFICATION AND LIABILITY.—The
21 Administrator shall not proceed with a request for
22 proposals, award any contract, commit any United
23 States Government funds, or enter into any other
24 agreement for the provision of a commercial reusable
25 suborbital vehicle launch service for a NASA-spon-

1 sored spaceflight participant until indemnification
2 and liability issues associated with the use of such
3 systems by the United States Government have been
4 addressed and the Administrator has provided to the
5 Committee on Science, Space, and Technology of the
6 House of Representatives and the Committee on
7 Commerce, Science, and Transportation of the Sen-
8 ate a report describing the indemnification and li-
9 ability provisions that are planned to be included in
10 such contracts and agreements.

11 **SEC. 708. FUNDAMENTAL SPACE LIFE AND PHYSICAL**
12 **SCIENCES RESEARCH.**

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

1 in keeping with the priorities established in the National
2 Academies' decadal survey entitled "Recapturing a Future
3 for Space Exploration: Life and Physical Sciences Re-
4 search for a New Era".

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

11 (c) STRATEGIC PLAN.—

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

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

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

3 **SEC. 709. RESTORING NASA'S COMMITMENT TO ENGINEER-**
4 **ING RESEARCH.**

5 (a) SENSE OF CONGRESS.—It is the sense of Con-
6 gress that engineering excellence has long been a hallmark
7 of NASA's ability to make significant advances in aero-
8 nautics and space exploration. However, as has been noted
9 in recent National Academies reports, increasingly con-
10 strained funding and competing priorities have led to an
11 erosion of NASA's commitment to basic engineering re-
12 search, the research that provides the basis for the tech-
13 nology development that enables NASA's many chal-
14 lenging missions to succeed. If current trends continue,
15 NASA's ability to attract and maintain the best and
16 brightest engineering workforce at the NASA Centers as
17 well as its ability to remain on the cutting edge of aero-
18 nautical and space technology will continue to erode and
19 will threaten NASA's ability to be a world leader in aero-
20 nautics research and development and space exploration.

21 (b) PLAN.—The Administrator shall develop a plan
22 for restoring a meaningful basic engineering research pro-
23 gram at the NASA Centers, including, as appropriate, col-
24 laborations with industry, universities, and other relevant
25 organizations. The plan shall identify the organizational

1 approach to be followed, an initial set of basic research
2 priorities, and a proposed budget.

3 (c) REPORT.—Not later than 180 days after the date
4 of enactment of this Act, the Administrator shall transmit
5 the plan to the Committee on Science, Space, and Tech-
6 nology of the House of Representatives and the Committee
7 on Commerce, Science, and Transportation of the Senate.

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

9 (a) STUDY.—The Administrator, in collaboration
10 with other relevant Federal agencies, shall carry out a
11 technical and scientific assessment of the capabilities and
12 resources required to expand NASA's Near-Earth Object
13 Program, to include the detection, tracking, cataloguing,
14 and characterizing of potentially hazardous near-Earth
15 objects 30-50 meters in diameter.

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

22 **SEC. 711. RESEARCH ON NEAR-EARTH OBJECT TSUNAMI**
23 **EFFECTS.**

24 (a) REPORT ON POTENTIAL TSUNAMI EFFECTS
25 FROM NEAR-EARTH OBJECT IMPACT.—The Adminis-

1 trator, in collaboration with the Administrator of NOAA
2 and other relevant Federal agencies, shall prepare a report
3 identifying and describing existing research activities and
4 further research objectives that would increase our under-
5 standing of the nature of the effects of potential tsunamis
6 that could occur if a near-Earth object were to impact an
7 ocean of Earth.

8 (b) TRANSMITTAL.—Not later than 180 days after
9 the date of enactment of this Act, the Administrator shall
10 transmit the report required prepared under subsection
11 (a) to the Committee on Science, Space, and Technology
12 of the House of Representatives and the Committee on
13 Commerce, Science, and Transportation of the Senate.

14 **SEC. 712. REVIEW OF ORBITAL DEBRIS REMOVAL CON-**
15 **CEPTS.**

16 (a) SENSE OF CONGRESS.—It is the sense of Con-
17 gress that the amount of orbital debris in low-Earth orbit
18 poses risks for human activities and robotic spacecraft and
19 that this debris may increase due to collisions between ex-
20 isting debris objects. Understanding options to address
21 and remove orbital debris is important for ensuring safe
22 and effective spacecraft operations in low-Earth orbit.

23 (b) REVIEW.—The Administrator, in collaboration
24 with other relevant Federal agencies, shall solicit and re-
25 view concepts and technological options for removing or-

1 bital debris from low-Earth orbit. The solicitation and re-
2 view shall also address the requirements for and feasibility
3 of developing and implementing each of the options.

4 (c) TRANSMITTAL.—Not later than 270 days after
5 the date of enactment of this Act, the Administrator shall
6 provide a report to the Committee on Science, Space, and
7 Technology of the House of Representatives and the Com-
8 mittee on Commerce, Science, and Transportation of the
9 Senate on the solicitation and review required under sub-
10 section (b).