

AMENDMENT IN THE NATURE OF A SUBSTITUTE
TO _____
OFFERED BY MR. GORDON OF TENNESSEE

Strike all after the enacting clause and insert the following:

1 SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

2 (a) SHORT TITLE.—This Act may be cited as the
3 “National Aeronautics and Space Administration Author-
4 ization Act of 2010”.

5 (b) TABLE OF CONTENTS.—The table of contents for
6 this Act is as follows:

- Sec. 1. Short title; table of contents.
- Sec. 2. Findings.
- Sec. 3. Definitions.

TITLE I—AUTHORIZATION OF APPROPRIATIONS

- Sec. 101. Fiscal year 2011.
- Sec. 102. Fiscal year 2012.
- Sec. 103. Fiscal year 2013.

TITLE II—POLICY FOR HUMAN SPACE FLIGHT AND
EXPLORATION

- Sec. 201. United States human space flight policy.
- Sec. 202. Independent study on human exploration of space.

TITLE III—EXPANSION OF HUMAN SPACE FLIGHT BEYOND THE
INTERNATIONAL SPACE STATION AND LOW-EARTH ORBIT

- Sec. 301. Human space flight beyond low-Earth orbit.
- Sec. 302. Space launch system.
- Sec. 303. Multipurpose crew vehicle.
- Sec. 304. Utilization of existing workforce and assets in development of Space Launch System and multipurpose crew vehicle.
- Sec. 305. NASA launch support and infrastructure modernization program for the Space Launch System.
- Sec. 306. Space radiation.

TITLE IV—DEVELOPMENT AND USE OF COMMERCIAL CARGO
AND CREW TRANSPORTATION CAPABILITIES

- Sec. 401. Affirmation of policy.
- Sec. 402. Combined commercial cargo and crew capabilities development and crew capabilities account.
- Sec. 403. Commercial cargo capabilities development.
- Sec. 404. Commercial crew transportation capabilities development activities.
- Sec. 405. Procurement of commercial crew transportation services.
- Sec. 406. Acquisition strategy for procurement of commercial crew transportation services.
- Sec. 407. Report on International Space Station cargo return capability.

TITLE V—CONTINUATION, SUPPORT, AND EVOLUTION OF THE
INTERNATIONAL SPACE STATION

- Sec. 501. Continuation of the International Space Station through 2020.
- Sec. 502. Maximum utilization of the International Space Station.
- Sec. 503. Maintenance of United States segment and assurance of continued operations of the International Space Station.
- Sec. 504. Management of the ISS National Laboratory.
- Sec. 505. Outreach plan for United States ISS research.
- Sec. 506. Centrifuge.
- Sec. 507. ISS cargo resupply requirements and contingency capacity through 2020.
- Sec. 508. Exploration technology development using the ISS.
- Sec. 509. Fundamental space life science and physical sciences and related technology research.

TITLE VI—SPACE SHUTTLE RETIREMENT AND DISPOSITION

- Sec. 601. Sense of Congress on the Space Shuttle program.
- Sec. 602. Disposition of orbiter vehicles.

TITLE VII—EARTH SCIENCE

- Sec. 701. Sense of Congress on Earth observations.
- Sec. 702. Essential space-based Earth science and climate measurements.
- Sec. 703. Earth observations strategy and interagency coordination.
- Sec. 704. Decadal survey missions implementation for Earth observation.
- Sec. 705. Expansion of Earth science applications.
- Sec. 706. Earth science applications.
- Sec. 707. Commercial remote sensing data purchases pilot project.
- Sec. 708. Instrument test-beds and venture class missions.
- Sec. 709. Sense of Congress on NPOESS follow-on program.
- Sec. 710. Report on temperature records.

TITLE VIII—SPACE SCIENCE

- Sec. 801. Technology development.
- Sec. 802. Suborbital research activities.
- Sec. 803. Sense of Congress on overall science portfolio.
- Sec. 804. In-space servicing.
- Sec. 805. Decadal results.
- Sec. 806. Ongoing restoration of radioisotope thermoelectric generator material production.
- Sec. 807. Review of Explorer Program.

- Sec. 808. Collaboration with ESMD and SOMD on robotic missions.
- Sec. 809. Near-Earth object survey and policy with respect to threats posed.
- Sec. 810. Space weather.

TITLE IX—AERONAUTICS AND SPACE TECHNOLOGY

- Sec. 901. Sense of Congress on aeronautics research and development.
- Sec. 902. Aeronautics research goals.
- Sec. 903. Research coordination and collaboration.
- Sec. 904. Environmentally friendly aircraft research and development initiative.
- Sec. 905. Research on NextGen airspace management concepts and tools.
- Sec. 906. Research on aircraft cabin air quality.
- Sec. 907. Research on onboard volcanic ash sensor systems.
- Sec. 908. Aeronautics test facilities.
- Sec. 909. Expanded research program on composite materials used in aerospace.
- Sec. 910. Goal for NASA space technology.
- Sec. 911. Implementation plan for NASA space technology.
- Sec. 912. Decadal survey for NASA space technology.
- Sec. 913. Use of operational commercial suborbital vehicles for research, development, and education.

TITLE X—EDUCATION

- Sec. 1001. STEM education and training.
- Sec. 1002. Sense of Congress on the Experimental Program to Stimulate Competitive Research.
- Sec. 1003. Study of potential commercial orbital platform program impact on science, technology, engineering, and mathematics.
- Sec. 1004. Assessment of impediments to space science and engineering workforce development for minority and underrepresented groups at NASA.
- Sec. 1005. Independent review of the National Space Grant College and Fellowship Program.
- Sec. 1006. Hands-on space science and engineering education and training.

TITLE XI—REALIGNING AND REVITALIZING INSTITUTIONAL CAPABILITIES

- Sec. 1101. Sense of Congress on realigning and revitalizing institutional capabilities.
- Sec. 1102. Institutional requirements study.
- Sec. 1103. Modernization of laboratories, facilities, and equipment.
- Sec. 1104. NASA capabilities study requirement.
- Sec. 1105. Community transition support.
- Sec. 1106. Workforce stabilization and critical skills preservation.
- Sec. 1107. James E. Webb Cooperative Education Distinguished Scholar program.

TITLE XII—OTHER MATTERS

- Sec. 1201. Report on space traffic management.
- Sec. 1202. National and international orbital debris mitigation.
- Sec. 1203. Strengthening acquisition and program management and controlling program costs.
- Sec. 1204. Amendment to the National Aeronautics and Space Act of 1958.

- Sec. 1205. Sense of Congress on independent verification and validation of NASA software.
- Sec. 1206. Counterfeit and substandard parts.
- Sec. 1207. Information security.
- Sec. 1208. Enhanced-use leasing.
- Sec. 1209. Sense of Congress concerning the Stennis Space Center.
- Sec. 1210. Preservation and management of lunar sites.
- Sec. 1211. Continuity of moderate resolution land imaging remote sensing data.
- Sec. 1212. Study on export control matters related to United States astronaut safety and NASA mission operations.
- Sec. 1213. Ethics programs in the Office of General Counsel.
- Sec. 1214. Independent cost analysis.

TITLE XIII—COMPLIANCE WITH STATUTORY PAY-AS-YOU-GO-ACT
OF 2010

- Sec. 1301. Compliance provision.

1 **SEC. 2. FINDINGS.**

2 The Congress makes the following findings:

- 3 (1) In the 50 years since the establishment of
4 NASA, the arena of space has evolved substantially.
5 As the uses and users of space continue to expand,
6 the issues and operations in the regions closest to
7 Earth have become increasingly complex, with a
8 growing number of overlaps between civil, commer-
9 cial, and national security activities. These develop-
10 ments present opportunities and challenges to the
11 space activities of NASA and the United States.
- 12 (2) The extraordinary challenges of achieving
13 access to space both motivated and accelerated the
14 development of technologies and industrial capabili-
15 ties that have had widespread applications which
16 have contributed to the technological excellence of
17 the United States. It is essential to tie space activity

1 to human challenges ranging from enhancing the in-
2 fluence, relationships, security, economic develop-
3 ment, and commerce of the United States to improv-
4 ing the overall human condition.

5 (3) NASA's programs have the potential to in-
6 spire our youth to pursue studies and careers in
7 science, technology, engineering, and mathematics,
8 and NASA should carry out its activities in a man-
9 ner that enhances the educational and outreach po-
10 tential of its programs.

11 (4) It is essential to the economic well-being of
12 the United States that its aerospace industrial ca-
13 pacity, highly skilled workforce, and embedded ex-
14 pertise remain engaged in demanding, challenging,
15 and exciting efforts that ensure United States lead-
16 ership in space exploration and related activities.

17 (5) A strong, robust NASA program is in the
18 national interest. Ensuring that it can continue to
19 pursue cutting-edge space and aeronautical research
20 and development activities and push back the fron-
21 tier of space exploration requires a sustained and
22 adequate commitment in resources. However,
23 NASA's share of the Federal discretionary budg-
24 etary authority has declined significantly relative to
25 its post-Apollo historical average. It should be a na-

1 tional goal to restore NASA’s funding share to its
2 post-Apollo historical average.

3 (6) NASA is and should remain a multimission
4 agency with a balanced and robust set of core mis-
5 sions in science, aeronautics, and human space flight
6 and exploration.

7 (7) NASA should be vigilant in taking all nec-
8 essary steps to control cost and schedule growth in
9 mission projects, including the development of an in-
10 tegrated cost containment strategy, and adopt meas-
11 ures that improve the performance and transparency
12 of its cost and acquisition management practices.
13 NASA should approach cost and schedule manage-
14 ment with the same level of innovation, rigor, and
15 technical excellence that it applies to the execution
16 of its mission projects.

17 **SEC. 3. DEFINITIONS.**

18 In this Act:

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

22 (2) CIS-LUNAR SPACE.—The term “cis-lunar
23 space” means the region of space from the Earth
24 out to and including the region around the surface
25 of the Moon.

1 (3) DEEP SPACE.—The term “deep space”
2 means the region of space beyond cis-lunar space.

3 (4) INSTITUTION OF HIGHER EDUCATION.—The
4 term “institution of higher education” has the
5 meaning given such term in section 101 of the High-
6 er Education Act of 1965 (20 U.S.C. 2001).

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

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

11 (7) NEAR-EARTH SPACE.—The term “near-
12 Earth space” means the region of space that in-
13 cludes low-Earth orbit and extends out to and in-
14 cludes geosynchronous orbit.

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

17 (9) OSTP.—The term “OSTP” means the Of-
18 fice of Science and Technology Policy.

19 (10) SPACE LAUNCH SYSTEM.—The term
20 “Space Launch System” means the approach NASA
21 will take, consistent with the provisions of this Act,
22 to achieve the United States Government launch-re-
23 lated capabilities called for in this Act.

1 **TITLE I—AUTHORIZATION OF**
2 **APPROPRIATIONS**

3 **SEC. 101. FISCAL YEAR 2011.**

4 There are authorized to be appropriated to NASA for
5 fiscal year 2011, \$19,000,000,000, as follows:

6 (1) For Exploration, \$3,998,100,000, of
7 which—

8 (A) \$3,381,100,000 shall be for the imple-
9 mentation of the Space Launch System, multi-
10 purpose crew vehicle, and associated program
11 and other necessary support, including
12 \$428,600,000 for the NASA Launch Support
13 and Infrastructure Modernization Program;

14 (B) \$155,000,000 shall be for Human Re-
15 search;

16 (C) \$412,000,000 shall be for Commercial
17 Cargo and Crew Capability Development Activi-
18 ties and studies related to commercial crew
19 services and for Commercial Crew Capabilities;
20 and

21 (D) \$50,000,000 shall be for Robotic Pre-
22 cursor Studies and Instruments.

23 (2) For Space Operations, \$5,079,900,000, of
24 which—

1 (A) \$2,779,800,000 shall be for the ISS
2 program, of which \$75,000,000 shall be for
3 fundamental space life science and physical
4 sciences and related technology research using
5 ground-based, free-flyer, and ISS facilities, in-
6 cluding ISS National Laboratory research;

7 (B) \$1,609,700,000 shall be for Space
8 Shuttle, to support Space Shuttle flight oper-
9 ations and related activities; and

10 (C) \$690,400,000 shall be for Space and
11 Flight Support.

12 (3) For Science, \$5,015,700,000, of which—

13 (A) \$1,801,800,000 shall be for Earth
14 Sciences;

15 (B) \$1,485,700,000 shall be for Planetary
16 Science;

17 (C) \$1,076,300,000 shall be for Astro-
18 physics;

19 (D) \$646,900,000 shall be for
20 Heliophysics, of which \$5,000,000 shall be an
21 augmentation to the Explorers program; and

22 (E) \$5,000,000 shall be an augmentation
23 to the total amount provided under subpara-
24 graphs (C) and (D) for Astrophysics and
25 Heliophysics in order to augment the funding

1 for the Science Mission Directorate's suborbital
2 research programs, to be allocated between the
3 Astrophysics and Heliophysics suborbital pro-
4 grams at the Administrator's discretion.

5 (4) For Aeronautics and Space Technology,
6 \$1,179,600,000, of which—

7 (A) \$579,600,000 shall be for Aeronautics
8 Research; and

9 (B) \$600,000,000 shall be for Space Tech-
10 nology, of which \$300,000,000 shall be for Ex-
11 ploration Technology Development and
12 \$15,000,000 shall be for the Commercial Reus-
13 able Suborbital Research program.

14 (5) For Education, \$180,000,000, of which—

15 (A) \$25,000,000 shall be for the Experi-
16 mental Program to Stimulate Competitive Re-
17 search;

18 (B) \$45,000,000 shall be for the Space
19 Grant program; and

20 (C) \$28,400,000 shall be for the Minority
21 Research and Education Program.

22 (6) For Cross-Agency Support Programs,
23 \$3,111,400,000.

24 (7) For Construction and Environmental Com-
25 pliance and Restoration, \$397,300,000.

1 (8) For Inspector General, \$38,000,000.

2 **SEC. 102. FISCAL YEAR 2012.**

3 There are authorized to be appropriated to NASA for
4 fiscal year 2012, \$19,450,000,000, as follows:

5 (1) For Exploration, \$5,074,400,000, of
6 which—

7 (A) \$4,459,400,000 shall be for the imple-
8 mentation of the Space Launch System, multi-
9 purpose crew vehicle, and associated program
10 and other necessary support, including
11 \$500,000,000 for the NASA Launch Support
12 and Infrastructure Modernization Program;

13 (B) \$165,000,000 shall be for Human Re-
14 search;

15 (C) \$400,000,000 shall be for Commercial
16 Cargo and Crew Capability Development Activi-
17 ties and studies related to commercial crew
18 services and for Commercial Crew Capabilities;
19 and

20 (D) \$50,000,000 shall be for Robotic Pre-
21 cursor Studies and Instruments.

22 (2) For Space Operations, \$3,704,200,000, of
23 which—

24 (A) \$2,983,600,000 shall be for the ISS
25 program, of which \$100,000,000 shall be for

1 fundamental space life science and physical
2 sciences and related technology research using
3 ground-based, free-flyer, and ISS facilities, in-
4 cluding ISS National Laboratory research; and

5 (B) \$720,600,000 shall be for Space and
6 Flight Support.

7 (3) For Science, \$5,278,600,000, of which—

8 (A) \$1,944,500,000 shall be for Earth
9 Sciences;

10 (B) \$1,547,200,000 shall be for Planetary
11 Science;

12 (C) \$1,109,300,000 shall be for Astro-
13 physics;

14 (D) \$672,600,000 shall be for
15 Heliophysics, of which \$25,000,000 shall be an
16 augmentation to the Explorers program; and

17 (E) \$5,000,000 shall be an augmentation
18 to the total amount provided under subpara-
19 graphs (C) and (D) for Astrophysics and
20 Heliophysics in order to augment the funding
21 for the Science Mission Directorate's suborbital
22 research programs, to be allocated between the
23 Astrophysics and Heliophysics suborbital pro-
24 grams at the Administrator's discretion.

1 (4) For Aeronautics and Space Technology,
2 \$1,610,900,000, of which—

3 (A) \$598,700,000 shall be for Aeronautics
4 Research; and

5 (B) \$1,012,200,000 shall be for Space
6 Technology, of which \$437,300,000 shall be for
7 Exploration Technology Development and
8 \$15,000,000 shall be for the Commercial Reus-
9 able Suborbital Research program.

10 (5) For Education, \$180,000,000, of which—

11 (A) \$25,000,000 shall be for the Experi-
12 mental Program to Stimulate Competitive Re-
13 search;

14 (B) \$45,000,000 shall be for the Space
15 Grant program; and

16 (C) \$28,400,000 shall be for the Minority
17 Research and Education Program.

18 (6) For Cross-Agency Support Programs,
19 \$3,189,600,000.

20 (7) For Construction and Environmental Com-
21 pliance and Restoration, \$373,800,000, of which
22 \$10,000,000 shall be for an augmentation to the
23 President's requested level in order to support the
24 NASA laboratory revitalization initiative described in
25 section 1103.

1 (8) For Inspector General, \$38,500,000.

2 **SEC. 103. FISCAL YEAR 2013.**

3 There are authorized to be appropriated to NASA for
4 fiscal year 2013, \$19,960,000,000, as follows:

5 (1) For Exploration, \$4,995,400,000, of
6 which—

7 (A) \$4,370,400,000 shall be for the imple-
8 mentation of the Space Launch System, multi-
9 purpose crew vehicle, and associated program
10 and other necessary support, including
11 \$400,000,000 for the NASA Launch Support
12 and Infrastructure Modernization Program;

13 (B) \$175,000,000 shall be for Human Re-
14 search;

15 (C) \$400,000,000 shall be for Commercial
16 Cargo and Crew Capability Development Activi-
17 ties and studies related to commercial crew
18 services and for Commercial Crew Capabilities;
19 and

20 (D) \$50,000,000 shall be for Robotic Pre-
21 cursor Studies and Instruments.

22 (2) For Space Operations, \$3,853,300,000, of
23 which—

24 (A) \$3,129,400,000 shall be for the ISS
25 program, of which \$100,000,000 shall be for

1 fundamental space life science and physical
2 sciences and related technology research using
3 ground-based, free-flyer, and ISS facilities, in-
4 cluding ISS National Laboratory research; and

5 (B) \$723,900,000 shall be for Space and
6 Flight Support.

7 (3) For Science, \$5,569,500,000, of which—

8 (A) \$2,089,500,000 shall be for Earth
9 Sciences;

10 (B) \$1,591,200,000 shall be for Planetary
11 Science;

12 (C) \$1,149,100,000 shall be for Astro-
13 physics;

14 (D) \$734,700,000 shall be for
15 Heliophysics, of which \$55,000,000 shall be an
16 augmentation to the Explorers program; and

17 (E) \$5,000,000 shall be an augmentation
18 to the total amount provided under subpara-
19 graphs (C) and (D) for Astrophysics and
20 Heliophysics in order to augment the funding
21 for the Science Mission Directorate's suborbital
22 research programs, to be allocated between the
23 Astrophysics and Heliophysics suborbital pro-
24 grams at the Administrator's discretion.

1 (4) For Aeronautics and Space Technology,
2 \$1,669,100,000, of which—

3 (A) \$609,400,000 shall be for Aeronautics
4 Research; and

5 (B) \$1,059,700,000 shall be for Space
6 Technology, of which \$449,000,000 shall be for
7 Exploration Technology Development and
8 \$15,000,000 shall be for the Commercial Reus-
9 able Suborbital Research program.

10 (5) For Education, \$180,000,000, of which—

11 (A) \$25,000,000 shall be for the Experi-
12 mental Program to Stimulate Competitive Re-
13 search;

14 (B) \$45,000,000 shall be for the Space
15 Grant program; and

16 (C) \$28,400,000 shall be for the Minority
17 Research and Education Program.

18 (6) For Cross-Agency Support Programs,
19 \$3,276,800,000.

20 (7) For Construction and Environmental Com-
21 pliance and Restoration, \$376,900,000, of which
22 \$10,000,000 shall be for an augmentation to the
23 President's requested level in order to support the
24 NASA laboratory revitalization initiative described in
25 section 1103.

1 (8) For Inspector General, \$39,000,000.

2 **TITLE II—POLICY FOR HUMAN**
3 **SPACE FLIGHT AND EXPLO-**
4 **RATION**

5 **SEC. 201. UNITED STATES HUMAN SPACE FLIGHT POLICY.**

6 (a) USE OF NON-UNITED STATES HUMAN SPACE
7 FLIGHT TRANSPORTATION CAPABILITIES.—Consistent
8 with other provisions of this Act, it is the policy of the
9 United States that reliance upon non-United States
10 human space flight capabilities shall be undertaken as a
11 contingency in circumstances where no United States-
12 owned and operated human space flight capability is avail-
13 able, operational, and certified for flight by appropriate
14 Federal agencies.

15 (b) UNITED STATES HUMAN SPACE FLIGHT CAPA-
16 BILITIES.—Consistent with other provisions of this Act,
17 the Congress reaffirms the policy stated in section 501(a)
18 of the National Aeronautics and Space Administration Au-
19 thorization Act of 2005 (42 U.S.C. 16761(a)) that the
20 United States shall maintain an uninterrupted capability
21 for human space flight and operations in low-Earth orbit
22 and beyond, as an essential instrument of national secu-
23 rity and of the capacity to ensure continued United States
24 participation in and leadership in the exploration and utili-
25 zation of space.

1 **SEC. 202. INDEPENDENT STUDY ON HUMAN EXPLORATION**
2 **OF SPACE.**

3 (a) IN GENERAL.—In fiscal year 2013, the Adminis-
4 trator shall contract with the National Academies for a
5 review of progress made by the United States in address-
6 ing the goals set forth in the National Aeronautics and
7 Space Act of 1958, the National Aeronautics and Space
8 Administration Authorization Acts of 2005 and 2008, and
9 in this Act for human space flight and exploration.

10 (b) ELEMENTS.—The review shall include—

11 (1) participation by representatives of a broad
12 range of disciplines, backgrounds, and ages, includ-
13 ing individuals with experience in civil, commercial,
14 international, scientific, and national security inter-
15 ests;

16 (2) input from international partners involved
17 in human space flight activities;

18 (3) an examination of the relationship of na-
19 tional goals to foundational capabilities, robotic ac-
20 tivities, technologies, and missions authorized by this
21 Act;

22 (4) a review and prioritization of scientific, en-
23 gineering, economic, geopolitical, and societal ques-
24 tions that can be addressed by the Nation's human
25 space flight and exploration activities to benefit the

1 citizens of the United States and to improve the
2 overall human condition; and

3 (5) findings and recommendations, if any, for
4 the 10-year period commencing October 1, 2015.

5 **TITLE III—EXPANSION OF**
6 **HUMAN SPACE FLIGHT BE-**
7 **YOND THE INTERNATIONAL**
8 **SPACE STATION AND LOW-**
9 **EARTH ORBIT**

10 **SEC. 301. HUMAN SPACE FLIGHT BEYOND LOW-EARTH**
11 **ORBIT.**

12 (a) FINDINGS.—The Congress makes the following
13 findings:

14 (1) The extension of the human presence from
15 low-Earth orbit to other regions of space beyond
16 low-Earth orbit will enable missions to the surface of
17 the Moon and missions to deep space destinations
18 such as near-Earth asteroids and Mars.

19 (2) The regions of cis-lunar space are accessible
20 to other national and commercial launch capabilities,
21 and such access raises a host of national security
22 concerns and economic implications that inter-
23 national human space endeavors can help to address.

24 (3) The ability to support human missions in
25 regions beyond low-Earth orbit and on the surface

1 of the Moon can also drive developments in emerging
2 areas of space infrastructure and technology.

3 (4) Developments in space infrastructure and
4 technology can stimulate and enable increased space
5 applications, such as in-space servicing, propellant
6 resupply and transfer, and in situ resource utiliza-
7 tion, and open opportunities for additional users of
8 space, whether national, commercial, or inter-
9 national.

10 (5) A long term objective for human exploration
11 of space should be the eventual international explo-
12 ration of Mars.

13 (6) Future international missions beyond low-
14 Earth orbit should be designed to incorporate capa-
15 bility development and availability, affordability, and
16 international contributions.

17 (7) Human space flight and future exploration
18 beyond low-Earth orbit should be based around a
19 pay-as-you-go approach.

20 (b) REPORT ON INTERNATIONAL COLLABORATION.—

21 (1) REPORT REQUIRED.—Not later than 120
22 days after the date of enactment of this Act, the Ad-
23 ministrators shall transmit to the Committee on
24 Science and Technology of the House of Representa-
25 tives and the Committee on Commerce, Science, and

1 Transportation of the Senate a report on the fol-
2 lowing:

3 (A) Any effort by NASA to expand and en-
4 sure effective international collaboration on the
5 ISS.

6 (B) The efforts of NASA, including its ap-
7 proach and progress, in defining near-term and
8 far-term human space missions.

9 (2) NASA CONTRIBUTIONS.—In preparing the
10 report required by paragraph (1), the Administrator
11 shall assume that NASA will contribute to the ef-
12 forts described in that paragraph the following:

13 (A) A Space Launch System.

14 (B) A multipurpose crew vehicle.

15 (C) Such other technology elements the
16 Administrator may consider appropriate, and
17 which the Administrator shall specifically iden-
18 tify in the report.

19 **SEC. 302. SPACE LAUNCH SYSTEM.**

20 (a) UNITED STATES EXPLORATION POLICY.—The
21 Congress reaffirms its support for the exploration policy
22 set forth in sections 401 and 402 of the National Aero-
23 nautics and Space Administration Authorization Act of
24 2008 (Public Law 110–422; 122 Stat. 4788–4789). Fur-
25 ther, it is the policy of the United States that in pursuit

1 of these objectives, NASA shall develop a Space Launch
2 System capable of accessing, at a minimum, the full range
3 of destinations envisioned in the National Aeronautics and
4 Space Administration Authorization Act of 2008, and in-
5 cluding cis-lunar space, Lagrangian points, the Moon,
6 near-Earth objects, and Mars and its moons, as well as
7 being capable of providing, when used in conjunction with
8 the multipurpose crew vehicle described in section 303, a
9 continuing backup capability for supplying and supporting
10 International Space Station cargo requirements or crew
11 delivery requirements not otherwise met by available com-
12 mercial or partner-supplied vehicles.

13 (b) INITIATION OF DEVELOPMENT.—

14 (1) IN GENERAL.—The Administrator shall,
15 within 90 days after the date of the enactment of
16 this Act, develop a plan for a Space Launch System
17 with, at a minimum, the design objectives, capabili-
18 ties, and requirements specified in subsection (c)
19 and shall proceed immediately thereafter to initiate
20 development, testing, and evaluation. The plan shall
21 include the use of the multipurpose crew vehicle de-
22 scribed in section 303 of this Act. The Adminis-
23 trator shall ensure that the plan accounts for the
24 continued operation of the International Space Sta-
25 tion until at least 2020 and the anticipated con-

1 strains in the growth of NASA funding during the
2 development of the Space Launch System and the
3 multipurpose crew vehicle. The Administrator shall
4 provide copies of the plan to the Senate Committee
5 on Appropriations, the Senate Committee on Com-
6 merce, Science, and Transportation, the House of
7 Representatives Committee on Appropriations, and
8 the House of Representatives Committee on Science
9 and Technology.

10 (2) IMPLEMENTATION.—The plan shall be im-
11 plemented in a manner that—

12 (A) facilitates the planned transition of
13 Space Shuttle and Constellation program per-
14 sonnel to the activities described in paragraph
15 (1) upon the retirement of the Space Shuttle
16 fleet, while providing for cost effective manage-
17 ment and vehicle development;

18 (B) provides for a robust flight and ground
19 test (as described in subsection (c)(2)) and
20 demonstration program;

21 (C) streamlines program management
22 processes to the maximum extent practicable
23 while ensuring that the Government's ability to
24 meet its responsibilities for cost discipline, safe-
25 ty, and mission assurance is maintained;

1 (D) working with industry, eliminates un-
2 necessary NASA and industry institutional in-
3 frastructure, other fixed costs, processes, and
4 oversight, reducing fixed costs to the extent
5 practicable and maximizing the program's af-
6 fordability;

7 (E) provides incentives, through innovative
8 management practices, to NASA program and
9 project managers and industry counterparts to
10 establish and maintain realistic cost and sched-
11 ule estimates, and take necessary steps to avoid
12 cost and schedule growth;

13 (F) seeks to minimize to the extent prac-
14 ticable the operating costs of both the Space
15 Launch System and multipurpose crew vehicle;

16 (G) enables development to occur in an in-
17 cremental fashion with increasingly challenging
18 uncrewed and crewed demonstration flights in
19 and beyond low-Earth orbit, as appropriate;
20 and

21 (H) allows developmental elements to serve
22 as potential testbeds for the demonstration of
23 key enabling exploration technologies and oper-
24 ational capabilities.

1 (3) MODIFICATION OF CURRENT CONTRACTS.—

2 In order to limit NASA's termination liability costs
3 and support critical capabilities, the Administrator
4 shall, to the extent practicable, extend or modify ex-
5 isting contracts necessary to meet the requirements
6 in paragraphs (1) and (2), including contracts for
7 flight and ground testing of solid rocket motors, if
8 necessary, to ensure their availability for develop-
9 ment of the Space Launch System. At least 30 days
10 before terminating any flight support or development
11 contract to which this section applies, or allowing
12 such a contract to lapse, the Administrator shall
13 submit to the committees described in paragraph (1)
14 a justification for such termination or lapse allowed.

15 (c) MINIMUM CAPABILITY REQUIREMENTS.—

16 (1) IN GENERAL.—The Space Launch System
17 developed pursuant to subsection (b) shall be de-
18 signed to, at a minimum—

19 (A) provide a scalable capability of lifting
20 payloads of at least 130 metric tons into low-
21 Earth orbit on a single launch vehicle with an
22 upper stage in preparation for transit for mis-
23 sions beyond low-Earth orbit;

1 (B) provide the capability of lifting the
2 multipurpose crew vehicle and associated crew
3 escape launch abort system;

4 (C) provide the capability to serve as a
5 backup system to ensure continuing capability
6 for supplying and supporting International
7 Space Station cargo requirements or crew deliv-
8 ery requirements not otherwise met by available
9 commercial or partner-supplied vehicles; and

10 (D) have at least the capability described
11 in subparagraph (C) by December 31, 2016.

12 (2) TESTING.—Ground and flight testing of ele-
13 ments, components, subsystems, and processes shall
14 be undertaken as appropriate during development of
15 the Space Launch System. Testing activities may in-
16 clude, at a minimum, ground and flight testing of
17 propulsion systems, solid rocket motors, liquid fueled
18 engines, and other elements, components, and sub-
19 systems of the Space Launch System.

20 (3) EVOLVABILITY.—The Space Launch System
21 shall, to the extent practicable, incorporate capabili-
22 ties for evolutionary growth.

23 (4) TRANSITION NEEDS.—The Administrator
24 shall ensure critical skills and capabilities are re-
25 tained, modified, and developed, as appropriate, in

1 areas related to solid and liquid engines, large di-
2 ameter fuel tanks, rocket propulsion, and other
3 ground test capabilities for an effective transition to
4 the Space Launch System.

5 **SEC. 303. MULTIPURPOSE CREW VEHICLE.**

6 (a) INITIATION OF DEVELOPMENT.—

7 (1) IN GENERAL.—The Administrator shall con-
8 tinue the development of a multipurpose crew vehicle
9 to be available as soon as practicable, and no later
10 than for use with the Space Launch System de-
11 scribed in section 302. The vehicle shall continue to
12 advance development of the human safety features,
13 designs, and systems in the Orion project. NASA
14 shall develop an integrated approach with the plan
15 developed under section 302(b)(1) that is consistent
16 with the human space flight and exploration goals in
17 the National Aeronautics and Space Administration
18 Authorization Acts of 2005 and 2008, and the over-
19 all goals and objectives of this Act.

20 (2) OPERATIONAL CAPABILITY.—The multipur-
21 pose crew vehicle developed pursuant to this section
22 shall achieve operational capability by not later than
23 December 31, 2016.

24 (3) TESTING.—For purposes of meeting the
25 deadline established by paragraph (2), the Adminis-

1 trator shall undertake one or more crew capability
2 demonstration prototype tests of the multipurpose
3 crew vehicle, at least one of which shall be to the
4 International Space Station prior to December 31,
5 2016. The priority for the launch of this vehicle to
6 the International Space Station shall be making use
7 of the capabilities of the Space Launch System, if
8 available.

9 (b) MINIMUM CAPABILITY REQUIREMENTS.—The
10 multipurpose crew vehicle developed pursuant to sub-
11 section (a) shall be designed to have, at a minimum—

12 (1) the capability to serve as the primary crew
13 vehicle for missions beyond low-Earth orbit;

14 (2) the capability to conduct regular in-space
15 operations, such as rendezvous, docking, and
16 extravehicular activities, in conjunction with pay-
17 loads delivered by the Space Launch System devel-
18 oped pursuant to section 302, or other vehicles, in
19 preparation for missions beyond low-Earth orbit or
20 servicing of assets described in section 804, or other
21 assets in cis-lunar space;

22 (3) the capability to provide an alternative
23 means of delivery of crew and cargo to the Inter-
24 national Space Station, in the event other vehicles,

1 whether commercial vehicles or partner-supplied ve-
2 hicles, are unable to perform that function; and

3 (4) the capacity for efficient and timely evo-
4 lution, including the incorporation of new tech-
5 nologies, and competition of subelements.

6 **SEC. 304. UTILIZATION OF EXISTING WORKFORCE AND AS-**
7 **SETS IN DEVELOPMENT OF SPACE LAUNCH**
8 **SYSTEM AND MULTIPURPOSE CREW VEHI-**
9 **CLE.**

10 (a) **IN GENERAL.**—In developing the Space Launch
11 System pursuant to section 302 and the multipurpose
12 crew vehicle pursuant to section 303, the Administrator
13 shall, to the extent practicable, utilize—

14 (1) existing contracts, investments, workforce,
15 industrial base, components, and capabilities from
16 the Space Shuttle and Orion and Ares 1 and explo-
17 ration program integration and operations projects,
18 including existing United States propulsion systems
19 and those currently under development, solid rocket
20 motors, and space-suit development activities; and

21 (2) associated testing facilities, either in exist-
22 ence or under construction as of the date of enact-
23 ment of this Act.

24 (b) **DISCHARGE OF REQUIREMENTS.**—In meeting the
25 requirements of subsection (a), the Administrator—

1 (1) shall, to the extent practicable, utilize exist-
2 ing ground-based manufacturing capability, ground
3 and flight testing activities, launch and operations
4 infrastructure, and workforce expertise;

5 (2) shall, to the extent practicable, make the
6 best use of existing ground infrastructure invest-
7 ments, software, vehicle, and mission operations
8 processes;

9 (3) shall complete construction and activation
10 of the A-3 test stand with a completion goal of Sep-
11 tember 30, 2013;

12 (4) shall procure, develop, and flight test appli-
13 cable components as appropriate;

14 (5) shall take appropriate actions to ensure
15 timely and cost-effective development of the Space
16 Launch System and the multipurpose crew vehicle,
17 including the use of a procurement approach that in-
18 corporates adequate and effective oversight, the fa-
19 cilitation of contractor efficiencies, and the stream-
20 lining of contract and procurement requirements;

21 (6) shall strive to ensure that activities under-
22 taken in support of achieving the capability de-
23 scribed in section 302(c)(1)(C) shall also contribute
24 to achieving the capability described in section
25 302(c)(1)(A); and

1 (7) shall strive to attain, to the extent prac-
2 ticable, the increase in safety relative to the Space
3 Shuttle recommended by the NASA Astronaut Office
4 in the aftermath of the *Columbia* accident.

5 **SEC. 305. NASA LAUNCH SUPPORT AND INFRASTRUCTURE**
6 **MODERNIZATION PROGRAM FOR THE SPACE**
7 **LAUNCH SYSTEM.**

8 (a) IN GENERAL.—The Administrator shall carry out
9 a program the primary purpose of which is to prepare in-
10 frastructure at the Kennedy Space Center that is needed
11 to enable processing and launch of the Space Launch Sys-
12 tem. Vehicle interfaces and other ground processing and
13 payload integration areas should be simplified to minimize
14 overall costs, enhance safety, and complement the purpose
15 of this section.

16 (b) NASA LAUNCH SUPPORT AND INFRASTRUCTURE
17 MODERNIZATION PROGRAM IN SUPPORT OF THE SPACE
18 LAUNCH SYSTEM.—

19 (1) IN GENERAL.—The Administrator shall
20 carry out a program to prepare infrastructure at the
21 Kennedy Space Center that is needed to enable
22 Space Launch System processing and launch activi-
23 ties, including simplifying vehicle interfaces and
24 other ground processing and payload integration

1 areas to minimize overall costs, enhance safety, and
2 complement the purpose of this section.

3 (2) ELEMENTS.—The program required by this
4 section shall include—

5 (A) investments in support of the Space
6 Launch System to—

7 (i) improve processing and launch op-
8 erations at the Kennedy Space Center;

9 (ii) enhance the overall capabilities of
10 the Eastern Range; and

11 (iii) reduce the long-term cost of oper-
12 ations and maintenance;

13 (B) measures in support of the Space
14 Launch System to provide multivehicle support
15 and improvements in payload processing; and

16 (C) such other measures in support of the
17 Space Launch System as the Administrator
18 may consider appropriate.

19 (c) REPORT ON NASA LAUNCH SUPPORT AND IN-
20 FRASTRUCTURE MODERNIZATION PROGRAM FOR THE
21 SPACE LAUNCH SYSTEM.—Not later than 180 days after
22 the date of enactment of this Act, the Administrator shall
23 transmit to the Committee on Science and Technology of
24 the House of Representatives and the Committee on Com-
25 merce, Science, and Transportation of the Senate a report

1 on the plan for the implementation of the program author-
2 ized in subsection (b).

3 (d) OTHER ACTIVITIES.—Of the funds authorized to
4 be appropriated in title I to carry out the provisions of
5 subsection (b), up to 10 percent in each of the fiscal years
6 2011, 2012, and 2013 may be made available to carry out
7 the following activities:

8 (1) Investments to improve civil and national
9 security operations at the Kennedy Space Center
10 and Cape Canaveral Air Force Station to enhance
11 the overall capabilities of the Eastern Range and to
12 reduce the long-term cost of operations and mainte-
13 nance.

14 (2) Such other measures related to launch sup-
15 port and infrastructure modernization at the Ken-
16 nedy Space Center as the Administrator shall con-
17 sider appropriate to carry out NASA's launch oper-
18 ations.

19 (3) Such investments to improve launch infra-
20 structure at NASA flight facilities scheduled to
21 launch cargo to the ISS under the commercial or-
22 bital transportation services program as the Admin-
23 istrator may consider appropriate.

24 **SEC. 306. SPACE RADIATION.**

25 (a) STRATEGY AND IMPLEMENTATION PLAN.—

1 (1) IN GENERAL.—The Administrator shall de-
2 velop a space radiation mitigation and management
3 strategy and implementation plan that includes key
4 milestones, a timetable, and estimation of budget re-
5 quirements.

6 (2) COORDINATION MECHANISM.— The strategy
7 shall include a mechanism to coordinate NASA re-
8 search, in-house expertise, technology, facilities, en-
9 gineering, operations, and other functions required
10 to support the strategy and plan.

11 (3) TRANSMITTAL.—The Administrator shall
12 transmit the strategy and plan to the Committee on
13 Science and Technology of the House of Representa-
14 tives and the Committee on Commerce, Science, and
15 Transportation of the Senate not later than 1 year
16 after the date of enactment of this Act.

17 (b) SPACE RADIATION RESEARCH FACILITIES.—The
18 Administrator, in consultation with the heads of other ap-
19 propriate Federal agencies, shall—

20 (1) assess the national capabilities for carrying
21 out critical ground-based research on space radiation
22 biology; and

23 (2) identify any issues that could affect the
24 ability to carry out that research.

1 (c) RESEARCH ON SOLAR PARTICLE EVENTS.—The
2 Administrator shall carry out research on solar particle
3 events to improve the predictions and forecasts of solar
4 particle events that could affect human missions beyond
5 low-Earth orbit.

6 (d) RADIATION RESEARCH ON NON-HUMAN PRI-
7 MATES.—

8 (1) IN GENERAL.—Not later than 1 year after
9 the date of enactment of this Act, the Administrator
10 shall transmit to the Committee on Science and
11 Technology of the House of Representatives and the
12 Committee on Commerce, Science, and Transpor-
13 tation of the Senate a report on prior radiation re-
14 search on non-human primates and the justification
15 and rationale for any additional research involving
16 non-human primates.

17 (2) CONSULTATION.—In preparing the report,
18 the Administrator shall consult with other Federal
19 agencies that have previously conducted radiation re-
20 search on non-human primates.

1 **TITLE IV—DEVELOPMENT AND**
2 **USE OF COMMERCIAL CARGO**
3 **AND CREW TRANSPORTATION**
4 **CAPABILITIES**

5 **SEC. 401. AFFIRMATION OF POLICY.**

6 The Congress affirms the policy of—

7 (1) making use of United States commercially
8 provided ISS cargo, crew transportation, and crew
9 rescue services to the maximum extent practicable;

10 (2) prohibiting, to the extent practicable, any
11 capability of the Space Launch System from com-
12 peting with United States commercial providers that
13 meet the requirements of this title for the provision
14 of routine ISS crew and cargo transportation and
15 rescue services; and

16 (3) facilitating, to the maximum extent prac-
17 ticable, the transfer of NASA-developed technologies
18 to United States commercial orbital human space
19 transportation companies in order to help promote
20 the development of commercially provided ISS crew
21 transportation and crew rescue services.

1 **SEC. 402. COMBINED COMMERCIAL CARGO AND CREW CA-**
2 **PABILITIES DEVELOPMENT AND CREW CAPA-**
3 **BILITIES ACCOUNT.**

4 (a) ESTABLISHMENT.—Funds authorized in title I of
5 this Act for Commercial Cargo and Crew Capability Devel-
6 opment Activities and Commercial Crew Capabilities shall
7 be maintained in a combined funding account within the
8 overall Exploration account.

9 (b) ALLOCATION OF FUNDS.—Funds in the combined
10 account established under subsection (a) shall be allocated
11 at the discretion of the Administrator to those activities
12 related to commercial cargo and crew capabilities develop-
13 ment, including the Commercial Orbital Transportation
14 Services program, and to procurement of commercial crew
15 capabilities, that the Administrator deem to be of the
16 highest priority in each of the fiscal years for which funds
17 are authorized by this Act in order to support the contin-
18 ued operation and utilization of the ISS. The amount of
19 funds made available to a company for the development
20 of commercial crew capabilities shall, to the extent prac-
21 ticable, be limited to that amount of funding that is
22 matched by non-Federal provided funding. If the Adminis-
23 trator determines that the requirement for non-Federal
24 matching funds should be waived in whole or in part in
25 a particular instance, the Administrator shall report to the
26 Committee on Science and Technology of the House of

1 Representatives and the Committee on Commerce,
2 Science, and Transportation of the Senate in a timely
3 manner the justification for that determination and the
4 amount of non-Federal contribution and what type of
5 noncash match, if any, the Government will receive from
6 the company if the matching funds requirement is waived.

7 **SEC. 403. COMMERCIAL CARGO CAPABILITIES DEVELOP-**
8 **MENT.**

9 (a) IN GENERAL.—The Administrator shall continue
10 to support the existing Commercial Orbital Transportation
11 Services program, aimed at enabling the commercial space
12 industry in support of NASA to develop reliable means
13 of launching cargo and supplies to the ISS throughout the
14 duration of the facility's operation. The Administrator
15 may apply funds towards the reduction of risk to the time-
16 ly start of these services, specifically towards—

17 (1) efforts to conduct additional flight tests
18 during the Commercial Orbital Transportation Serv-
19 ices program;

20 (2) activities needed to maintain schedules or
21 minimize any potential delays to the achievement of
22 the commercial cargo resupply capability; and

23 (3) activities related to the development of the
24 ground infrastructure needed for commercial cargo
25 capability, if those activities are at risk of being de-

1 (2) procedures to facilitate the ability of com-
2 mercial crew transportation providers to understand
3 and comply with such requirements, standards, and
4 processes, including—

5 (A) effective communication to the com-
6 mercial sector of necessary information; and

7 (B) technical assistance, to the maximum
8 extent practicable;

9 (3) the process NASA will use for certifying
10 that commercial human spaceflight systems (includ-
11 ing mission control, operations, ground systems, and
12 other supporting infrastructure) comply with such
13 requirements, standards, and processes and related
14 NASA policies and procedures for safety and reli-
15 ability, which process shall include independent
16 verification and validation of such compliance, and
17 which shall be no less stringent than the NASA poli-
18 cies and procedural requirements established for
19 launch of Class A (high cost and high priority) pay-
20 load; and

21 (4) a description of the process NASA will
22 apply for securing ongoing NASA insight into the
23 design methodologies, processes, technologies, test
24 data, and production and quality control practices
25 employed in the development of the commercial crew

1 transportation system throughout the development,
2 test, demonstration, and production phases.

3 (b) LICENSING OF MULTIPURPOSE CREW VEHICLE
4 INTELLECTUAL PROPERTY.—The Administrator shall
5 seek to ensure that contracts for development of the multi-
6 purpose crew vehicle under section 303 contain provisions
7 for the nonexclusive licensing of relevant intellectual prop-
8 erty derived from the development of a multipurpose crew
9 vehicle authorized by this Act to participating commercial
10 providers of any crew rescue capability development un-
11 dertaken pursuant to this section.

12 (c) ASAP REVIEW OF NASA'S HUMAN-RATING RE-
13 QUIREMENTS, STANDARDS, AND PROCESSES.—

14 (1) IN GENERAL.—The Aerospace Safety Advi-
15 sory Panel (ASAP) shall conduct a review to identify
16 issues pertinent to the establishment of human-rat-
17 ing requirements, standards, and processes for com-
18 mercial crew transportation and rescue systems that
19 are proposed for transport of United States astro-
20 nauts.

21 (2) REPORT.—Within 270 days after the date
22 of enactment of this Act, the Aerospace Safety and
23 Advisory Panel shall transmit to the Congress a re-
24 port describing—

1 (A) the Panel's assessment of NASA's cur-
2 rently established human-rating specifications
3 and guidance;

4 (B) the Panel's view of the mandatory
5 safety requirements that should be met with re-
6 gard to human rating; and

7 (C) the steps NASA and the commercial
8 space industry need to take to ensure that com-
9 mercial crew transportation and rescue vehicles
10 have human rating requirements, standards,
11 and processes equivalent to those of NASA.

12 (d) TECHNOLOGY TRANSFER.—The Administrator
13 shall make available, on a nonexclusive basis, NASA-devel-
14 oped technologies for transfer to potential United States
15 commercial orbital human space transportation compa-
16 nies. NASA shall determine the appropriate means,
17 through cost-reimbursable arrangements or other mecha-
18 nisms, to transfer the technologies.

19 (e) TECHNICAL ASSISTANCE AND FACILITIES.—The
20 Administrator shall make available, to the extent prac-
21 ticable, NASA facilities and equipment to assist in the
22 testing and demonstration of commercial crew transpor-
23 tation systems, including those associated with NASA's
24 safety and mission assurance activities, such as NASA's
25 Independent Verification and Validation facility for soft-

1 ware verification. The Administrator shall determine the
2 appropriate means, through cost-reimbursable arrange-
3 ments, agreements entered into under section 203(c)(5)
4 of the National Aeronautics and Space Act of 1958 (42
5 U.S.C. 2473(c)(5)), or other mechanisms, to provide tech-
6 nical assistance and access to facilities to the commercial
7 space sector.

8 (f) USE OF GOVERNMENT-SUPPLIED CAPABILITIES
9 AND INFRASTRUCTURE.—In evaluating any proposed de-
10 velopment activity for commercially developed crew or
11 cargo launch capabilities, the Administrator shall identify
12 the anticipated contribution of Federal Government per-
13 sonnel, expertise, technologies, and infrastructure to be
14 utilized in support of design, development, or operations
15 of such capabilities as well as an estimate of the monetary
16 value of that contribution.

17 **SEC. 405. PROCUREMENT OF COMMERCIAL CREW TRANS-**
18 **PORTATION SERVICES.**

19 NASA shall seek, to the extent practicable, to procure
20 available United States commercial crew transportation
21 services to transport astronauts to and from the ISS, if
22 the following conditions are met:

23 (1) Those commercial services have dem-
24 onstrated the capability to meet NASA-specified as-

1 cent, transit, entry, and ISS proximity operations
2 safety requirements.

3 (2) The service provider has completed, and
4 NASA has verified, crewed flight demonstrations or
5 operational flights that comply with NASA stand-
6 ards, policies, and procedures.

7 (3) The per-seat cost to the United States is
8 reasonable and has a basis in the cost to the com-
9 mercial entity providing the crew transportation
10 service.

11 (4) The Administrator has transmitted to the
12 Committee on Science and Technology of the House
13 of Representatives and the Committee on Commerce,
14 Science, and Transportation of the Senate not later
15 than 180 days after the date of enactment of this
16 Act a commercial space market assessment, con-
17 ducted in coordination with the Federal Aviation Ad-
18 ministration's Office of Commercial Space Transpor-
19 tation and the Department of Commerce Office of
20 Space Commercialization, for purposes of this para-
21 graph, of the potential non-Government market for
22 commercial crew and cargo transportation systems
23 and capabilities, including an assessment of the ac-
24 tivities associated with potential private sector utili-
25 zation of the ISS research and technology develop-

1 ment capabilities and other potential activities in
2 low-Earth orbit. The market assessment shall in-
3 clude estimates of the lowest, most likely, and high-
4 est levels of non-Government market demand for
5 commercial crew transportation systems and capa-
6 bilities and cargo transportation systems and capa-
7 bilities over the next 10 years and over the next 20
8 years.

9 (5)(A) The Administrator has transmitted to
10 the Congress a review of current Government pro-
11 curement and acquisition practices and processes
12 and law, including agreement authorities under the
13 National Aeronautics and Space Act of 1958, to de-
14 termine the most cost-effective means of procuring
15 commercial crew transportation capabilities and re-
16 lated services in a manner that ensures appropriate
17 accountability, transparency, and maximum effi-
18 ciency in the procurement of such capabilities and
19 services.

20 (B) The review shall include—

21 (i) an identification of proposed measures
22 to address risk management and means of in-
23 demnification of commercial providers of such
24 capabilities and services;

1 (ii) measures for quality control, safety
2 oversight, including the application of Federal
3 oversight processes within the jurisdiction of
4 other Federal agencies; and

5 (iii) a description of, and justification for,
6 the proposed procurement process.

7 (C) In support of the review by such Commit-
8 tees, the Comptroller General shall undertake an as-
9 sessment of the proposed procurement process and
10 transmit to the Committee on Science and Tech-
11 nology of the House of Representatives and the
12 Committee on Commerce, Science, and Transpor-
13 tation of the Senate a report within 90 days after
14 the date on which the Administrator provides the de-
15 scription and justification to such Committees.

16 (6) Any company that seeks to provide commer-
17 cial crew transportation services under contract to
18 NASA shall enter into an arrangement with NASA
19 that allows NASA to obtain ongoing insight into the
20 design methodologies, processes, technologies, test
21 data, and production and quality control practices
22 employed in the development of the commercial crew
23 transportation system throughout the development,
24 test, demonstration, and production phases.
25 NASA—

1 (A) may offer early warning of conditions
2 that may be the basis for withholding certifi-
3 cation of the crew transportation systems for
4 the flight of United States Government per-
5 sonnel or declining to enter into a contract for
6 services; and

7 (B) may not require the company to make
8 changes to its design, technologies, or processes
9 during the development, test, demonstration, or
10 production phases.

11 (7) The Administrator shall certify that a com-
12 mercial ISS crew transportation and crew rescue
13 service provider with which a contract is planned has
14 demonstrated the safety and reliability of its systems
15 for crew transportation and crew rescue to be equiv-
16 alent to NASA-promulgated safety and reliability
17 policies, procedures, and standards for human
18 spaceflight. Individual certifications made under this
19 paragraph shall be provided to the Committee on
20 Science and Technology of the House of Representa-
21 tives and the Committee on Commerce, Science, and
22 Transportation of the Senate.

23 (8) Sufficient successful flight experience has
24 been accrued by the service provider's system to pro-
25 vide to NASA the safety-related and reliability-re-

1 lated data and information needed to determine
2 whether to fly its astronauts on that system. The
3 Administrator shall—

4 (A) establish qualitative and quantitative
5 guidelines and measures by which systems'
6 flight experience will be assessed and shall es-
7 tablish appropriate milestones and minimum
8 performance objectives to be achieved before au-
9 thority is granted to proceed to the procure-
10 ment of commercially developed crew transpor-
11 tation capabilities or systems, which guidelines
12 shall include a procedure to provide inde-
13 pendent assurance of flight safety and flight
14 readiness before the authorization of United
15 States Government personnel to participate as
16 crew onboard any commercial launch vehicle de-
17 veloped pursuant to this section; and

18 (B) certify, prior to entering into any con-
19 tract or financial commitment with an indi-
20 vidual service provider, that successful flight ex-
21 perience accrued has provided NASA with suffi-
22 cient safety-related and reliability-related data
23 and information to make an informed assess-
24 ment, with each certification transmitted to the
25 Committee on Science and Technology of the

1 House of Representatives and the Committee
2 on Commerce, Science, and Transportation of
3 the Senate prior to entering into any contract
4 or financial commitment.

5 (9) Indemnification and liability issues associ-
6 ated with the use of such systems by the United
7 States Government have been addressed and the Ad-
8 ministrator has provided to the Congress a report
9 describing the indemnification and liability provi-
10 sions that are planned to be included in such con-
11 tracts and their legal basis.

12 (10) The provision of a commercial capability to
13 provide ISS crew services shall include crew rescue
14 requirements, and shall be undertaken through the
15 procurement process initiated in conformance with
16 this section and section 406.

17 **SEC. 406. ACQUISITION STRATEGY FOR PROCUREMENT OF**
18 **COMMERCIAL CREW TRANSPORTATION**
19 **SERVICES.**

20 (a) ACQUISITION STRATEGY.—The Administrator
21 shall procure commercial crew transportation services
22 using an acquisition strategy consistent with the findings
23 of NASA's review of current Government procurement
24 and acquisition practices and processes and the results of

1 the Comptroller General's assessment, required under sec-
2 tion 405(5)(B), of NASA's proposed procurement process.

3 (b) FISCAL YEAR 2011 CONTRACTS AND PROCURE-
4 MENT AGREEMENTS.—

5 (1) IN GENERAL.—Except as provided in para-
6 graph (2), the Administrator may not execute a con-
7 tract or procurement agreement with respect to the
8 procurement of commercial crew services during fis-
9 cal year 2011.

10 (2) EXCEPTION.—Notwithstanding paragraph
11 (1), the Administrator may execute a contract or
12 procurement agreement with respect to commercial
13 crew services during fiscal year 2011 if—

14 (A) the requirements of section 404(a) and
15 (c) and section 405 are met; and

16 (B) the total amount involved for all such
17 contracts and procurement agreements executed
18 during fiscal year 2011 does not exceed
19 \$50,000,000 for fiscal year 2011.

20 **SEC. 407. REPORT ON INTERNATIONAL SPACE STATION**
21 **CARGO RETURN CAPABILITY.**

22 Not later than 120 days after the date of enactment
23 of this Act, the Administrator shall transmit to the Com-
24 mittee on Science and Technology of the House of Rep-
25 resentatives and the Committee on Commerce, Science,

1 and Transportation of the Senate a report on potential
2 alternative commercially developed means for the capa-
3 bility for a soft-landing return on land from the ISS of—

4 (1) research samples or other derivative mate-
5 rials; and

6 (2) small to mid-sized (up to 1,000 kilograms)
7 equipment for return and analysis, or for refurbish-
8 ment and redelivery, to the ISS.

9 **TITLE V—CONTINUATION, SUP-**
10 **PORT, AND EVOLUTION OF**
11 **THE INTERNATIONAL SPACE**
12 **STATION**

13 **SEC. 501. CONTINUATION OF THE INTERNATIONAL SPACE**
14 **STATION THROUGH 2020.**

15 (a) POLICY OF THE UNITED STATES.—It shall be the
16 policy of the United States, in consultation with its inter-
17 national partners in the ISS program, to support full and
18 complete utilization of the ISS through at least 2020 and
19 to seek to minimize to the extent practicable the operating
20 costs of the ISS.

21 (b) NASA ACTIONS.—In furtherance of the policy set
22 forth in subsection (a), NASA shall pursue international,
23 United States commercial, and intragovernmental means,
24 consistent with other provisions in this Act, to maximize
25 ISS logistics supply, maintenance, and operational capa-

1 bilities, reduce risks to ISS systems sustainability, and off-
2 set and minimize United States operations costs related
3 to the ISS.

4 **SEC. 502. MAXIMUM UTILIZATION OF THE INTERNATIONAL**
5 **SPACE STATION.**

6 (a) IN GENERAL.—With assembly of the ISS com-
7 plete, NASA shall take steps to maximize the productivity
8 and use of the ISS with respect to scientific and techno-
9 logical research and development, advancement of space
10 exploration, and international collaboration.

11 (b) NASA ACTIONS.—In carrying out subsection (a),
12 NASA shall undertake the following:

13 (1) INNOVATIVE USE OF UNITED STATES SEG-
14 MENT.—The United States segment of the ISS,
15 which has been designated as a National Labora-
16 tory, shall be developed, managed, and utilized in a
17 manner that enables the effective and innovative use
18 of such facility, as provided in section 504.

19 (2) INTERNATIONAL COOPERATION.—The ISS
20 shall continue to be utilized as a key component of
21 international efforts to build missions and capabili-
22 ties that further the development of a human pres-
23 ence beyond near-Earth space and advance United
24 States security and economic goals. The Adminis-
25 trator shall actively seek ways to encourage and en-

1 able the use of ISS capabilities to support these ef-
2 forts.

3 (3) DOMESTIC COLLABORATION.—The ISS
4 shall be utilized in a manner that provides opportu-
5 nities for collaboration with other Federal, academic,
6 and United States commercial research and develop-
7 ment programs consistent with the objectives of the
8 United States Government and consistent with the
9 provisions in this Act.

10 **SEC. 503. MAINTENANCE OF UNITED STATES SEGMENT AND**
11 **ASSURANCE OF CONTINUED OPERATIONS OF**
12 **THE INTERNATIONAL SPACE STATION.**

13 (a) IN GENERAL.—The Administrator shall take all
14 actions necessary to ensure the safe and effective oper-
15 ation, maintenance, and maximum utilization of the
16 United States segment of the ISS through at least Sep-
17 tember 30, 2020.

18 (b) VEHICLE AND COMPONENT REVIEW.—

19 (1) IN GENERAL.—In carrying out subsection
20 (a), the Administrator shall, as soon as is prac-
21 ticable after the date of enactment of this Act, carry
22 out a comprehensive assessment of the essential
23 modules, operational systems and components, struc-
24 tural elements, and permanent scientific equipment
25 on board or planned for delivery and installation

1 aboard the ISS, including both United States and
2 international partner elements, for purposes of iden-
3 tifying the spare or replacement modules, systems
4 and components, elements, and equipment that are
5 required to ensure complete, effective, and safe func-
6 tioning and full scientific utilization of the ISS
7 through September 30, 2020.

8 (2) DATA.—In carrying out the assessment, the
9 Administrator shall assemble any existing data, and
10 provide for the development of any data or analysis
11 not currently available, that is necessary for pur-
12 poses of the assessment.

13 (c) REPORTS.—

14 (1) REPORT ON ASSESSMENT.—

15 (A) REPORT REQUIRED.—Not later than
16 120 days after the date of enactment of this
17 Act, the Administrator shall transmit to the
18 Committee on Science and Technology of the
19 House of Representatives and the Committee
20 on Commerce, Science, and Transportation of
21 the Senate a report on the assessment required
22 by subsection (b).

23 (B) ELEMENTS.—The report required by
24 this paragraph shall include, to the extent prac-
25 ticable, the following:

1 (i) A description of the spare or re-
2 placement modules, systems and compo-
3 nents, elements, and equipment identified
4 pursuant to the assessment that are cur-
5 rently produced, in inventory, or on order,
6 a description of the state of their readi-
7 ness, and a schedule for their delivery to
8 the ISS (including the planned transpor-
9 tation means for such delivery), including
10 for each such module, system or compo-
11 nent, element, or equipment a description
12 of—

13 (I) its specifications, including
14 size, weight, and necessary configura-
15 tion for launch and delivery to the
16 ISS;

17 (II) its function;

18 (III) its location; and

19 (IV) its criticality for ISS system
20 integrity.

21 (ii) A description of the spare or re-
22 placement modules, systems and compo-
23 nents, elements, and equipment identified
24 pursuant to the assessment that are not
25 currently produced, in inventory, or on

1 order, including for each such module, sys-
2 tem or component, element, or equipment
3 a description of—

4 (I) its specifications, including
5 size, weight, and necessary configura-
6 tion for launch and delivery to the
7 ISS;

8 (II) its function;

9 (III) its location;

10 (IV) its criticality for ISS system
11 integrity; and

12 (V) the anticipated cost and
13 schedule for its design, procurement,
14 manufacture, and delivery to the ISS.

15 (iii) A detailed summary of the deliv-
16 ery schedule and associated delivery vehicle
17 requirements necessary to transport all
18 spare and replacement elements considered
19 essential for the ongoing and sustained
20 functionality of all critical systems of the
21 ISS, both in and of themselves and as an
22 element of an integrated, mutually depend-
23 ent essential capability, including an as-
24 sessment of the current schedule for deliv-
25 ery, the availability of delivery vehicles to

1 meet that schedule, and the likelihood of
2 meeting that schedule through such vehi-
3 cles.

4 (2) GAO REPORT.—

5 (A) REPORT REQUIRED.—Not later than
6 90 days after the transmittal under paragraph
7 (1) of the assessment required by subsection
8 (b), the Comptroller General of the United
9 States shall transmit to the Committee on
10 Science and Technology of the House of Rep-
11 resentatives and the Committee on Commerce,
12 Science, and Transportation of the Senate a re-
13 port on the assessment. The report shall set
14 forth an evaluation of the assessment by the
15 Comptroller General, including an evaluation of
16 the accuracy and level of confidence in the find-
17 ings of the assessment.

18 (B) COOPERATION WITH GAO.—The Ad-
19 ministrator shall provide for the monitoring and
20 participation of the Comptroller General in the
21 assessment in a manner that permits the Comp-
22 troller General to prepare and transmit the re-
23 port required by subparagraph (A).

24 (d) UTILIZATION OF RESEARCH FACILITIES AND CA-
25 PABILITIES.—NASA shall plan, manage, and support re-

1 search facilities and capabilities aboard the ISS (other
2 than exploration-related research and technology develop-
3 ment facilities and capabilities, and associated ground
4 support and logistics) consistent with section 504. NASA
5 organizations and officials shall plan, manage, and sup-
6 port exploration-related research and technology develop-
7 ment facilities, capabilities, and associated ground support
8 and logistics in a manner that does not interfere with
9 other activities under section 504.

10 (e) SPACE SHUTTLE MISSION TO ISS.—

11 (1) SPACE SHUTTLE MISSION.—The Adminis-
12 trator shall fly the Launch-On-Need Shuttle mission
13 currently designated in the Shuttle Flight Manifest
14 dated February 28, 2010, to the ISS in fiscal year
15 2011, but no earlier than June 1, 2011, (unless re-
16 quired earlier by an operations contingency), unless,
17 after review of the results of the assessment required
18 by paragraph (2), and after the determination under
19 paragraph (3)(A), the Administrator determines that
20 the level of risk of flying such mission is unaccept-
21 able.

22 (2) ASSESSMENT OF SAFE MEANS OF RE-
23 TURN.—The Administrator shall provide for an as-
24 sessment by the NASA Engineering and Safety Cen-
25 ter of the procedures and plans developed to ensure

1 the safety of the Space Shuttle crew and alternative
2 means of return, in the event the Space Shuttle is
3 damaged or otherwise unable to return safely to
4 Earth.

5 (3) SCHEDULE AND PAYLOAD.—The determina-
6 tion of the schedule and payload for the mission au-
7 thorized by paragraph (1) shall take into account
8 the following:

9 (A) The supply and logistics delivery re-
10 quirements of the ISS.

11 (B) The findings of the assessment re-
12 quired by paragraph (2).

13 (4) FUNDS.—Amounts authorized to be appro-
14 priated by section 101(2)(B) shall be available for
15 the mission authorized by paragraph (1).

16 **SEC. 504. MANAGEMENT OF THE ISS NATIONAL LABORA-**
17 **TORY.**

18 (a) SELECTION OF NOT-FOR-PROFIT ENTITY FOR
19 MANAGEMENT OF NATIONAL LABORATORY.—

20 (1) IN GENERAL.—The Administrator shall
21 competitively select an independent, United States
22 entity that is exempt from taxation under section
23 501(c)(3) of the Internal Revenue Code of 1986 to
24 provide the scientific leadership for and manage the
25 activities of the ISS National Laboratory in accord-

1 ance with this section and to provide initial financial
2 assistance.

3 (2) REQUEST FOR INFORMATION.—Not later
4 than 30 days after the date of enactment of this
5 Act, the Administrator shall issue a request for in-
6 formation for the institutional management of non-
7 NASA research to be carried out on the ISS Na-
8 tional Laboratory.

9 (3) PLAN.—Not later than 90 days after the
10 date of enactment of this Act, the Administrator
11 shall develop a plan for the selection of an institu-
12 tional approach and independent entity for the man-
13 agement of ISS National Laboratory research.

14 (4) QUALIFICATIONS.—The entity competitively
15 selected under paragraph (1) shall possess the capa-
16 bilities to coordinate and arrange for competitive,
17 peer-reviewed selection of research and development
18 projects utilizing the ISS National Laboratory and
19 to otherwise manage the activities of the ISS Na-
20 tional Laboratory.

21 (5) PROHIBITION ON OTHER ACTIVITIES.—The
22 competitive selection under paragraph (1) shall re-
23 quire that the selected entity engage exclusively in
24 activities relating to the management of the ISS Na-
25 tional Laboratory and activities that promote its

1 long term research and development mission as re-
2 quired by this section, without any other organiza-
3 tional objectives or responsibilities on behalf of the
4 entity or any parent organization or other entity.

5 (b) NASA LIAISONS.—

6 (1) DESIGNATION.—The Administrator shall
7 designate an official or employee of the Space Oper-
8 ations Mission Directorate of NASA headquarters
9 and the responsible official designated under section
10 509(b)(1) to act as liaisons between NASA and the
11 entity selected under subsection (a) with regard to
12 the management of the ISS National Laboratory.

13 (2) CONSULTATION WITH LIAISONS.—The enti-
14 ty selected under subsection (a) shall carry out its
15 responsibilities in cooperation and consultation with
16 the officials or employees designated under para-
17 graph (1).

18 (c) PLANNING AND COORDINATION OF ISS NA-
19 TIONAL LABORATORY RESEARCH ACTIVITIES.—Following
20 the competitive selection under subsection (a)(1), the Ad-
21 ministrator shall provide initial financial assistance to the
22 entity in order for the entity to initiate the following:

23 (1) Competitive, peer-reviewed selection of non-
24 NASA research and development activities to be car-
25 ried out using the ISS National Laboratory.

1 (2) Planning and coordination of the ISS Na-
2 tional Laboratory research activities.

3 (3) Development and implementation of guide-
4 lines, selection criteria, and flight support require-
5 ments for non-NASA scientific utilization of ISS re-
6 search capabilities and facilities available in United
7 States-owned modules of the ISS or in partner-
8 owned facilities of the ISS allocated to United States
9 utilization by international agreement.

10 (4) Interaction with and coordination of the
11 International Space Station National Laboratory
12 Advisory Committee established under section 602 of
13 the National Aeronautics and Space Administration
14 Authorization Act of 2008 (42 U.S.C. 17752) with
15 the governance of the entity, and review of rec-
16 ommendations provided by that Committee regard-
17 ing agreements with non-NASA Federal agencies,
18 academic institutions and consortia, and commercial
19 entities leading to the utilization of the ISS National
20 Laboratory facilities.

21 (5) Prioritization and coordination of transpor-
22 tation requirements in support of the ISS National
23 Laboratory research and development objectives, in-
24 cluding provision for delivery of instruments, logis-
25 tics support, and related experiment materials, and

1 provision for return to Earth of collected samples,
2 materials, and scientific instruments in need of re-
3 placement or upgrade.

4 (6) Cooperation with NASA, other Federal
5 agencies, the States, institutions of higher education,
6 and commercial entities in ensuring the enhance-
7 ment and sustained operations, as appropriate, of
8 nonexploration-related research payload ground sup-
9 port facilities for the ISS, including the Space Life
10 Sciences Laboratory, the Space Station Processing
11 Facility, and the Payload Operations Integration
12 Center.

13 (7) Development and implementation of sci-
14 entific outreach and education activities designed to
15 ensure effective utilization of ISS research capabili-
16 ties including the conduct of scientific assemblies,
17 conferences, and other fora for the presentation of
18 research findings, methods, and mechanisms for the
19 dissemination of nonrestricted research findings and
20 the development of educational programs, course
21 supplements, and interaction with educational pro-
22 grams at all grade levels, including coordination with
23 NASA mission directorates regarding student-fo-
24 cused research opportunities for conduct of research
25 in the ISS National Laboratory facilities.

1 (8) Such other matters relating to the utiliza-
2 tion of the ISS National Laboratory facilities for re-
3 search and development as are identified in the
4 agreement between NASA and the independent enti-
5 ty after its competitive selection.

6 (d) RESEARCH MANAGEMENT PLAN.—The Adminis-
7 trator, in coordination with officials or employees des-
8 ignated under subsection (b), shall require that the entity
9 designated under subsection (a) prepare a United States
10 ISS research management plan that—

11 (1) establishes a process for selecting United
12 States ISS research;

13 (2) identifies the expertise and support avail-
14 able to researchers selected to carry out research on
15 the ISS;

16 (3) establishes a process for prioritizing and de-
17 termining allocation schedules for research to be car-
18 ried out on the ISS;

19 (4) establishes a process for prioritizing and ac-
20 commodating logistical and transportation require-
21 ments for ISS research payloads;

22 (5) establishes flight schedules for research pay-
23 loads to the ISS (and research materials to be re-
24 turned to Earth, if necessary); and

1 (6) addresses other relevant factors associated
2 with the selection, management, and oversight of re-
3 search on the ISS National Laboratory.

4 (e) TRANSMITTAL TO CONGRESS.—The plan pre-
5 pared under subsection (d) shall be transmitted to the
6 Congress not later than 18 months after the date of enact-
7 ment of this Act.

8 (f) RESEARCH CAPACITY ALLOCATION AND INTEGRA-
9 TION OF RESEARCH PAYLOADS.—

10 (1) ALLOCATION OF ISS RESEARCH CAPAC-
11 ITY.—As soon as practicable after the date of enact-
12 ment of this Act, but not later than October 1,
13 2011, ISS National Laboratory-managed experi-
14 ments shall be guaranteed access to, and utilization
15 of, not less than 50 percent of the United States
16 ISS research capacity allocation, including power,
17 cold stowage, and requisite crew time onboard the
18 ISS through September 30, 2020. Access to the ISS
19 research capacity includes provision for the adequate
20 upmass and downmass capabilities to utilize the ISS
21 research capacity, as available. The Administrator
22 may allocate additional capacity to the ISS National
23 Laboratory should such additional capacity be in ex-
24 cess of NASA research requirements.

1 (2) ADDITIONAL RESEARCH CAPABILITIES.—If
2 any NASA research plan is determined to require re-
3 search capacity onboard the ISS beyond the percent-
4 age allocated under paragraph (1), such research
5 plan shall be prepared in the form of a requested re-
6 search opportunity to be submitted to the process es-
7 tablished under this section for the consideration of
8 proposed research within the capacity allocated to
9 the ISS National Laboratory. A proposal for such a
10 research plan may include the establishment of part-
11 nerships with non-NASA institutions eligible to pro-
12 pose research to be conducted within the ISS Na-
13 tional Laboratory capacity. Until September 30,
14 2020, the officials or employees designated under
15 subsection (b) may grant an exception to this re-
16 quirement in the case of a proposed experiment con-
17 sidered essential for purposes of preparing for explo-
18 ration beyond low-Earth orbit, as determined by
19 joint agreement between the entity selected under
20 subsection (a) and the officials or employees des-
21 ignated under subsection (b).

22 (3) RESEARCH PRIORITIES AND ENHANCED CA-
23 PACITY.—The independent entity selected under sub-
24 section (a) shall consider recommendations of the
25 National Academies Decadal Survey on Biological

1 and Physical Sciences in Space in establishing re-
2 search priorities and in developing proposed en-
3 hancements of research capacity and opportunities
4 for the ISS National Laboratory.

5 (4) RESPONSIBILITY FOR RESEARCH PAYLOAD
6 INTEGRATION.—NASA shall retain its roles and re-
7 sponsibilities in providing research payload physical,
8 analytical, and operations integration during pre-
9 flight, post-flight, transportation, and orbital phases
10 essential to ensure safe and effective flight readiness
11 and vehicle integration of research activities ap-
12 proved and prioritized by the independent entity se-
13 lected under subsection (a) and the officials or em-
14 ployees designated under subsection (b).

15 **SEC. 505. OUTREACH PLAN FOR UNITED STATES ISS RE-**
16 **SEARCH.**

17 Not later than 18 months after the date of enactment
18 of this Act, the Administrator shall transmit to the Con-
19 gress a plan prepared by the independent entity selected
20 under section 504(a) for broadening and enhancing the
21 outreach to potential United States Government, aca-
22 demic, and commercial users of the ISS.

23 **SEC. 506. CENTRIFUGE.**

24 (a) ASSESSMENT.—The Administrator shall issue a
25 request for information and shall carry out an assessment

1 of innovative options for deploying a variable-gravity cen-
2 trifuge on the ISS. The assessment shall identify the re-
3 quirements for a variable-gravity centrifuge to support
4 fundamental and applied research on the ISS, including
5 research to help mitigate the risk of long-term spaceflight
6 beyond low-Earth orbit. The assessment shall also—

7 (1) review the requirements for development,
8 launch, and operation of the facility on the ISS;

9 (2) provide an estimate of the potential cost
10 and timeline for developing and deploying the cen-
11 trifuge capabilities evaluated as part of the assess-
12 ment;

13 (3) evaluate the status of previous work on de-
14 velopment of an in-flight centrifuge for the ISS and
15 the cost and time that would be required to complete
16 the work and launch the facility; and

17 (4) identify the potential for international col-
18 laboration and other potential partnerships or inno-
19 vative acquisition approaches that could facilitate
20 the development and deployment of a centrifuge fa-
21 cility for the ISS.

22 (b) TRANSMITTAL TO CONGRESS.—The Adminis-
23 trator shall transmit to the Congress the assessment de-
24 scribed in subsection (a) not later than 1 year after the
25 date of enactment of this Act.

1 **SEC. 507. ISS CARGO RESUPPLY REQUIREMENTS AND CON-**
2 **TINGENCY CAPACITY THROUGH 2020.**

3 (a) IN GENERAL.—The Administrator shall ensure
4 the availability of ISS cargo resupply capacity to support
5 the full and productive utilization and the extended oper-
6 ations of the ISS through the year 2020.

7 (b) ASSESSMENT.—The Administrator shall conduct
8 an assessment of the ISS cargo resupply capacity required
9 to support the enhanced research utilization and extended
10 operations of the ISS through 2020. The assessment shall
11 describe the methodology and assumptions used to define
12 the cargo requirements and provide a breakdown of the
13 cargo resupply requirements (upmass and downmass) to
14 support scientific research, other research and develop-
15 ment, operations and maintenance, crew supplies, and
16 other necessary activities. In addition, the assessment
17 shall identify the systems to be used for ISS cargo resup-
18 ply, the amount of cargo those systems will transport, and
19 the timeline for cargo resupply services to the ISS.

20 (c) ADDITIONAL RESUPPLY OPTIONS.—The Admin-
21 istrator shall explore with ISS partners options for ensur-
22 ing the provision of needed upmass to and downmass from
23 the ISS in the event that adequate commercial cargo re-
24 supply capabilities are not available during any extended
25 period after the date that the Space Shuttle is retired. Be-
26 fore acquiring from ISS partners upmass or downmass

1 cargo, the Administrator must certify to the Congress that
2 no United States or commercial cargo resupply capabilities
3 are available.

4 **SEC. 508. EXPLORATION TECHNOLOGY DEVELOPMENT**
5 **USING THE ISS.**

6 (a) **PLAN.**—The Administrator shall develop prior-
7 ities for technology development, testing, and demonstra-
8 tion activities that enable and support NASA’s long-term
9 plans for exploration beyond low-Earth orbit and that re-
10 quire the capabilities of the ISS and shall develop a plan,
11 including milestones, a schedule, and an estimate of re-
12 source requirements, for carrying out the prioritized ac-
13 tivities. The plan shall be developed for the period of fiscal
14 years 2011 through 2020.

15 (b) **TRANSMITTAL TO CONGRESS.**—The Adminis-
16 trator shall transmit to the Congress the plan developed
17 under subsection (a) not later than 270 days after the date
18 of enactment of this Act.

19 **SEC. 509. FUNDAMENTAL SPACE LIFE SCIENCE AND PHYS-**
20 **ICAL SCIENCES AND RELATED TECHNOLOGY**
21 **RESEARCH.**

22 (a) **STRATEGIC PLAN FOR SCIENCE AND TECH-**
23 **NOLOGY RESEARCH.**—

24 (1) **DEVELOPMENT.**—The Administrator, in
25 consultation with academia, other Federal agencies,

1 and other potential stakeholders, shall develop a
2 strategic plan for carrying out competitive, peer-re-
3 viewed fundamental space life science and physical
4 sciences and related technology research, including
5 research on phenomena, such as the response of
6 fluids and materials to reduced gravity environ-
7 ments, that need to be understood in developing ex-
8 ploration-related technologies and systems. The plan
9 shall—

10 (A) address the facilities and instrumenta-
11 tion that would enable and facilitate such re-
12 search;

13 (B) be consistent with the priorities and
14 recommendations established by the National
15 Academies in its decadal survey of life and
16 microgravity sciences;

17 (C) provide a research timeline and iden-
18 tify the resource requirements for its implemen-
19 tation;

20 (D) include an estimate of the number of
21 students, including undergraduate, graduate,
22 and post-doctoral students, and early-career re-
23 searchers that would be supported in carrying
24 out the plan; and

25 (E) identify—

- 1 (i) criteria for the proposed space re-
2 search, including—
- 3 (I) a justification for the research
4 to be carried out in the space micro-
5 gravity environment;
- 6 (II) the use of model systems;
- 7 (III) the testing of flight hard-
8 ware to understand and ensure its
9 functioning in the microgravity envi-
10 ronment;
- 11 (IV) the use of controls to help
12 distinguish among the direct and indi-
13 rect effects of microgravity, among
14 other effects of the flight or space en-
15 vironment;
- 16 (V) approaches for facilitating
17 data collection, analysis, and interpre-
18 tation;
- 19 (VI) procedures to ensure repeti-
20 tion of experiments as needed; and
- 21 (VII) support for timely presen-
22 tation of the peer-reviewed results of
23 the research;
- 24 (ii) instrumentation required to sup-
25 port the measurements and analysis of the

1 research to be carried out under the stra-
2 tegic plan, including the potential use of
3 instrumentation developed by other coun-
4 tries and the potential for a variable-grav-
5 ity centrifuge to support the research;

6 (iii) the capabilities needed to support
7 direct, real-time communications between
8 astronauts working on research experi-
9 ments onboard the ISS and the principal
10 investigator on the ground; and

11 (iv) a process for involving the exter-
12 nal user community in research planning,
13 including planning for relevant flight hard-
14 ware and instrumentation, and for utiliza-
15 tion of the ISS, free flyers, or other re-
16 search platforms.

17 (2) TRANSMITTAL TO CONGRESS.—Not later
18 than 1 year after the date of enactment of this Act,
19 the Administrator shall transmit to the Congress the
20 strategic plan developed under paragraph (1).

21 (b) INTEGRATED RESEARCH MANAGEMENT PRO-
22 GRAM.—

23 (1) RESPONSIBLE OFFICIAL.—

24 (A) IN GENERAL.—The Administrator
25 shall ensure that a responsible official is des-

1 ignated at NASA headquarters to lead a com-
2 petitive, integrated basic and applied research
3 program in fundamental space life science and
4 physical sciences and related technology.

5 (B) RESPONSIBILITIES.—The official des-
6 ignated under subparagraph (A) shall be re-
7 sponsible for—

8 (i) leading near-term and long-term
9 strategic planning pursuant to the research
10 plan developed under subsection (a);

11 (ii) ensuring the input of the external
12 user community in science planning proc-
13 esses;

14 (iii) ensuring the implementation of
15 an integrated, multidisciplinary and inter-
16 disciplinary, competitive research program
17 in fundamental space life and physical
18 sciences and related technology;

19 (iv) supporting the appropriate inter-
20 action of research investigators and NASA
21 managers and engineers in planning, de-
22 signing, testing, and operations related to
23 such research projects;

24 (v) monitoring progress of the pro-
25 gram in achieving the objectives and mile-

1 stones identified in the strategic plan de-
2 veloped under subsection (a)(1); and

3 (vi) other functions required to sup-
4 port the research program under this sec-
5 tion.

6 (C) COORDINATION AND COMMUNICA-
7 TIONS.—The Administrator shall ensure that
8 the responsible official coordinates and commu-
9 nicates the fundamental space life science and
10 physical sciences and related technology re-
11 search activities with relevant entities within
12 NASA, with the ISS research management enti-
13 ty designated under section 504(a), and with
14 other relevant agencies and organizations.

15 (2) BUDGET REQUEST.—The Administrator
16 shall, as part of the annual NASA fiscal year budget
17 request—

18 (A) identify and include a description of
19 research being carried out pursuant to section
20 204 of the National Aeronautics and Space Ad-
21 ministration Authorization Act of 2005 (42
22 U.S.C. 16633);

23 (B) identify the percentage of the total re-
24 search budget for ISS research that the re-

1 search described in subparagraph (A) rep-
2 resents; and

3 (C) identify the programs proposed for
4 carrying out research activities on the ISS and
5 the proposed funding to support those research
6 programs, including a breakdown for each of
7 the programs identified of the funding re-
8 quested for competitive grants.

9 **TITLE VI—SPACE SHUTTLE**
10 **RETIREMENT AND DISPOSITION**

11 **SEC. 601. SENSE OF CONGRESS ON THE SPACE SHUTTLE**
12 **PROGRAM.**

13 (a) FINDINGS.—The Congress makes the following
14 findings:

15 (1) The Space Shuttle program represents a
16 national asset consisting of critical skills and capa-
17 bilities, including the ability to lift large payloads
18 into space and return them to Earth.

19 (2) The Space Shuttle has carried more than
20 355 people from 16 nations into space.

21 (3) The Space Shuttle has projected the best of
22 American values around the world, and Space Shut-
23 tle crews have sparked the imagination and dreams
24 of the world's youth and young at heart.

1 (b) SENSE OF CONGRESS.—It is the sense of the
2 Congress that—

3 (1) it is essential that the retirement of the
4 Space Shuttle and the transition to new human
5 space flight capabilities be done in a manner con-
6 sistent with the legacy of this national asset; and

7 (2) it is imperative for the United States to re-
8 tain the skills and the industrial capability needed to
9 implement the new Space Launch System specified
10 in section 302 of this Act.

11 **SEC. 602. DISPOSITION OF ORBITER VEHICLES.**

12 (a) DISPOSITION.—

13 (1) IN GENERAL.—The Administrator shall re-
14 tire the Space Shuttle orbiters pursuant to a sched-
15 ule established by the Administrator and in a man-
16 ner consistent with provisions of this Act. Upon the
17 termination of the Space Shuttle program, the Ad-
18 ministrator shall decommission any remaining Space
19 Shuttle orbiter vehicles according to established safe-
20 ty and historic preservation procedures prior to their
21 designation as surplus government property. The or-
22 biter vehicles shall be made available and located for
23 display and maintenance through a competitive pro-
24 cedure that takes into account geographical diver-
25 sity, established pursuant to the disposition plan de-

1 developed under section 613(a) of the National Aero-
2 nautics and Space Administration Authorization Act
3 of 2008 (42 U.S.C. 17761(a)), with priority consid-
4 eration given to eligible applicants meeting all condi-
5 tions of that plan which would provide for the dis-
6 play and maintenance of orbiters at locations with
7 the best potential value to the public, including
8 where the location of the orbiters can advance edu-
9 cational opportunities in science, technology, engi-
10 neering, and mathematics disciplines, and with an
11 historical relationship with—

12 (A) the launch, flight operations, or proc-
13 essing of the Space Shuttle orbiters;

14 (B) the retrieval of NASA manned space
15 vehicles; or

16 (C) significant contributions to human
17 space flight.

18 (2) ENTERPRISE.—The Smithsonian Institu-
19 tion, which, as of the date of enactment of this Act,
20 houses the Space Shuttle Enterprise, shall determine
21 any new location for the Enterprise.

22 (b) DISPLAY AND MAINTENANCE.—The orbiter vehi-
23 cles made available under subsection (a) shall be displayed
24 and maintained through agreements and procedures es-
25 tablished pursuant to section 613(a) of the National Aero-

1 nautics and Space Administration Authorization Act of
2 2008 (42 U.S.C. 17761(a)).

3 **TITLE VII—EARTH SCIENCE**

4 **SEC. 701. SENSE OF CONGRESS ON EARTH OBSERVATIONS.**

5 It is the sense of the Congress that—

6 (1) Earth observations are critical to scientific
7 understanding and monitoring of the Earth-system,
8 to protecting human health and property, to growing
9 the economy of the United States, and to strength-
10 ening the national security and international posture
11 of the United States;

12 (2) recognizing the number of relevant partici-
13 pants and activities involved with Earth observations
14 within the United States Government and inter-
15 nationally, collaboration should be strengthened;

16 (3) NASA plays a critical role through its abil-
17 ity to provide data on solar output, sea level rise, at-
18 mospheric and ocean temperature, ozone depletion,
19 and air pollution and to observe human and environ-
20 ment relationships;

21 (4) programs should utilize open standards con-
22 sistent with international data-sharing principles and
23 obtain and convert data from other Federal agen-
24 cies, including data from the United States Geologi-
25 cal Survey;

1 (5) data derived from satellites operated by
2 NOAA, as well as from international satellites, are
3 important to the study of climate science, and coop-
4 erative relationships and programs should be main-
5 tained;

6 (6) Earth-observing satellites and sustained
7 monitoring programs will continue to play a vital
8 role in climate science, environmental understanding,
9 mitigation of destructive environmental impacts, and
10 contributing to the general national welfare; and

11 (7) land remote-sensing observation plays a
12 critical role in Earth science, and the national space
13 policy supports this role by requiring operational
14 land remote-sensing capabilities.

15 **SEC. 702. ESSENTIAL SPACE-BASED EARTH SCIENCE AND**
16 **CLIMATE MEASUREMENTS.**

17 The Administrator, in cooperation with the Adminis-
18 trator of NOAA and other relevant Federal agencies, shall
19 enter into an arrangement with the National Academies
20 for a study, to be completed and transmitted to the Con-
21 gress not later than 18 months after the date of enactment
22 of this Act, to provide a prioritized list and definition of
23 essential Earth science and climate measurements that
24 should be collected with Federal Government space-based
25 means and maintained and archived by the Federal Gov-

1 ernment on a continuous basis. The study shall also iden-
2 tify which measurements could potentially be obtained
3 through international partnerships, from data purchases
4 or other arrangements with private or commercial entities,
5 or from other relevant sources.

6 **SEC. 703. EARTH OBSERVATIONS STRATEGY AND INTER-**
7 **AGENCY COORDINATION.**

8 (a) IN GENERAL.—The Director of OSTP, in con-
9 sultation with the Administrator, the Administrator of
10 NOAA, and other relevant Federal agencies, shall—

11 (1) develop a strategy for Earth observations by
12 the Federal Government; and

13 (2) establish a mechanism to ensure greater co-
14 ordination of the research, operations, transition of
15 experimental research to operations, and activities
16 relating to civilian Earth observation of those Fed-
17 eral agencies, including NASA, that have active pro-
18 grams that either contribute directly or indirectly to
19 such research, operations, and activities.

20 (b) STRATEGIC IMPLEMENTATION PLAN.—The Di-
21 rector shall develop a strategic implementation plan to put
22 into practice the strategy and mechanism required under
23 subsection (a)(1) and (2) that is both updated at least
24 every 3 years and includes a process for external inde-
25 pendent advisory input. The plan shall include—

1 (1) a description of the responsibilities of the
2 various Federal agencies in Earth observations;

3 (2) recommended cost-sharing and procurement
4 arrangements between Federal agencies and other
5 entities, including international arrangements;

6 (3) provisions to ensure the sustained, long
7 term space-based climate observations; and

8 (4) a description of the formal mechanism for
9 planning, coordinating, and supporting the
10 transitioning of NASA research findings, assets, and
11 capabilities to NOAA operations and other relevant
12 Federal agency operations, which may include the
13 establishment of a formal or informal interagency
14 transition office.

15 (c) REPORT.—The Director shall transmit to the
16 Congress within 90 days after the date of enactment of
17 this Act a report on the strategy and mechanism under
18 subsection (a) and shall transmit to the Congress within
19 270 days after such date of enactment the strategic imple-
20 mentation plan under subsection (b).

21 **SEC. 704. DECADAL SURVEY MISSIONS IMPLEMENTATION**
22 **FOR EARTH OBSERVATION.**

23 The Administrator shall undertake to implement, as
24 appropriate, missions identified in the National Research
25 Council's Earth Science Decadal Survey, especially the top

1 priorities, within the scope of the funds authorized for the
2 Earth Science Mission Directorate.

3 **SEC. 705. EXPANSION OF EARTH SCIENCE APPLICATIONS.**

4 It is the sense of the Congress that—

5 (1) NASA's Earth science data can increasingly
6 aid efforts to improve the human condition and pro-
7 vide greater security; and

8 (2) NASA's contributions with respect to Earth
9 science applications and NASA's role in such efforts
10 should be supported.

11 **SEC. 706. EARTH SCIENCE APPLICATIONS.**

12 The Administrator shall develop guidelines and proce-
13 dures for entering into arrangements with State, local, re-
14 gional, and tribal government agencies and other Federal
15 agencies that seek to benefit from ongoing NASA tech-
16 nical information, capabilities, and support related to
17 Earth science applications and decision support systems.
18 The guidelines and procedures shall include a definition
19 of the partnership, milestones, cost-sharing, and project-
20 relevant criteria for the project. The guidelines and proce-
21 dures shall define arrangements for reimbursement for
22 NASA services, as appropriate, including the use of NASA
23 spacecraft and aircraft, sensors, equipment, facilities, and
24 associated personnel for the purpose of aiding State, local,

1 regional, and tribal governments and other Federal agen-
2 cies.

3 **SEC. 707. COMMERCIAL REMOTE SENSING DATA PUR-**
4 **CHASES PILOT PROJECT.**

5 (a) WORKSHOP.—

6 (1) IN GENERAL.—Not later than 9 months
7 after the date of enactment of this Act, the Adminis-
8 trator shall organize a workshop to identify the es-
9 sential criteria for a pilot project for purchasing
10 commercial remote sensing data to support research
11 in Earth science and for applied uses of the data to
12 address State, local, regional, and tribal needs.

13 (2) PARTICIPANTS.—The workshop shall in-
14 clude relevant commercial remote sensing data pro-
15 viders, scientists, remote sensing data users, and
16 other Federal agencies (including NOAA), among
17 other relevant stakeholders.

18 (3) SUBJECT MATTER.—The workshop shall ad-
19 dress lessons learned and recommendations related
20 to past experience with commercial data purchases,
21 including those outlined in the National Research
22 Council report entitled “Toward New Partnerships
23 in Remote Sensing: Government, the Private Sector,
24 and Earth Science Research”.

1 (b) PILOT PROJECT.—Not later than 18 months
2 after the date of enactment of this Act, after consideration
3 of the results of the workshop under subsection (a) and
4 after obtaining relevant information from potential com-
5 mercial remote sensing data providers and users of such
6 data, the Administrator shall establish a pilot project for
7 the provision, through competitive solicitations, of com-
8 mercial remote sensing data for research and applied uses
9 of the data to serve State, local, regional, and tribal needs.

10 **SEC. 708. INSTRUMENT TEST-BEDS AND VENTURE CLASS**
11 **MISSIONS.**

12 (a) IN GENERAL.—The Administrator shall pursue
13 innovative ways to fly instrument-level payloads for early
14 demonstration or as co-manifested payloads.

15 (b) SENSE OF CONGRESS.—It is the sense of the
16 Congress that—

17 (1) the use of the ISS as an accessible platform
18 for the placement of instrument-level payloads for
19 early demonstration or as co-manifested payloads,
20 where practicable, should be encouraged; and

21 (2) in order to address the cost and schedule
22 challenges associated with large flight systems,
23 NASA should pursue smaller systems where prac-
24 ticable and warranted.

1 **SEC. 709. SENSE OF CONGRESS ON NPOESS FOLLOW-ON**
2 **PROGRAM.**

3 (a) FINDINGS.—The Congress makes the following
4 findings:

5 (1) Polar orbiting satellites are vital for weath-
6 er prediction, climate and environmental monitoring,
7 national security, emergency response, and climate
8 research.

9 (2) The National Polar Orbiting Environmental
10 Satellite System (NPOESS) has suffered from years
11 of steadily rising cost estimates and schedule delays.

12 (3) An independent review team recommended
13 that NPOESS be restructured to improve the prob-
14 ability of success and to protect the continuity of
15 weather and climate data.

16 (b) SENSE OF CONGRESS.—It is the sense of the
17 Congress that—

18 (1) the Congress supports restructuring the
19 program to minimize schedule slips and cost over-
20 runs, to clarify the responsibilities and accountability
21 of NASA, NOAA, and the Department of Defense,
22 and to retain necessary coordination across civil and
23 defense weather and climate programs;

24 (2) the Administrator of NOAA and the Sec-
25 retary of Defense should maximize the use of assets
26 from the NPOESS as they establish the NOAA

1 Joint Polar Satellite System at NASA's Goddard
2 Space Flight Center and the Department of De-
3 fense's Defense Weather Satellite System;

4 (3) the Administrator of NOAA and the Sec-
5 retary of Defense should structure their programs in
6 order to maintain satellite data continuity for the
7 Nation's weather and climate requirements; and

8 (4) the Administrator of NOAA and the Sec-
9 retary of Defense should provide immediate notifica-
10 tion to the Congress of any impediments that may
11 require congressional intervention in order for the
12 agencies to meet launch readiness dates, together
13 with any recommended actions.

14 **SEC. 710. REPORT ON TEMPERATURE RECORDS.**

15 Not later than 1 year after the date of enactment
16 of this Act, the Administrator shall issue to the Congress
17 a report detailing the extent and degree to which NASA's
18 temperature records overlap with the records at the Cli-
19 matic Research Unit at the University of East Anglia, the
20 reasons for and sources of that overlap, and the possibility
21 that NASA's temperature records have been compromised.

22 **TITLE VIII—SPACE SCIENCE**

23 **SEC. 801. TECHNOLOGY DEVELOPMENT.**

24 The Administrator shall ensure that the Science Mis-
25 sion Directorate maintains a long term technology devel-

1 opment program for space and Earth science in coordina-
2 tion with the overall NASA technology plan under section
3 911.

4 **SEC. 802. SUBORBITAL RESEARCH ACTIVITIES.**

5 (a) FINDING.—The report of the National Academy
6 of Sciences entitled “Revitalizing NASA’s Suborbital Pro-
7 gram: Advancing Science, Driving Innovation and Devel-
8 oping Workforce” found that suborbital science missions
9 were critical to building an aerospace workforce capable
10 of meeting the needs of current and future human and
11 robotic space exploration.

12 (b) MANAGEMENT.—

13 (1) DESIGNATION.—The Administrator shall
14 designate an individual to lead NASA’s suborbital
15 and airborne program.

16 (2) REPORTING.—Such individual shall report
17 directly to the Associate Administrator of the
18 Science Mission Directorate.

19 (3) RESPONSIBILITIES.—In order to ensure the
20 long term recognition of the combined value of sub-
21 orbital facilities and capabilities to the Science Mis-
22 sion Directorate, to NASA, and to the Nation, such
23 individual shall be responsible for—

24 (A) the development of short- and long-
25 term strategic plans for maintaining, renewing,

1 and extending suborbital facilities and capabili-
2 ties;

3 (B) the monitoring of progress towards
4 goals in the plans; and

5 (C) the integration of suborbital activities
6 and workforce development within NASA.

7 (c) ESTABLISHMENT OF SUBORBITAL RESEARCH
8 PROGRAM.—

9 (1) IN GENERAL.—In order to maintain critical
10 skills in the aerospace workforce, the Administrator
11 shall establish a Suborbital Research Program with-
12 in the Science Mission Directorate to advance
13 science and to train the next generation of scientists
14 and engineers in systems engineering and systems
15 integration.

16 (2) PROGRAM REQUIREMENTS.—The Suborbital
17 Research Program shall—

18 (A) include the use of sounding rockets,
19 aircraft, high altitude balloons, and other
20 NASA suborbital launch vehicles;

21 (B) integrate existing suborbital research
22 programs with orbital missions at the discretion
23 of the individual designated under subsection
24 (b); and

1 (C) emphasize the participation of under-
2 graduate and graduate students and post-doc-
3 toral researchers when announcements of op-
4 portunity are formulated.

5 (d) STRATEGIC PLAN.—Not later than 1 year after
6 the date of enactment of this Act, the Administrator shall
7 transmit to the Congress a strategic plan to support the
8 full and productive use of NASA’s suborbital and airborne
9 assets as a foundation for meeting its scientific research,
10 engineering, workforce development, and education goals
11 and objectives across NASA Centers and mission direc-
12 torates and in partnership with institutions of higher edu-
13 cation and other relevant external institutions. The stra-
14 tegic plan shall—

15 (1) be developed in consultation with relevant
16 NASA Centers and mission directorates and with
17 input from institutions of higher education, non-
18 profit research institutions, and private industry;

19 (2) identify the needs and priorities for using
20 NASA’s suborbital and airborne assets to support
21 NASA’s scientific research, engineering, workforce
22 development, and educational goals;

23 (3) provide the number and type of suborbital
24 missions anticipated in each fiscal year and the

1 number of undergraduate and graduate students ex-
2 pected to participate in the missions;

3 (4) identify and prioritize the required infra-
4 structure investments, including maintenance, up-
5 grades, and any enhanced facility or equipment ca-
6 pabilities, that are required to carry out the needs
7 and priorities described in paragraph (2); and

8 (5) provide an estimate of the budget require-
9 ments and a schedule and timeline for implementing
10 the plan.

11 (e) REPORT.—The Administrator shall transmit an-
12 nually to the Committee on Science and Technology of the
13 House of Representatives and the Committee on Com-
14 merce, Science, and Transportation of the Senate a report
15 on the number and type of suborbital missions conducted
16 in the preceding fiscal year and the number of under-
17 graduate and graduate students participating in the mis-
18 sions.

19 **SEC. 803. SENSE OF CONGRESS ON OVERALL SCIENCE**
20 **PORTFOLIO.**

21 The Congress reaffirms its sense that a balanced and
22 adequately funded set of activities, consisting of research
23 and analysis grants programs, technology development,
24 small, medium, and large space missions, and suborbital

1 research activities, contributes to a robust and productive
2 science program and serves as a catalyst for innovation.

3 **SEC. 804. IN-SPACE SERVICING.**

4 Pursuant to section 502 of the National Aeronautics
5 and Space Administration Authorization Act of 2008 (42
6 U.S.C. 17742), the Administrator shall continue to take
7 all necessary steps to ensure that provisions are made for
8 in-space or human servicing and repair of all future ob-
9 servatory-class scientific spacecraft intended to be de-
10 ployed in Earth orbit or at a Lagrangian point to the ex-
11 tent practicable and appropriate. The Administrator shall
12 ensure that NASA investments and future capabilities for
13 space technology, robotics, and human space flight take
14 the ability to service and repair these spacecraft into ac-
15 count, where appropriate, and incorporate such ability into
16 design and operational plans.

17 **SEC. 805. DECADAL RESULTS.**

18 (a) IN GENERAL.—The Administrator shall under-
19 take to implement, as appropriate, missions identified in
20 the National Research Council’s space science decadal sur-
21 veys in each mission area, with a focus on the top prior-
22 ities, within the scope of the funds authorized for the
23 Science Mission Directorate.

24 (b) EFFECT ON BUDGET REQUEST.—The Adminis-
25 trator shall take into account the current decadal surveys

1 from the National Academies' Space Studies Board when
2 submitting the President's budget request to the Con-
3 gress.

4 **SEC. 806. ONGOING RESTORATION OF RADIOISOTOPE**
5 **THERMOELECTRIC GENERATOR MATERIAL**
6 **PRODUCTION.**

7 (a) FINDINGS.—The Congress makes the following
8 findings:

9 (1) The United States has led the world in the
10 scientific exploration of space for nearly 50 years.

11 (2) Missions such as Viking, Voyager, Cassini,
12 and New Horizons have greatly expanded or will
13 greatly expand knowledge of our solar system and
14 planetary characteristics and evolution.

15 (3) Radioisotope power systems are the only
16 available power sources for deep space missions,
17 making it possible to travel to such distant destina-
18 tions as Mars, Jupiter, Saturn, Pluto, and beyond
19 and to maintain operational control and systems via-
20 bility for extended mission durations.

21 (4) Current radioisotope power systems supplies
22 and production will not fully support NASA missions
23 planned even in the next decade.

24 (5) Without a new domestic production capa-
25 bility, the United States will no longer have the

1 means to explore the majority of the solar system by
2 the end of this decade.

3 (6) Continuing to rely on Russia or other for-
4 eign sources for radioisotope power system fuel pro-
5 duction is not a secure option.

6 (7) Reestablishing domestic production will re-
7 quire a long lead-time. Thus, meeting future space
8 exploration mission needs requires that a restart
9 project begin at the earliest opportunity.

10 (b) IN GENERAL.—The Administrator, in coordina-
11 tion with the Secretary of Energy, shall pursue a joint
12 approach beginning in fiscal year 2011 towards restarting
13 and sustaining the domestic production of radioisotope
14 thermoelectric generator material for deep space and other
15 science and exploration missions. Funds authorized by this
16 Act for NASA shall be made available under a reimburs-
17 able agreement with the Department of Energy for the
18 purpose of reestablishing facilities to produce fuel required
19 for radioisotope thermoelectric generators to enable future
20 missions.

21 (c) REPORT.—Within 120 days after the date of en-
22 actment of this Act, the Administrator and the Secretary
23 of Energy shall transmit to the Committee on Science and
24 Technology of the House of Representatives and the Com-
25 mittee on Commerce, Science, and Transportation of the

1 Senate a joint report on coordinated agreements, planned
2 implementation, and anticipated schedule, production
3 quantities, and mission applications under this section.

4 (d) ANALYSIS OF REQUIREMENTS AND RISKS.—The
5 Administrator, in consultation with other Federal agen-
6 cies, shall conduct an analysis of NASA requirements for
7 radioisotope power system material to carry out planned,
8 high priority robotic missions in the solar system and
9 other surface exploration activities beyond low-Earth
10 orbit, as well as the risks to NASA missions in meeting
11 those requirements, or any additional requirements, due
12 to a lack of adequate domestic production of radioisotope
13 power system material. The analysis shall—

14 (1) detail NASA’s current projected mission re-
15 quirements for radioisotope power system material;

16 (2) explain the assumptions used to determine
17 NASA’s requirements for the material, including—

18 (A) the planned use of Advanced Stirling
19 Radioisotope Generator technology;

20 (B) the status of and timeline for com-
21 pleting development and demonstration of Ad-
22 vanced Stirling Radioisotope Generator tech-
23 nology, including the development of flight
24 readiness requirements; and

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

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

10 (4) outline a process for meeting any additional
11 NASA requirements for the material; and

12 (5) estimate the incremental costs required to
13 increase the amount of material produced each year,
14 if such an increase is needed to support additional
15 NASA requirements for the material.

16 (e) TRANSMITTAL.—Not later than 180 days after
17 the date of enactment of this Act, the Administrator shall
18 transmit to the Congress the results of the analysis.

19 **SEC. 807. REVIEW OF EXPLORER PROGRAM.**

20 (a) ESTABLISHMENT.—Not later than 120 days after
21 the date of enactment of this Act, the Administrator shall
22 enter into an arrangement with the National Academies
23 to conduct a review of the Explorer Program and offer
24 any recommendations as it considers necessary.

1 (b) SCOPE.—Such review shall address at least the
2 following:

3 (1) A review of existing or recent Explorer pro-
4 gram elements such as NASA’s University Class Ex-
5 plorer (UNEX), Small Explorer (SMEX), Medium
6 Class Explorer (MIDEX), Explorers (EX), and Mis-
7 sions of Opportunity to assess the degree of—

8 (A) innovation in instrumentation and
9 other technology and space mission elements;

10 (B) flexibility and new approaches in man-
11 agement and collaboration;

12 (C) project implementation within the
13 planned budget and schedule; and

14 (D) training opportunities for space sci-
15 entists and engineers.

16 (2) The status, capability, and availability of
17 launch vehicles and infrastructure to support the
18 Explorer program elements.

19 (3) Projected launch capabilities and facilities
20 for Explorers, including private sector launch capa-
21 bilities.

22 (4) The frequency of Explorer missions.

23 (5) The balance of Explorer missions among
24 theme areas and between larger and smaller mission
25 sizes.

1 (6) The opportunities and challenges for part-
2 ner participation in Explorer missions, including
3 international and interagency collaborations.

4 (7) The contributions of Explorers to a robust
5 space science program, and the value of the Explorer
6 program for the Nation's scientific research and en-
7 gineering community, including its impact on the
8 training of younger researchers and engineers.

9 (c) REPORT.—Not later than 16 months after the
10 date of enactment of this Act, the Administrator shall
11 transmit to the Congress the review and a plan for re-
12 sponding to the recommendations of the review.

13 **SEC. 808. COLLABORATION WITH ESMD AND SOMD ON**
14 **ROBOTIC MISSIONS.**

15 (a) IN GENERAL.—The Administrator shall ensure
16 that the Exploration Systems Mission Directorate and the
17 Space Operations Mission Directorate coordinate with the
18 Science Mission Directorate on an overall approach and
19 plan for interagency and international collaboration on
20 robotic missions that are NASA or internationally devel-
21 oped, including missions to the Moon or its vicinity,
22 Lagrangian points, near-Earth objects, and Mars.

23 (b) PLAN.—Within 90 days after the date of enact-
24 ment of this Act, the Administrator shall transmit to the
25 Committee on Science and Technology of the House of

1 Representatives and the Committee on Commerce,
2 Science, and Transportation of the Senate a plan for im-
3 plementation of the collaborative approach required by
4 subsection (a).

5 (c) RESTRICTION.—The Administrator may not can-
6 cel or initiate any Exploration Systems Mission Direc-
7 torate or Science Mission Directorate robotic project be-
8 fore the plan is transmitted under subsection (b).

9 **SEC. 809. NEAR-EARTH OBJECT SURVEY AND POLICY WITH**
10 **RESPECT TO THREATS POSED.**

11 (a) RESPONSIBLE OFFICIAL.—

12 (1) IN GENERAL.—The Administrator shall des-
13 ignate a responsible official for coordinating NASA's
14 near-Earth object observation activities and NASA's
15 interactions with other Federal agencies and inter-
16 national entities on near-Earth object surveys, de-
17 fense, and efforts related to addressing any threats
18 to the United States posed by near-Earth objects.

19 (2) REPORTING.—The responsible official shall
20 report directly to the Administrator.

21 (b) REAFFIRMATION OF POLICY ON NEAR-EARTH
22 OBJECT SURVEY.—The Congress reaffirms the direction
23 set forth in section 321(d)(1) of the National Aeronautics
24 and Space Administration Authorization Act of 2005 (42
25 U.S.C. 16691(d)(1)) that directed the Administrator to

1 “plan, develop, and implement a Near-Earth Object Sur-
2 vey program to detect, track, catalogue, and characterize
3 the physical characteristics of near-Earth objects equal to
4 or greater than 140 meters in diameter in order to assess
5 the threat of such near-Earth objects to the Earth”.

6 (c) REAFFIRMATION OF POLICY WITH RESPECT TO
7 THREATS POSED BY NEAR-EARTH OBJECTS.—The Con-
8 gress reaffirms the direction set forth in section 804 of
9 the National Aeronautics and Space Administration Au-
10 thorization Act of 2008 (42 U.S.C. 17794) that directed
11 the Director of OSTP by October 15, 2010, to—

12 (1) develop a policy for notifying Federal agen-
13 cies and relevant emergency response institutions of
14 an impending near-Earth object threat, if near-term
15 public safety is at risk; and

16 (2) recommend a Federal agency or agencies to
17 be responsible for—

18 (A) protecting the United States from a
19 near-Earth object that is expected to collide
20 with Earth; and

21 (B) implementing a deflection campaign, in
22 consultation with international bodies, should
23 one be necessary.

24 (d) ARECIBO OBSERVATORY.—The Congress reiter-
25 ates its support for the use of the Arecibo Observatory

1 for NASA-funded near-Earth object-related activities. The
2 Administrator shall coordinate with the Director of the
3 National Science Foundation to ensure the availability of
4 the Arecibo Observatory's planetary radar to support
5 these activities.

6 (e) PLAN.—Not later than 270 days after the date
7 of enactment of this Act, the Administrator shall transmit
8 to the Congress a plan for carrying out the direction re-
9 affirmed by subsection (b).

10 (f) AUTHORIZATION OF APPROPRIATIONS.—From
11 the funds authorized for Planetary Science in title I,
12 \$1,000,000 in fiscal year 2012 and \$1,000,000 in fiscal
13 year 2013 shall be for supporting competitively awarded
14 grants for investigation of innovative approaches to car-
15 rying out the congressionally mandated survey of near-
16 Earth objects equal to or greater than 140 meters in di-
17 ameter.

18 **SEC. 810. SPACE WEATHER.**

19 (a) FINDINGS.—The Congress makes the following
20 findings:

21 (1) Space weather events pose a significant
22 threat to modern technological systems.

23 (2) The effects of severe space weather events
24 on the electric power grid, telecommunications and
25 entertainment satellites, airline communications dur-

1 ing polar routes, and space-based position, naviga-
2 tion, and timing systems could have significant soci-
3 etal, economic, national security, and health impacts.

4 (3) Earth and space observing satellites, such
5 as the Advanced Composition Explorer, Geo-
6 stationary Operational Environmental Satellites,
7 Polar Operational Environmental Satellites, and De-
8 fense Meteorological Satellites, provide crucial data
9 necessary to predict space weather events.

10 (b) STRATEGY AND IMPLEMENTATION PLAN.—The
11 Director of OSTP, in coordination with the Administrator
12 and with other relevant Federal agencies, space weather
13 coordinating bodies, industry, academia, and other stake-
14 holders, shall prepare a long-term strategy for a sustain-
15 able space weather program and shall develop a plan to
16 implement the strategy. The implementation plan shall—

17 (1) provide an approach for improving the Na-
18 tion's ability to prepare, avoid, mitigate, respond to,
19 and recover from potentially devastating impacts of
20 space weather events;

21 (2) coordinate the operational activities of the
22 National Space Weather Program Council members,
23 including the NOAA Space Weather Prediction Cen-
24 ter and the United States Air Force Weather Agen-
25 cy;

1 (3) detail the current data sources, both space-
2 and ground-based, that are necessary for space
3 weather forecasting;

4 (4) detail the space- and ground-based systems
5 that will be required to gather data necessary for
6 space weather forecasting for the next 10 years;

7 (5) define individual agency responsibilities for
8 carrying out the strategy;

9 (6) identify the milestones and schedule re-
10 quired for each agency's contributions;

11 (7) provide an estimate of the resources re-
12 quired for each agency to carry out its responsibil-
13 ities;

14 (8) establish a process for coordinating agency
15 responsibilities, programs, and budgets required for
16 implementing the plan; and

17 (9) identify opportunities for private sector and
18 international contributions to implementing the plan.

19 (c) STUDY ON PREDICTION.—

20 (1) IN GENERAL.—The Director of OSTP shall
21 enter into an arrangement with the National Acad-
22 emies to assess the status of capabilities for space
23 weather prediction and recommend the highest pri-
24 ority basic research, infrastructure, and operational

1 needs required to improve the Nation's ability to
2 predict space weather events.

3 (2) INCLUSION.—The study shall also address
4 the benefits of space weather prediction.

5 (3) REPORT.—Not later than 18 months after
6 the date of enactment of this Act, the Director shall
7 transmit to the Congress the results of the study.

8 **TITLE IX—AERONAUTICS AND** 9 **SPACE TECHNOLOGY**

10 **SEC. 901. SENSE OF CONGRESS ON AERONAUTICS RE-** 11 **SEARCH AND DEVELOPMENT.**

12 It is the sense of the Congress that—

13 (1) aeronautics research remains vital to
14 NASA's mission and deserves continued support;

15 (2) NASA aeronautics research should be guid-
16 ed by, and consistent with, the National Aeronautics
17 Research and Development Policy;

18 (3) the OSTP-led National Science and Tech-
19 nology Council Aeronautics Science and Technology
20 subcommittee remains essential to developing and
21 coordinating national aeronautics research and de-
22 velopment plans and their prioritization for funding;

23 (4) it is also important that such national aero-
24 nautics research and development plans include a
25 focus on research, development, testing, and evalua-

1 tion infrastructure plans, as well as research and de-
2 velopment goals and objectives; and

3 (5) technology research conducted by NASA as
4 part of the larger national aeronautics effort helps
5 to secure, sustain, and advance the leadership role of
6 the United States in global aviation.

7 **SEC. 902. AERONAUTICS RESEARCH GOALS.**

8 The Administrator shall ensure that NASA maintains
9 a strong aeronautics research portfolio ranging from fun-
10 damental research through systems research with specific
11 research goals, including the following:

12 (1) AIRSPACE CAPACITY.—NASA's Aeronautics
13 Research Mission Directorate shall address research
14 needs of the Next Generation Air Transportation
15 System, including the ability of the National Air-
16 space System to handle up to 3 times the current
17 travel demand by 2025.

18 (2) ENVIRONMENTAL SUSTAINABILITY.—The
19 Directorate shall consider and pursue concepts to re-
20 duce noise, emissions, and fuel consumption while
21 maintaining high safety standards and shall pursue
22 research related to alternative fuels.

23 (3) AVIATION SAFETY.—The Directorate shall
24 proactively address safety challenges with new and

1 current air vehicles and with operations in the Na-
2 tion's current and future air transportation system.

3 **SEC. 903. RESEARCH COORDINATION AND COLLABORA-**
4 **TION.**

5 (a) DEPARTMENT OF DEFENSE.—The Administrator
6 shall continue to coordinate with the Secretary of Defense,
7 through the National Partnership for Aeronautics Testing,
8 to develop and implement joint plans for those elements
9 of the Nation's research, development, testing, and engi-
10 neering infrastructure that are of common interest and
11 use.

12 (b) FEDERAL AVIATION ADMINISTRATION.—The Ad-
13 ministrator shall continue to coordinate with, and work
14 closely with, the Administrator of the Federal Aviation
15 Administration, under the framework of the Senior Policy
16 Council, in the development of the Next Generation Air
17 Transportation Program. The Administrator shall encour-
18 age the Council to explore areas for greater collaboration,
19 including areas where NASA can help to accelerate the
20 development and demonstration of NextGen technologies.

21 **SEC. 904. ENVIRONMENTALLY FRIENDLY AIRCRAFT RE-**
22 **SEARCH AND DEVELOPMENT INITIATIVE.**

23 Section 302 of the National Aeronautics and Space
24 Administration Authorization Act of 2008 (42 U.S.C.
25 17721) is amended—

1 (1) by striking “The Administrator” and insert-
2 ing the following:

3 “(a) IN GENERAL.—The Administrator”; and

4 (2) by adding at the end the following:

5 “(b) PLAN.—

6 “(1) IN GENERAL.—The Administrator shall
7 develop a plan and associated timetable for this ini-
8 tiative identifying key milestones, including projected
9 flight demonstrations to validate vehicle and tech-
10 nology concepts in a relevant environment.

11 “(2) TRANSMITTAL.—Not later than 270 days
12 after the date of enactment of the National Aero-
13 nautics and Space Administration Authorization Act
14 of 2010, the Administrator shall transmit the plan
15 to the Congress.”.

16 **SEC. 905. RESEARCH ON NEXTGEN AIRSPACE MANAGE-**
17 **MENT CONCEPTS AND TOOLS.**

18 The Administrator shall review at least annually the
19 alignment and timing of NASA’s research and develop-
20 ment activities in support of the NextGen airspace man-
21 agement modernization initiative and shall make any nec-
22 essary adjustments by reprioritizing or retargeting
23 NASA’s research and development activities in support of
24 the NextGen initiative.

1 **SEC. 906. RESEARCH ON AIRCRAFT CABIN AIR QUALITY.**

2 The Administrator shall initiate research on aircraft
3 cabin air quality that complements research conducted by
4 the Federal Aviation Administration and its Center of Ex-
5 cellence on Research in the Intermodal Transport Envi-
6 ronment, including research on innovative aircraft cabin
7 air quality sensors operating during ground and flight op-
8 erations and on innovative warning and mitigation tech-
9 nologies for poor air quality.

10 **SEC. 907. RESEARCH ON ONBOARD VOLCANIC ASH SENSOR**
11 **SYSTEMS.**

12 (a) IN GENERAL.—The Administrator shall conduct
13 a study to assess the feasibility of establishing a project
14 focused on the development of a low-cost onboard volcanic
15 ash sensor system.

16 (b) SPECIFICATIONS.—The study shall consider, at a
17 minimum—

18 (1) NASA's unique capabilities;

19 (2) opportunities for collaboration, both nation-
20 ally and internationally; and

21 (3) projected resource requirements, research
22 milestones, and potential accomplishments.

23 **SEC. 908. AERONAUTICS TEST FACILITIES.**

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

1 (1) NASA must reverse the deteriorating condi-
2 tion of its aeronautics ground test facilities and in-
3 frastructure, as this condition is hampering the ef-
4 fectiveness and efficiency of aeronautics research
5 performed by both NASA and industry participants
6 making use of NASA facilities, thus reducing the
7 competitiveness of the United States aviation indus-
8 try;

9 (2) NASA has a role in providing test capabili-
10 ties that are not economically viable as commercial
11 entities and thus are not available elsewhere; and

12 (3) to ensure continued access to reliable and
13 efficient national-class test capabilities by research-
14 ers, NASA should seek to establish strategic part-
15 nerships with other Federal agencies, academic insti-
16 tutions, and industry.

17 (b) PLAN.—The Administrator shall develop a plan
18 to stabilize and, where possible, reverse the deterioration
19 of NASA’s aeronautics ground test facilities. The Admin-
20 istrator shall transmit such plan to the Congress not later
21 than 1 year after the date of enactment of this Act.

1 **SEC. 909. EXPANDED RESEARCH PROGRAM ON COMPOSITE**
2 **MATERIALS USED IN AEROSPACE.**

3 The Administrator shall expand NASA's research
4 program on composite materials used in aerospace appli-
5 cations to address—

6 (1) progressive damage analysis, aging, inspec-
7 tion techniques, and new manufacturing and repair
8 techniques; and

9 (2) ways to mitigate how the environment, op-
10 erating fluids, and mechanical loads interact with
11 composite materials over time.

12 **SEC. 910. GOAL FOR NASA SPACE TECHNOLOGY.**

13 (a) IN GENERAL.—It is critical that NASA maintain
14 a NASA space technology base that helps align mission
15 directorate investments and supports long term needs to
16 complement mission directorate-funded research and sup-
17 port, where appropriate, multiple users, building upon its
18 Innovative Partnerships Program and other partnering
19 approaches.

20 (b) ESTABLISHMENT OF SPACE TECHNOLOGY PRO-
21 GRAM.—The Administrator shall establish a space tech-
22 nology program to enable research and development on ad-
23 vanced space technologies and systems that are inde-
24 pendent of specific space mission flight projects. The pro-
25 gram shall support—

26 (1) early-stage concepts and innovation;

1 (2) development of innovative technologies in
2 areas such as in-space propulsion, power generation
3 and storage, liquid rocket propulsion, avionics, struc-
4 tures, and materials that may enable new ap-
5 proaches to human and robotic space missions; and

6 (3) flight demonstrations of technologies, in-
7 cluding those that have the potential to benefit mul-
8 tiple NASA mission directorates, other Federal
9 agencies, and the commercial space industry.

10 (c) EXPLORATION TECHNOLOGY DEVELOPMENT.—

11 The program established in subsection (b) shall also sup-
12 port the research, development, and demonstration of ena-
13 bling technologies in areas such as autonomous systems
14 and avionics, human-robotics systems, extravehicular tech-
15 nology, entry, descent, and landing technology, space
16 power systems, closed loop life support systems, cryogenic
17 propellant storage and transfer, and in-situ resource utili-
18 zation, among other technology areas, in support of future
19 exploration missions.

20 (d) PROCEDURE.—In establishing the space tech-
21 nology program under this section, the Administrator
22 shall—

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

1 (2) support the development of an organization
2 to investigate innovative concepts for technological
3 approaches, systems, architectures, or mission strat-
4 egies;

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

9 (4) undertake partnerships with other Federal
10 agencies, institutions of higher education, private in-
11 dustry, and other spacefaring nations, as appro-
12 priate.

13 **SEC. 911. IMPLEMENTATION PLAN FOR NASA SPACE TECH-**
14 **NOLOGY.**

15 Within 120 days after the date of enactment of this
16 Act, NASA shall transmit to the Committee on Science
17 and Technology of the House of Representatives and the
18 Committee on Commerce, Science, and Transportation of
19 the Senate a plan that outlines—

20 (1) how NASA's space technology program will
21 meet the goal described in section 910, including an
22 explanation of how the plan will link to other mis-
23 sion directorate technology efforts outlined in sec-
24 tions 801 and 802 of this Act;

25 (2) how the program will be structured;

1 (3) the process for prioritizing and funding
2 space technology efforts carried out within the pro-
3 gram;

4 (4) the performance measures, and a process
5 for evaluating the progress on the performance
6 measures, established for the program; and

7 (5) advisory input from non-NASA experts, in-
8 cluding experts from academia, other Federal agen-
9 cies, industry, and research institutions.

10 **SEC. 912. DECADAL SURVEY FOR NASA SPACE TECH-**
11 **NOLOGY.**

12 The Administrator shall enter into an arrangement
13 with the National Academies for a decadal survey study
14 to make recommendations for research and development
15 priorities for NASA's space technology program over the
16 next decade. Included in the decadal survey shall be an
17 identification and prioritization of key technology research
18 and development activities needed to enable a robust ex-
19 ploration technology program, from basic research and de-
20 velopment through flight demonstrations. The Adminis-
21 trator shall transmit the results of the study to the Con-
22 gress not later than 20 months after the date of enactment
23 of this Act.

1 **SEC. 913. USE OF OPERATIONAL COMMERCIAL SUB-**
2 **ORBITAL VEHICLES FOR RESEARCH, DEVEL-**
3 **OPMENT, AND EDUCATION.**

4 (a) IN GENERAL.—The report of the National Acad-
5 emy of Sciences entitled “Revitalizing NASA’s Suborbital
6 Program: Advancing Science, Driving Innovation and De-
7 veloping Workforce” found that suborbital science mis-
8 sions were critical to building an aerospace workforce ca-
9 pable of meeting the needs of current and future human
10 and robotic space exploration.

11 (b) ESTABLISHMENT.—The Administrator shall es-
12 tablish a Commercial Reusable Suborbital Research Pro-
13 gram within the Space Technology Program that shall
14 fund the development of competitively selected payloads
15 for scientific research, technology development, and edu-
16 cation, and shall provide flight opportunities, consistent
17 with the requirements of subsection (h), for those payloads
18 to microgravity environments and suborbital altitudes that
19 meet the requirements of such scientific research, tech-
20 nology development, and education. The Commercial Re-
21 usable Suborbital Research Program may fund engineer-
22 ing and integration demonstrations, proofs of concept, or
23 experiments for commercial reusable vehicle flights, once
24 the vehicles have met the requirements of subsection (h).
25 The program shall coordinate with NASA’s mission direc-

1 torates to help achieve NASA's research, technology, and
2 education goals.

3 (c) MANAGEMENT.—The Administrator shall des-
4 ignate an officer or employee of the Space Technology
5 Program to act as the responsible official for the Commer-
6 cial Reusable Suborbital Research Program in the Space
7 Technology Program. The designee shall be responsible for
8 the development of short-term and long-term strategic
9 plans related to the use of commercial reusable suborbital
10 vehicles to support NASA's requirements for competi-
11 tively-selected science, technology demonstration, and edu-
12 cational activities.

13 (d) PLAN.—The Administrator shall prepare a plan
14 describing the processes required to support the use of
15 commercial reusable suborbital flight vehicles for carrying
16 out competitively selected scientific and engineering inves-
17 tigation and educational activities. The plan shall—

18 (1) describe NASA, space flight operator, and
19 supporting contractor responsibilities for developing
20 standard payload interfaces and conducting payload
21 safety analyses, payload integration and processing,
22 payload operations, and safety assurance for NASA-
23 sponsored space flight participants, among other
24 functions required to fly NASA-sponsored payloads

1 and space flight participants on commercial sub-
2 orbital vehicles;

3 (2) identify NASA-provided hardware, software,
4 or services that may be provided to space flight op-
5 erators on a cost-reimbursable basis, through agree-
6 ments entered into under section 203(c)(5) of the
7 National Aeronautics and Space Act of 1958 (42
8 U.S.C. 2473(c)(5)), or on a contractual basis; and

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

15 (e) COMMERCIAL REUSABLE SUBORBITAL CAPABILI-
16 TIES AND RISKS.—The Administrator shall assess and
17 characterize the potential capabilities and performance of
18 commercial reusable suborbital vehicles for addressing sci-
19 entific research, including research requiring access to low
20 gravity and microgravity environments, for carrying out
21 technology demonstrations related to science, exploration,
22 or space operations requirements, and for providing oppor-
23 tunities for educating and training space scientists and en-
24 gineers, once those vehicles become operational. The as-
25 sessment shall also characterize the risks of using poten-

1 tial commercial reusable suborbital flights to NASA-spon-
2 sored researchers, investigators, and scientific investiga-
3 tions and flight hardware. The Administrator shall make
4 a determination on the need to enter into arrangements
5 with commercial reusable suborbital service providers for
6 flights or flight services to acquire analytical data to in-
7 form the assessment.

8 (f) TRANSMITTAL.—The plan and assessment de-
9 scribed in subsections (d) and (e) shall be transmitted to
10 the Congress not later than 1 year after the date of enact-
11 ment of this Act.

12 (g) REPORT.—The Administrator shall transmit a re-
13 port annually to the Congress describing progress in car-
14 rying out the Commercial Reusable Suborbital Research
15 Program, including the number and type of suborbital
16 missions planned in each fiscal year.

17 (h) INDEMNIFICATION AND LIABILITY.—The Admin-
18 istrator shall not proceed with a request for proposals,
19 award any contract, commit any United States Govern-
20 ment funds, or enter into any other agreement for the pro-
21 vision of a commercial reusable suborbital vehicle launch
22 service of a NASA-sponsored payload or spaceflight par-
23 ticipant until indemnification and liability issues associ-
24 ated with the use of such systems by the United States
25 Government shall have been addressed and the Adminis-

1 trator has provided to the Congress a report describing
2 the indemnification and liability provisions that are
3 planned to be included in such contracts or agreements.

4 **TITLE X—EDUCATION**

5 **SEC. 1001. STEM EDUCATION AND TRAINING.**

6 (a) IN GENERAL.—In order to create the diverse,
7 skilled scientific and technical workforce essential to meet-
8 ing the challenges facing NASA and the Nation in the
9 21st century, the Administrator shall develop, conduct,
10 support, promote, and coordinate formal and informal
11 educational and training activities that leverage NASA’s
12 unique content expertise and facilities to—

13 (1) contribute to improving science, technology,
14 engineering, and mathematics (STEM) education
15 and training at all levels in the United States; and

16 (2) enhance awareness and understanding of
17 STEM, including space and Earth sciences, aero-
18 nautics, and engineering.

19 (b) PROGRAMS.—

20 (1) IN GENERAL.—The Administrator shall
21 carry out evidence-based programs designed to—

22 (A) increase student interest and participa-
23 tion, including by women, underrepresented mi-
24 nority students, and students in rural schools;

1 (B) improve public literacy and support;
2 and

3 (C) improve the teaching and learning of
4 space and Earth sciences, aeronautics, engi-
5 neering, and other STEM disciplines supported
6 by NASA.

7 (2) INCLUDED PROGRAMS.—Programs author-
8 ized under this subsection may include—

9 (A) informal educational programming de-
10 signed to excite and inspire students and the
11 general public about space and Earth science,
12 aeronautics, engineering, and other STEM dis-
13 ciplines supported by NASA while strength-
14 ening their content knowledge in these dis-
15 ciplines;

16 (B) teacher training and professional de-
17 velopment opportunities for preservice and in-
18 service elementary and secondary school teach-
19 ers designed to increase the content knowledge
20 of teachers in space and Earth science, aero-
21 nautics, engineering, and other STEM dis-
22 ciplines supported by NASA, especially through
23 hands-on research and technology experiences;

24 (C) research opportunities for secondary
25 school students, including internships at NASA

1 and its Centers, that provide secondary school
2 students with hands-on research and technology
3 experiences as well as exposure to working sci-
4 entists and engineers;

5 (D) research opportunities at NASA and
6 its Centers for undergraduate and graduate
7 students pursuing degrees in space and Earth
8 sciences, aeronautics, engineering, and other
9 STEM disciplines supported by NASA;

10 (E) competitive scholarships, fellowships,
11 and traineeships for undergraduate and grad-
12 uate students in space and Earth sciences, aer-
13 onautics, engineering, and other STEM dis-
14 ciplines supported by NASA; and

15 (F) competitive grants for institutions of
16 higher education, with special consideration for
17 minority serving institutions, including 2-year
18 institutions of higher education, to establish or
19 expand degree programs or courses in space
20 and Earth sciences, aeronautics, engineering,
21 and other STEM disciplines supported by
22 NASA.

23 (c) ORGANIZATION OF STEM EDUCATION PRO-
24 GRAMS.—

1 (1) DIRECTOR OF STEM EDUCATION.—The Ad-
2 ministrators shall appoint or designate a Director of
3 STEM Education, who shall have the principal re-
4 sponsibility to oversee and coordinate all NASA pro-
5 grams and activities in support of STEM education
6 and training, including space and Earth sciences,
7 aeronautics, and engineering.

8 (2) QUALIFICATIONS.—The Director shall be an
9 individual who, by reason of professional background
10 and experience, is specially qualified to advise the
11 Administrator on all matters pertaining to STEM
12 education and training, including space and Earth
13 sciences, aeronautics, and engineering, at NASA.

14 (3) DUTIES.—The Director shall—

15 (A) oversee and coordinate all programs in
16 support of STEM education and training, in-
17 cluding space and Earth sciences, aeronautics,
18 and engineering;

19 (B) represent NASA as the principal inter-
20 agency liaison for all STEM education and
21 training programs, unless otherwise represented
22 by the Administrator or the Associate Adminis-
23 trator for Education;

24 (C) prepare the annual budget and advise
25 the Associate Administrator for Education and

1 the Administrator on all budgetary issues for
2 STEM education and training relative to the
3 programs of NASA;

4 (D) establish, periodically update, and
5 maintain a publicly accessible online inventory
6 of STEM education and training programs and
7 activities;

8 (E) develop, implement, and update the
9 STEM education and training strategic plan re-
10 quired under subsection (d);

11 (F) increase, to the maximum extent prac-
12 ticable, the participation and advancement of
13 women and underrepresented minorities at
14 every level of STEM education and training;
15 and

16 (G) perform such other matters relating to
17 STEM education and training as are required
18 by the Administrator or the Associate Adminis-
19 trator for Education.

20 (d) STRATEGIC PLAN.—The Director of STEM Edu-
21 cation shall develop, implement, and update once every 3
22 years a STEM education and training strategic plan for
23 NASA. The plan shall—

1 (1) identify and prioritize annual and long-term
2 STEM education and training goals and objectives
3 for NASA;

4 (2) describe the role of each NASA program or
5 activity in contributing to the goals and objectives
6 identified under paragraph (1);

7 (3) specify the metrics that will be used to as-
8 sess progress toward achieving those goals and ob-
9 jectives; and

10 (4) describe the approaches that will be taken
11 to assess the effectiveness of each STEM education
12 program and activity supported by NASA.

13 (e) OUTREACH TO STUDENTS FROM UNDERREP-
14 RESENTED GROUPS.—The Administrator shall seek to en-
15 sure that program participants include minority and
16 underrepresented groups, including students from a high-
17 need local education agency as defined in section 2102(3)
18 of the Elementary and Secondary Education Act of 1965
19 (20 U.S.C. 6602(3)).

20 (f) CONSULTATION AND PARTNERSHIP WITH OTHER
21 AGENCIES.—In carrying out the programs and activities
22 authorized under this section, the Administrator shall—

23 (1) consult with the Secretary of Education and
24 the Director of the National Science Foundation re-
25 garding activities designed to improve elementary

1 and secondary STEM education and training, and
2 recruit minorities that are underrepresented in
3 STEM teaching; and

4 (2) consult and partner with the Director of the
5 National Science Foundation in carrying out pro-
6 grams under this section designed to build capacity
7 in STEM education and training at the under-
8 graduate and graduate level.

9 **SEC. 1002. SENSE OF CONGRESS ON THE EXPERIMENTAL**
10 **PROGRAM TO STIMULATE COMPETITIVE RE-**
11 **SEARCH.**

12 It is the sense of the Congress that—

13 (1) the Experimental Program to Stimulate
14 Competitive Research of NASA strengthens the re-
15 search capabilities of jurisdictions that historically
16 have not participated equally in competitive aero-
17 space and aerospace-related research activities;

18 (2) the Experimental Program to Stimulate
19 Competitive Research of NASA has provided the
20 American taxpayer with a solid return on invest-
21 ment;

22 (3) the Experimental Program to Stimulate
23 Competitive Research of NASA has helped to
24 achieve broader geographical distribution of research
25 and development support by improving the research

1 infrastructure in States that historically have re-
2 ceived limited Federal research and development
3 funds; and

4 (4) in order to continue improvement and to in-
5 crease efficiency, the award of grants under the Ex-
6 perimental Program to Stimulate Competitive Re-
7 search of NASA should be coordinated with the
8 award of grants under the Experimental Program to
9 Stimulate Competitive Research of the National
10 Science Foundation, the Department of Energy, the
11 Department of Agriculture, the Department of De-
12 fense, the Environmental Protection Agency, and the
13 National Institutes of Health.

14 **SEC. 1003. STUDY OF POTENTIAL COMMERCIAL ORBITAL**
15 **PLATFORM PROGRAM IMPACT ON SCIENCE,**
16 **TECHNOLOGY, ENGINEERING, AND MATHE-**
17 **MATICS.**

18 A fundamental and unique capability of NASA is in
19 stimulating science, technology, engineering, and mathe-
20 matics education in the United States. In ensuring max-
21 imum use of that capability, the Administrator shall carry
22 out a study to—

23 (1) identify the benefits of and lessons learned
24 from ongoing and previous NASA orbital student
25 programs including, at a minimum, the Get Away

1 Special (GAS) and Earth Knowledge Acquired by
2 Middle School Students (EarthKAM) programs, on
3 science, technology, engineering, and mathematics
4 education;

5 (2) assess the potential impacts on science,
6 technology, engineering, and mathematics education
7 of a program that would facilitate the development
8 of scientific and educational payloads involving
9 United States students and educators and the flights
10 of those payloads on commercially available orbital
11 platforms, when available and operational, with the
12 goal of providing frequent and regular payload
13 launches;

14 (3) identify NASA expertise, such as NASA
15 science, engineering, payload development, and pay-
16 load operations, that could be made available to fa-
17 cilitate a science, technology, engineering, and math-
18 ematics program using commercial orbital platforms;
19 and

20 (4) identify the issues that would need to be ad-
21 dressed before NASA could properly assess the mer-
22 its and feasibility of the program described in para-
23 graph (2).

1 **SEC. 1004. ASSESSMENT OF IMPEDIMENTS TO SPACE**
2 **SCIENCE AND ENGINEERING WORKFORCE**
3 **DEVELOPMENT FOR MINORITY AND UNDER-**
4 **REPRESENTED GROUPS AT NASA.**

5 (a) **ASSESSMENT.**—The Administrator shall enter
6 into an arrangement for an independent assessment of any
7 impediments to space science and engineering workforce
8 development for minority and underrepresented groups at
9 NASA, including recommendations on—

10 (1) measures to address such impediments;

11 (2) opportunities for augmenting the impact of
12 space science and engineering workforce development
13 activities and for expanding proven, effective pro-
14 grams; and

15 (3) best practices and lessons learned, as identi-
16 fied through the assessment, to help maximize the
17 effectiveness of existing and future programs to in-
18 crease the participation of minority and underrep-
19 resented groups in the space science and engineering
20 workforce at NASA.

21 (b) **REPORT.**—A report on the assessment carried out
22 under subsection (a) shall be transmitted to the Congress
23 not later than 15 months after the date of enactment of
24 this Act.

1 (c) IMPLEMENTATION.—To the extent practicable,
2 the Administrator shall take all necessary steps to address
3 any impediments identified in the assessment.

4 **SEC. 1005. INDEPENDENT REVIEW OF THE NATIONAL**
5 **SPACE GRANT COLLEGE AND FELLOWSHIP**
6 **PROGRAM.**

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

9 (1) the National Space Grant College and Fel-
10 lowship Program, established in title II of the Na-
11 tional Aeronautics and Space Administration Au-
12 thorization Act of 1988 (42 U.S.C. 2486 et seq.),
13 has been an important program through which the
14 Federal Government has partnered with State and
15 local governments, institutions of higher education,
16 private industry, and other organizations to enhance
17 the understanding and use of space and aeronautics
18 activities and their benefits through education, the
19 fostering of interdisciplinary and multidisciplinary
20 space research and training, and supporting Federal
21 funding for graduate fellowships in space-related
22 fields; and

23 (2) enhancing the National Space Grant College
24 and Fellowship Program's effectiveness will support
25 the program's maximum contribution to NASA's

1 and the Nation's goals for science, technology, engi-
2 neering and mathematics (STEM) education and
3 training.

4 (b) REVIEW.—The Administrator shall enter into an
5 arrangement with the National Academies for a review of
6 the National Space Grant College and Fellowship Pro-
7 gram, including its structure and capabilities for sup-
8 porting STEM education and training, and recommenda-
9 tions on measures, if needed, to enhance the program's
10 effectiveness.

11 (c) TRANSMITTAL.—The Administrator shall trans-
12 mit the results of the review to the Congress not later than
13 18 months after the date of enactment of this Act.

14 **SEC. 1006. HANDS-ON SPACE SCIENCE AND ENGINEERING**
15 **EDUCATION AND TRAINING.**

16 (a) PILOT PROJECTS.—

17 (1) IN GENERAL.—Not later than 180 days
18 after the date of enactment of this Act, the Adminis-
19 trator shall competitively select pilot projects that
20 test and demonstrate new forms of collaborative and
21 hands-on education and training projects related to
22 aeronautics, exploration, science, space operations,
23 and human spaceflight, that serve to stimulate and
24 engage students in science and engineering, and that
25 foster skills including engineering, teamwork, project

1 management, and problem solving. In particular, the
2 pilot projects shall emphasize engineering and tech-
3 nology-related education and training. The pilot
4 projects shall include a breadth of activities that
5 range in scope and complexity and shall also test
6 and demonstrate selection, evaluation, mentoring,
7 and related tools and services required to support
8 the projects. The program shall be directed at serv-
9 ing undergraduates. The Administrator may include
10 broader participation from precollegiate and grad-
11 uate students, as appropriate. To the extent prac-
12 ticable, the initiative shall also be accessible to
13 NASA's young science, technical, and project man-
14 agement professionals.

15 (2) PROJECTS.—The pilot projects shall be car-
16 ried out through competitive solicitations. The dura-
17 tion of a project awarded under the pilot program
18 shall be no more than 4 years. The pilot projects
19 program shall—

20 (A) include a range of projects of varying
21 scope and complexity;

22 (B) provide participants with experience in
23 areas such as—

1 (i) formulating, planning, designing,
2 developing, testing and integrating, and
3 operating mission or flight hardware;

4 (ii) systems engineering;

5 (iii) analyzing data from a mission or
6 investigation; and

7 (iv) documentation, reporting, and re-
8 views;

9 (C) include defined and measurable objec-
10 tives;

11 (D) provide mentoring for participants;

12 (E) provide for evaluation of the project
13 and documentation of the outcomes of the
14 project and its contribution to education and
15 training; and

16 (F) encourage outreach to and partner-
17 ships with institutions of higher education, Fed-
18 eral agencies, private entities, and other institu-
19 tions involved in student collaborations and
20 hands-on training and education, including or-
21 ganizations that focus on engaging young girls
22 in science and engineering hands-on education
23 and training activities.

24 (3) EMPHASIS ON PARTICIPATION OF INDIVID-
25 UALS FROM UNDERREPRESENTED MINORITY POPU-

1 LATIONS.—The Administrator shall make it an em-
2 phasis of the pilot projects to seek the involvement
3 of participants from underserved and underrep-
4 resented minority populations.

5 (4) FLIGHT OPPORTUNITIES AND ACCESS TO
6 SPACE.—The Administrator shall ensure, to the ex-
7 tent practicable, the availability and accessibility of
8 platforms for flying and launching into space stu-
9 dents' collaborative and hands-on projects.

10 (5) FORUM FOR PARTICIPANT PRESEN-
11 TATIONS.—The Administrator shall organize a
12 forum for students and other participants in the
13 pilot projects to discuss and present their work, at
14 an appropriate stage of the project, and to engage
15 with other students and young professionals involved
16 in ongoing collaborative and hands-on training ac-
17 tivities related to aeronautics, exploration, science,
18 space operations, and human spaceflight.

19 (6) WORKSHOP.—The Administrator shall orga-
20 nize a workshop or workshops involving the competi-
21 tively-selected pilot project teams for the purposes of
22 collecting information on the results of the pilot
23 projects (including on selection, evaluation tools, and
24 mentoring services) and identifying lessons learned

1 and best practices for NASA-supported collaborative
2 and hands-on education and training projects.

3 (7) REPORT AND STRATEGY.—Not later than 3
4 years after the date of enactment of this Act, the
5 Administrator shall transmit to the Committee on
6 Science and Technology of the House of Representa-
7 tives and the Committee on Commerce, Science, and
8 Transportation of the Senate a report—

9 (A) on the outcomes of existing student
10 collaborative and hands-on projects such as
11 those being conducted as part of NASA's
12 science programs;

13 (B) on the results of the pilot projects; and

14 (C) on best practices of NASA's student
15 collaborations and hands-on education and
16 training activities.

17 The report shall define decision criteria, a strategy,
18 and a process for extending successful projects or
19 transitioning them into an ongoing, competitive pro-
20 gram.

21 (b) INFORMATION EXCHANGE.—The Administrator
22 shall support mission directorates sponsoring student col-
23 laborative and hands-on education and training projects
24 in exchanging information, sharing knowledge, and
25 leveraging activities, as appropriate.

1 (c) AUTHORIZATION OF APPROPRIATIONS.—There
2 are authorized to be appropriated from the authorization
3 of appropriations for education in title I such sums as may
4 be necessary for fiscal years 2011, 2012, and 2013 to
5 carry out this section, to remain available until expended.

6 **TITLE XI—REALIGNING AND RE-**
7 **VITALIZING INSTITUTIONAL**
8 **CAPABILITIES**

9 **SEC. 1101. SENSE OF CONGRESS ON REALIGNING AND REVI-**
10 **TALIZING INSTITUTIONAL CAPABILITIES.**

11 It is the sense of the Congress that NASA needs to
12 focus on ensuring that its structure, facilities, and equip-
13 ment are effectively aligned with current and future mis-
14 sions and expected funding levels in order to improve effi-
15 ciency and productivity. Such focus will also facilitate
16 NASA's ability to modernize its laboratories, facilities,
17 and equipment. Eighty percent of NASA's facilities are
18 over 40 years old. Additionally, in a number of areas,
19 NASA finds itself maintaining facilities and capabilities
20 scaled to another era.

21 **SEC. 1102. INSTITUTIONAL REQUIREMENTS STUDY.**

22 (a) IN GENERAL.—Within one year after the date of
23 submission of the Space Launch System Plan required by
24 section 302 of this Act, the Administrator shall transmit
25 to the Committee on Science and Technology of the House

1 of Representatives and the Committee on Commerce,
2 Science, and Transportation of the Senate a report on the
3 results of a comprehensive study that, taking into account
4 the long term direction provided by this Act, carefully ex-
5 amines NASA's structure and institutional assets and
6 identifies a strategy to evolve toward efficient sizing and
7 distribution of facilities, laboratories, test capabilities, and
8 other infrastructure consistent with NASA's missions and
9 mandates. The Administrator shall pay particular atten-
10 tion to identifying and removing unneeded or duplicative
11 infrastructure.

12 (b) RECONFIGURATION AND REINVESTMENT STRAT-
13 EGY.—The Administrator shall include in the study a sug-
14 gested reconfiguration and reinvestment strategy that
15 would conform the needed equipment and facilities to the
16 requirements of missions and priorities authorized and di-
17 rected by this Act. As part of this strategy, the Adminis-
18 trator shall include consideration and application of the
19 findings and recommendations of the National Research
20 Council report entitled “Capabilities for the Future: An
21 Assessment of NASA Laboratories for Basic Research”,
22 prepared in response to section 1003 of the National Aero-
23 nautics and Space Administration Authorization Act of
24 2008 (42 U.S.C. 17812).

1 **SEC. 1103. MODERNIZATION OF LABORATORIES, FACILI-**
2 **TIES, AND EQUIPMENT.**

3 (a) STRATEGY.—

4 (1) IN GENERAL.—Within 90 days after com-
5 pletion of the study required under section 1102, the
6 Administrator shall develop a strategy for the main-
7 tenance, repair, upgrading, and modernization of
8 NASA's laboratories, facilities, and equipment.

9 (2) CRITERIA.—The strategy shall include cri-
10 teria for prioritizing deferred maintenance tasks and
11 also for upgrading or modernizing laboratories, fa-
12 cilities, and equipment.

13 (3) OTHER CONSIDERATIONS.—The strategy
14 shall also include an assessment of modifications
15 needed to maximize usage of facilities that offer
16 unique and highly specialized benefits to the aero-
17 space industry and the American public.

18 (b) IMPLEMENTATION PLAN.—The Administrator
19 shall develop a plan for implementing the strategy devel-
20 oped under subsection (a), including a timeline, mile-
21 stones, and an estimate of resources required for carrying
22 out the plan.

23 (c) TRANSMITTAL TO CONGRESS.—The Adminis-
24 trator shall transmit to the Congress the strategy devel-
25 oped under subsection (a) and the plan developed under

1 subsection (b) not later than 180 days after the comple-
2 tion of the study required under section 1102.

3 (d) ESTABLISHMENT OF CAPITAL FUND.—

4 (1) IN GENERAL.—The Administrator shall es-
5 tablish a capital fund for each of NASA's Centers
6 for the modernization of facilities and laboratories.

7 (2) SOURCE OF FUNDING.—The Administrator
8 shall ensure to the maximum extent practicable that
9 all financial savings achieved by closing outdated or
10 surplus facilities at a NASA Center shall be made
11 available to that Center's capital fund for the pur-
12 pose of modernizing the Center's facilities and lab-
13 oratories and for upgrading the infrastructure at the
14 Center.

15 **SEC. 1104. NASA CAPABILITIES STUDY REQUIREMENT.**

16 (a) IN GENERAL.—Upon completion of the study re-
17 quired under section 1102, the Administrator shall estab-
18 lish an independent panel to examine alternative models
19 for aligning NASA's workforce, Centers, and related facili-
20 ties with current and future missions and expected fund-
21 ing levels in order to improve efficiency and productivity,
22 while maintaining core Federal competencies and keeping
23 appropriately governmental functions internal to NASA.

24 (b) SCOPE OF EXAMINATION.—The panel's examina-
25 tion shall include a recommended implementation strat-

1 egy, which shall identify any additional legislative authori-
2 ties necessary to enable implementation of the rec-
3 ommended strategy, including recommended actions to
4 provide aid and assistance to affected communities to miti-
5 gate adverse impacts resulting from implementation of the
6 proposed strategy.

7 (c) TRANSMITTAL.—The Administrator shall trans-
8 mit to the Committee on Science and Technology of the
9 House of Representatives and the Committee on Com-
10 merce, Science, and Transportation of the Senate the re-
11 sults of this study within 1 year after the date on which
12 the study is begun.

13 **SEC. 1105. COMMUNITY TRANSITION SUPPORT.**

14 (a) SENSE OF CONGRESS.—The Congress supports
15 efforts to assist and provide aid to communities that are
16 adversely impacted by NASA program changes, contract
17 or program cancellations, or proposed institutional
18 changes, so as to minimize the social and economic im-
19 pacts to those communities, workers, and businesses.

20 (b) EXPANDED SCOPE OF SPACE SHUTTLE TRANSI-
21 TION LIAISON OFFICE.—Section 613(b) of the National
22 Aeronautics and Space Administration Authorization Act
23 of 2008 (42 U.S.C. 17761(b)) is amended—

1 (1) in paragraph (1), by striking “Space Shut-
2 tle Transition Liaison Office” and inserting “Post-
3 Shuttle Transition Liaison Office”; and

4 (2) in paragraph (3), by striking “2 years after
5 the completion of the last Space Shuttle flight” and
6 inserting “2 years after the award of the final fund-
7 ing authorized under section 1105(c) of the National
8 Aeronautics and Space Administration Authorization
9 Act of 2010”.

10 (c) **FUNDING FOR COMMUNITY TRANSITION SUP-**
11 **PORT.**—The Administrator shall work closely with other
12 Federal agencies and the private sector to assist commu-
13 nities adversely impacted by NASA program changes, con-
14 tract or program cancellations with worker retraining,
15 placement and other transition activities. Amounts author-
16 ized to be appropriated by section 101(2)(B) shall be
17 available for activities pursuant to this section.

18 **SEC. 1106. WORKFORCE STABILIZATION AND CRITICAL**
19 **SKILLS PRESERVATION.**

20 (a) **LIMITATION.**—Prior to receipt by the Congress
21 of the strategy and implementation plan under section
22 1103(c), none of the funds authorized for use under this
23 Act may be used to transfer the functions, missions, or
24 activities, and associated civil service and contractor posi-

1 tions, from any NASA facility without authorization by
2 the Congress to implement the proposed strategy.

3 (b) PRESERVATION OF SKILLS AND COM-
4 PETENCIES.—The Administrator shall preserve the critical
5 skills and competencies in place at NASA Centers prior
6 to enactment of this Act in order to facilitate timely imple-
7 mentation of the requirements of this Act and to minimize
8 disruption to the workforce.

9 (c) PROHIBITION.—The Administrator may not im-
10 plement any reduction-in-force or other involuntary sepa-
11 rations of permanent, non-Senior-Executive-Service, civil
12 servant employees any earlier than 6 months after the re-
13 ceipt of the study required under section 1102, except for
14 cause on charges of misconduct, delinquency, or ineffi-
15 ciency.

16 **SEC. 1107. JAMES E. WEBB COOPERATIVE EDUCATION DIS-**
17 **TINGUISHED SCHOLAR PROGRAM.**

18 (a) ESTABLISHMENT.—The Administrator is author-
19 ized to establish a national cooperative education program
20 to complement existing NASA Center-administered coop-
21 erative education initiatives.

22 (b) APPLICATION PROCESS.—The Administrator
23 shall encourage and seek applications from the pool of
24 American students pursuing science, technology, engineer-

1 ing, or mathematics degrees who wish to gain working ex-
2 perience at NASA.

3 (c) SELECTION.—From the applications, the Admin-
4 istrator shall select 10 finalists annually as James E.
5 Webb Cooperative Education Distinguished Scholars.

6 (d) AWARD.—The James E. Webb Cooperative Edu-
7 cation Distinguished Scholars shall be provided with—

8 (1) learning experiences that will enhance their
9 understanding of activities conducted in the various
10 NASA Centers in furtherance of NASA's missions
11 and priorities;

12 (2) exposure to NASA headquarters functions
13 and activities; and

14 (3) stipends for living expenses.

15 **TITLE XII—OTHER MATTERS**

16 **SEC. 1201. REPORT ON SPACE TRAFFIC MANAGEMENT.**

17 Within 180 days after the date of enactment of this
18 Act, the Administrator shall transmit to the Committee
19 on Science and Technology of the House of Representa-
20 tives and the Committee on Commerce, Science, and
21 Transportation of the Senate a report on the status of
22 the initiation of discussions with other space-faring coun-
23 tries on a framework to address the sharing of information
24 intended to promote safe access into, operations in, and
25 return from outer space, as required by section 1102 of

1 the National Aeronautics and Space Administration Au-
2 thorization Act of 2008 (42 U.S.C. 17821).

3 **SEC. 1202. NATIONAL AND INTERNATIONAL ORBITAL DE-**
4 **BRIS MITIGATION.**

5 (a) FINDINGS.—The Congress makes the following
6 findings:

7 (1) A national and international effort is need-
8 ed to develop a coordinated approach towards the
9 prevention, negation, and removal of orbital debris.

10 (2) The guidelines issued by the Inter-Agency
11 Space Debris Coordination Committee provide a con-
12 sensus understanding of 10 national space agencies
13 (including NASA) plus the European Space Agency
14 on the necessity of mitigating the creation of space
15 debris and measures for doing so. NASA's participa-
16 tion on the Committee should be robust, and NASA
17 should urge other space-relevant Federal agencies
18 (including the Departments of State, Defense, and
19 Commerce) to work to ensure that their counterpart
20 agencies in foreign governments are aware of these
21 national commitments and the importance in which
22 the United States holds them.

23 (3) The key components of such approach
24 should include—

1 (A) a process for debris prevention through
2 agreements regarding spacecraft design, oper-
3 ations, and end-of-life disposition plans to mini-
4 mize orbiting vehicles or elements which are
5 nonfunctional;

6 (B) the development of a robust space situ-
7 ational awareness network that can identify po-
8 tential collisions and provide sufficient trajec-
9 tory and orbital data to enable avoidance ma-
10 neuvers; and

11 (C) the interagency development of an
12 overall strategy for review by the President,
13 with recommendations for proposed inter-
14 national collaborative efforts to address this
15 challenge.

16 (b) INTERNATIONAL DISCUSSION.—

17 (1) IN GENERAL.—The Administrator shall, in
18 consultation with such other Federal agencies as the
19 Administrator considers appropriate, continue and
20 strengthen discussions with representatives of other
21 space-faring countries, within the Inter-Agency
22 Space Debris Coordination Committee and else-
23 where, to address orbital debris mitigation.

24 (2) INTERAGENCY EFFORT.—

1 (A) IN GENERAL.—For purposes of car-
2 rying out this subsection, the Director of
3 OSTP, in coordination with the Director of the
4 National Security Council and other Federal
5 agencies and using the President’s Council of
6 Advisors on Science and Technology coordi-
7 nating mechanism, shall develop an overall
8 strategy for review by the President, with rec-
9 ommendations for proposed international col-
10 laborative efforts, to address orbital debris miti-
11 gation.

12 (B) REPORT.—Within 1 year after the
13 date of enactment of this Act, the Adminis-
14 trator shall transmit to the Congress a report
15 describing the strategy.

16 **SEC. 1203. STRENGTHENING ACQUISITION AND PROGRAM**
17 **MANAGEMENT AND CONTROLLING PROGRAM**
18 **COSTS.**

19 (a) FINDINGS.—The Congress makes the following
20 findings:

21 (1) In 2007 the Government Accountability Of-
22 fice issued a report on NASA’s high risk acquisition
23 performance.

24 (2) In response, NASA prepared a corrective
25 action plan 2 years ago.

1 (3) Several major programs, such as the James
2 Webb Space Telescope, have experienced cost
3 growth, significantly exceeding their baseline cost es-
4 timate.

5 (4) The adherence of NASA to program cost
6 and schedule targets and discipline across NASA
7 programs remains a concern.

8 (b) SUMMARY REPORTS.—

9 (1) REPORTS REQUIRED.—Not later than 90
10 days after the date of enactment of this Act, and not
11 later than April 30 of each year thereafter, the Ad-
12 ministrator shall transmit to the Congress a report
13 on the implementation during the preceding year for
14 the corrective action plan referred to in subsection
15 (a)(2).

16 (2) ELEMENTS.—Each report under this sub-
17 section shall set forth, for the year covered by such
18 report, the following:

19 (A) A description of each NASA major
20 program that has exceeded either—

21 (i) its cost baseline by 15 percent or
22 more; or

23 (ii) a milestone of the program by 6
24 months or more from the date provided for
25 it in the Baseline Report.

1 (B) For each major program specified
2 under subparagraph (A), a plan for such de-
3 crease in scope or requirements, or other meas-
4 ures, to be undertaken to control cost and
5 schedule, including any cost monitoring or cor-
6 rective actions undertaken pursuant to the Na-
7 tional Aeronautics and Space Administration
8 Authorization Act of 2005 (Public Law 109–
9 155).

10 (c) PROHIBITION ON EXPENDITURE OF FUNDS
11 WHEN 30 PERCENT THRESHOLD IS EXCEEDED.—Section
12 103(e) of the National Aeronautics and Space Administra-
13 tion Authorization Act of 2005 (42 U.S.C. 16613(e)) is
14 amended by striking “beginning 18 months after the date
15 the Administrator transmits a report under subsection
16 (d)(1)” and inserting “beginning 18 months after the Ad-
17 ministrator makes such determination”.

18 (d) PROJECT AND PROGRAM RESERVES.—To ensure
19 that the establishment, maintenance, and allotment of
20 project and program reserves contribute to prudent man-
21 agement, not later than 180 days after the date of enact-
22 ment of this Act, the Administrator shall transmit to the
23 Congress a report describing NASA’s criteria for estab-
24 lishing the amount of reserves at the project and program

1 levels and how such criteria complement NASA's policy
2 of budgeting at a 70 percent confidence level.

3 (e) INDEPENDENT REVIEWS.—Not later than 270
4 days after the date of enactment of this Act, the Adminis-
5 trator shall transmit to the Congress a report describing
6 NASA's procedures for conducting independent reviews of
7 projects and programs at life-cycle milestones and how
8 NASA ensures the independence of the individuals who
9 conduct those reviews prior to their assignment.

10 (f) REVISED REGULATIONS REQUIRED.—Not later
11 than 270 days after the date of enactment of this Act,
12 the Administrator shall revise the NASA Supplement to
13 the Federal Acquisition Regulation to provide uniform
14 guidance and tighten existing requirements for preventing
15 organizational conflicts of interest by contractors in major
16 acquisition programs. The revised regulations required by
17 this subsection shall, at a minimum—

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

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

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

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

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

20 (2) ensure that NASA receives advice, when ap-
21 propriate, on systems architecture and systems engi-
22 neering matters with respect to major acquisition
23 programs from federally funded research and devel-
24 opment centers or other sources independent of the
25 prime contractor;

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

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

16 (g) TOTAL TERMINATION LIABILITY ESTIMATE.—
17 The Administrator shall transmit to the Congress, not
18 later than April 30 of each year, an estimate of the total
19 termination liability as of the end of the second fiscal
20 quarter for each NASA contract with a total value in ex-
21 cess of \$200,000,000.

1 **SEC. 1204. AMENDMENT TO THE NATIONAL AERONAUTICS**
2 **AND SPACE ACT OF 1958.**

3 Section 202 of the National Aeronautics and Space
4 Act of 1958 (42 U.S.C. 2472) is amended by adding at
5 the end the following new subsection:

6 “(d) The Administrator and the Deputy Adminis-
7 trator may be retired commissioned military personnel.”.

8 **SEC. 1205. SENSE OF CONGRESS ON INDEPENDENT**
9 **VERIFICATION AND VALIDATION OF NASA**
10 **SOFTWARE.**

11 It is the sense of the Congress that—

12 (1) safety is at the heart of every NASA mis-
13 sion;

14 (2) the Office of Safety and Mission Assurance
15 remains vital to assuring the safety of all NASA ac-
16 tivities;

17 (3) among the most important activities of the
18 Office of Safety and Mission Assurance is the per-
19 formance of independent safety and mission assur-
20 ance assessments and process verification reviews;

21 (4) as NASA embarks on a new path, inde-
22 pendent verification and validation of software must
23 be of the highest priority to ensure safety through-
24 out all NASA programs;

1 (5) NASA's activities depend on software integ-
2 rity to achieve their goals and deliver a successful
3 mission to the American people;

4 (6) independent verification and validation is
5 necessary to ensure that safety-critical software will
6 operate dependably and support mission success;

7 (7) the creation of the Independent Verification
8 and Validation Facility of NASA was the direct re-
9 sult of recommendations made by the National Re-
10 search Council and the Report of the Presidential
11 Commission on the Space Shuttle Challenger Acci-
12 dent;

13 (8) the mission-critical software of NASA must
14 operate dependably and safely;

15 (9) the Independent Verification and Validation
16 Facility of NASA plays an important role in assur-
17 ing the safety of all NASA activities by improving
18 methodologies for risk identification and assessment
19 and providing recommendations for risk mitigation
20 and acceptance; and

21 (10) the Independent Verification and Valid-
22 ation Facility of NASA should be the primary pro-
23 vider of independent verification and validation serv-
24 ices for software created by or for NASA.

1 **SEC. 1206. COUNTERFEIT AND SUBSTANDARD PARTS.**

2 (a) REVIEW.—

3 (1) IN GENERAL.—Not later than 1 year after
4 the date of enactment of this Act, the Comptroller
5 General shall transmit to the Committee on Science
6 and Technology of the House of Representatives, the
7 Committee on Commerce, Science, and Transpor-
8 tation of the Senate, and the Administrator a review
9 of NASA's practices with respect to counterfeit and
10 substandard parts.

11 (2) SPECIFICATIONS.—The review shall exam-
12 ine—

13 (A) the trends in known and identified
14 counterfeit and substandard parts in NASA's
15 supply chain;

16 (B) NASA's processes and controls to de-
17 tect counterfeit and substandard parts and to
18 prevent their use;

19 (C) any gaps in such processes and con-
20 trols; and

21 (D) best practices for—

22 (i) training employees in detecting
23 and preventing the use of counterfeit and
24 substandard parts; and

1 (ii) establishing an internal database
2 to track suspected or confirmed counterfeit
3 and substandard parts.

4 (b) DETECTION AND PREVENTION PROGRAM.—

5 (1) IN GENERAL.—After analyzing the review
6 transmitted under subsection (a), the Administrator
7 shall implement a program, in coordination with
8 other Federal agencies, to detect, track, catalog, and
9 prevent the use of counterfeit and substandard parts
10 by or for NASA.

11 (2) REQUIREMENTS.—In implementing the pro-
12 gram, the Administrator shall establish—

13 (A) counterfeit and substandard part iden-
14 tification training for all employees that pro-
15 cure, process, distribute, and install parts to—

16 (i) teach employees how to identify
17 counterfeit and substandard parts;

18 (ii) teach employees procedures to fol-
19 low if they suspect a part is counterfeit or
20 substandard; and

21 (iii) regularly update employees on
22 new threats, identification techniques, and
23 procedures; and

24 (B) a mechanism to coordinate the train-
25 ing in subparagraph (A) with industry associa-

1 tions, manufacturers, suppliers, and other Fed-
2 eral agencies, as appropriate;

3 (C) an internal database to track all sus-
4 pected or confirmed counterfeit and sub-
5 standard parts that, at a minimum, includes in-
6 formation on—

7 (i) companies and individuals known
8 or suspected of selling such parts;

9 (ii) parts known or suspected of being
10 counterfeit or substandard, including lot
11 and date codes, part numbers, and part
12 images;

13 (iii) countries of origin of such parts;

14 (iv) sources of the information in-
15 cluded in the database;

16 (v) United States Customs seizures of
17 such parts; and

18 (vi) Government-Industry Data Ex-
19 change Program reports and other relevant
20 public or private sector reports; and

21 (D) a mechanism to—

22 (i) report all information on suspected
23 or confirmed counterfeit or substandard
24 parts to law enforcement agencies, indus-
25 try associations, and other databases; and

1 (ii) issue bulletins to industry on
2 counterfeit and substandard parts and re-
3 lated counterfeit activity.

4 (3) CHANGES TO PROCUREMENT AND ACQUISI-
5 TION POLICY.—

6 (A) IN GENERAL.—In implementing the
7 program, the Administrator shall amend exist-
8 ing acquisition and procurement policy to en-
9 sure the purchase of parts from trusted or ap-
10 proved manufacturers.

11 (B) APPROVED MANUFACTURERS.—The
12 Administrator shall establish a list, assessed
13 and adjusted at least annually, of trusted or ap-
14 proved manufacturers.

15 (C) CRITERIA.—The Administrator shall
16 develop criteria which manufacturers shall meet
17 in order to be placed on such list. The criteria
18 may include—

19 (i) the use in parts of—

20 (I) authentication or encryption
21 codes;

22 (II) embedded security markings;

23 (III) unique, difficult to counter-
24 feit labels and markings; and

- 1 (IV) identified, distinct lot and
2 serial codes on external packaging;
3 (ii) the use of radio frequency identi-
4 fication embedded into high-value parts;
5 (iii) physical destruction of defective,
6 damaged, and substandard parts that are
7 byproducts of the manufacturing process;
8 (iv) testing certifications;
9 (v) maintenance of procedures for
10 handling any counterfeit parts;
11 (vi) maintenance of secure facilities to
12 prevent unauthorized access to proprietary
13 information; and
14 (vii) maintenance of product return,
15 buy back, and inventory control practices
16 that limit counterfeiting.
- 17 (4) REPORT.—Within 1 year after the date of
18 the transmittal of the report under subsection (a),
19 the Administrator shall transmit to the Committee
20 on Science and Technology of the House of Rep-
21 resentatives and the Committee on Commerce,
22 Science, and Transportation of the Senate a report
23 on the progress of implementing this subsection.

1 **SEC. 1207. INFORMATION SECURITY.**

2 (a) FINDINGS.—The Congress makes the following
3 findings:

4 (1) The Comptroller General, as directed by the
5 National Aeronautics and Space Administration Au-
6 thorization Act of 2008, provided in October 2009
7 the results of the Government Accountability Office’s
8 review of information security controls that protect
9 NASA’s information technology resources and infor-
10 mation from inadvertent or deliberate misuse, fraud-
11 ulent use, disclosure, modification, or destruction.

12 (2) The Comptroller General found that the
13 systems supporting NASA’s mission directorates at
14 the 3 Centers it reviewed have vulnerabilities in in-
15 formation security controls that place mission sen-
16 sitive information, scientific and other data, and in-
17 formation systems at increased risk of compromise.

18 (b) MONITORING RISK.—

19 (1) UPDATE ON SYSTEM IMPLEMENTATION.—
20 Not later than 120 days after the date of enactment
21 of this Act, and on a biennial basis thereafter, the
22 chief information officer of NASA, in coordination
23 with other national security agencies, shall provide
24 to the Committee on Science and Technology of the
25 House of Representatives and the Committee on

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

3 (A) an update on efforts to implement a
4 system to provide dynamic, comprehensive, real-
5 time information regarding the risk of unau-
6 thorized remote, proximity, and insider use or
7 access for all information infrastructure under
8 the responsibility of the chief information offi-
9 cer and mission-related networks, including con-
10 tractor networks, for the purpose of reducing
11 such risk;

12 (B) an assessment of whether the system
13 has demonstrably and quantifiably reduced net-
14 work risk compared to alternative methods of
15 ensuring security; and

16 (C) an assessment of the progress that
17 each Center and facility has made toward im-
18 plementing the system.

19 (2) EXISTING ASSESSMENTS.—The assessments
20 required of the Inspector General under section
21 3545 of title 44, United States Code, shall evaluate
22 the effectiveness of the system described in this sub-
23 section.

24 (c) REPORT ON PROCESSING CLASSIFIED NASA IN-
25 FORMATION ON NON-FEDERAL CLOUD COMPUTING FA-

1 CILITIES.—Not later than 1 year after NASA has entered
2 into a contract for its first use of a non-Federal cloud com-
3 puting facility, the Comptroller General shall transmit to
4 the Committee on Science and Technology of the House
5 of Representatives and the Committee on Commerce,
6 Science, and Transportation of the Senate a report detail-
7 ing—

8 (1) whether either sensitive but unclassified or
9 classified NASA information, or both, were proc-
10 essed on that facility; and

11 (2) if any such information was processed on
12 that facility, how NASA ensured that data access
13 and security requirements were in place to safeguard
14 NASA's sensitive or classified information.

15 (d) INFORMATION SECURITY AWARENESS AND EDU-
16 CATION.—

17 (1) IN GENERAL.—In consultation with the De-
18 partment of Education, national security agencies,
19 and other NASA directorates, the chief information
20 officer of NASA shall institute an information secu-
21 rity awareness and education program for all opera-
22 tors and users of NASA information infrastructure
23 with the goal of reducing unauthorized remote, prox-
24 imity, and insider use or access.

1 (2) PROGRAM REQUIREMENTS.—The program
2 shall include, at a minimum—

3 (A) ongoing classified and unclassified
4 threat-based briefings and automated exercises
5 and examinations that simulate common attack
6 techniques;

7 (B) a requirement that all NASA employ-
8 ees and contractors engaged in the operation or
9 use of NASA information infrastructure shall
10 participate in the program;

11 (C) a requirement that access to NASA in-
12 formation infrastructure shall only be granted
13 to operators and users who regularly satisfy the
14 requirements of the program; and

15 (D) a system, created by the chief human
16 capital officer of NASA in consultation with the
17 chief information officer, to provide recognition
18 to operators and users of NASA information in-
19 frastructure for continuous high achievement in
20 the program.

21 (e) DEFINITIONS.—In this section:

22 (1) CLOUD COMPUTING.—The term “cloud
23 computing” means a model for enabling convenient,
24 on-demand network access to a shared pool of
25 configurable computing resources that can be rapidly

1 provisioned with minimal management effort or serv-
2 ice provider interaction.

3 (2) **INFORMATION INFRASTRUCTURE.**—The
4 term “information infrastructure” means the under-
5 lying framework that information systems and assets
6 rely on to process, transmit, receive, or store infor-
7 mation electronically, including programmable elec-
8 tronic devices and communications networks and any
9 associated hardware, software, or data.

10 **SEC. 1208. ENHANCED-USE LEASING.**

11 It is the sense of the Congress that NASA is making
12 progress in implementing its enhanced-use leasing pro-
13 gram and that NASA should continue to monitor the pro-
14 gram’s use to ensure effective utilization and sharing of
15 lessons learned across Centers.

16 **SEC. 1209. SENSE OF CONGRESS CONCERNING THE STEN-**
17 **NIS SPACE CENTER.**

18 It is the sense of the Congress that—

19 (1) the Stennis Space Center is essential to the
20 national capability for the development and certifi-
21 cation of liquid propulsion technologies vital to our
22 Nation’s space flight program; and

23 (2) the Federal Government should fully utilize
24 the Stennis Space Center by continuing to make it
25 available for further development of commercial

1 aerospace capabilities under appropriate arrange-
2 ments.

3 **SEC. 1210. PRESERVATION AND MANAGEMENT OF LUNAR**
4 **SITES.**

5 (a) INTERNATIONAL DIALOGUE.—The Director of
6 OSTP, in cooperation with the Administrator and other
7 relevant Federal agencies, shall enter into a dialogue with
8 international bodies and commercial entities to identify
9 the questions and research needed to understand—

10 (1) the potential adverse impacts of various
11 uses of the Moon on scientific research activities;

12 (2) the potential adverse impacts of such uses
13 on lunar areas of historical, cultural, or scientific
14 value; and

15 (3) how to prevent or mitigate such impacts.

16 (b) GRANT PROGRAM.—The Administrator, in co-
17 operation with other relevant Federal agencies and stake-
18 holders, may establish a grant program to conduct re-
19 search for the purpose of identifying and characterizing
20 potential impacts related to lunar activities and describing
21 potential means for managing and mitigating the impacts.

22 (c) INTERNATIONAL FRAMEWORK.—Informed by the
23 dialogue under subsection (a), the Director of OSTP shall
24 initiate an effort to establish an international framework
25 for identifying, protecting, and preserving lunar areas de-

1 terminated to be of significant historical, cultural, or sci-
2 entific value.

3 (d) REPORT.—Not later than 2 years after the date
4 of enactment of this Act, the Director of OSTP shall
5 transmit to the Congress a report on the results of the
6 international dialogue under subsection (a) and progress
7 toward the establishment of an international framework
8 under subsection (c).

9 **SEC. 1211. CONTINUITY OF MODERATE RESOLUTION LAND**
10 **IMAGING REMOTE SENSING DATA.**

11 (a) REAFFIRMATION OF POLICY.—The Congress re-
12 affirms the finding in section 2(1) of the Land Remote
13 Sensing Policy Act of 1992 (15 U.S.C. 5601(1)) that
14 states the following: “The continuous collection and utili-
15 zation of land remote sensing data from space are of
16 major benefit in studying and understanding human im-
17 pacts on the global environment, in managing the Earth’s
18 natural resources, in carrying out national security func-
19 tions, and in planning and conducting many other activi-
20 ties of scientific, economic, and social importance.”.

21 (b) CONTINUOUS LAND REMOTE SENSING DATA
22 COLLECTION.—In consultation with other relevant Fed-
23 eral agencies, the Director of OSTP shall take steps to
24 ensure, to the maximum extent practicable, the continuous
25 collection of space-based medium-resolution observations

1 of the Earth's land cover and to ensure that the data are
2 made available in such ways as to facilitate the widest pos-
3 sible use.

4 **SEC. 1212. STUDY ON EXPORT CONTROL MATTERS RE-**
5 **LATED TO UNITED STATES ASTRONAUT SAFE-**
6 **TY AND NASA MISSION OPERATIONS.**

7 (a) ESTABLISHMENT.—The Director of OSTP, in
8 consultation with the Administrator and other relevant
9 Federal agencies, shall conduct a study to examine the
10 need for a process for granting real-time, limited waivers
11 to export control license restrictions or regulations that
12 are necessary for United States Government entities and
13 contractors to enter into technical discussions and to share
14 technical data with foreign government entities and con-
15 tractors to resolve anomalies that may—

16 (1) threaten the safety of United States astro-
17 nauts aboard cooperative crewed spacecraft such as
18 the ISS; or

19 (2) impair the operations of international civil
20 research and other spacecraft that involve the na-
21 tional interests of the United States.

22 (b) TRANSMITTAL.—The Director of OSTP shall
23 transmit to the Committee on Science and Technology of
24 the House of Representatives and the Committee on Com-
25 merce, Science, and Transportation of the Senate results

1 of the study not later than 1 year after the date of enact-
2 ment of this Act.

3 **SEC. 1213. ETHICS PROGRAMS IN THE OFFICE OF GENERAL**
4 **COUNSEL.**

5 (a) REAFFIRMATION OF RESPONSIBILITIES OF
6 COUNSEL.—The legal staff of the Office of General Coun-
7 sel of NASA are reminded that as Government attorneys
8 they have a special obligation to instruct NASA staff to
9 comply with applicable Federal law and regulations.

10 (b) BIENNIAL ETHICS TRAINING FOR COUNSEL.—
11 Each attorney within the Office of General Counsel of
12 NASA shall be required to receive ethics training in the
13 legal obligations of Government attorneys on a biennial
14 basis.

15 (c) CERTIFICATION OF TRAINING.—Certification of
16 participation in such training shall be included in each
17 such attorney's personnel record.

18 (d) DESIGNATED ETHICS OFFICER.—The General
19 Counsel of NASA may not serve as NASA's designated
20 ethics officer.

21 **SEC. 1214. INDEPENDENT COST ANALYSIS.**

22 (a) OFFICE OF PROGRAM ANALYSIS AND EVALUA-
23 TION.—There is established within NASA an Office of
24 Program Analysis and Evaluation. The Office of Program
25 Analysis and Evaluation shall be headed by an Associate

1 Administrator designated by the Administrator, who shall
2 report directly to the Administrator. At a minimum, the
3 Office of Program Analysis and Evaluation shall—

4 (1) prepare NASA's annual budget request for
5 submission to the Office of Management and Budget;
6 et;

7 (2) perform routine performance assessments of
8 NASA programs;

9 (3) perform cost and schedule analysis on
10 NASA programs;

11 (4) perform independent program reviews of
12 projects at major milestones; and

13 (5) provide support or analysis at the request of
14 the Administrator.

15 (b) COST ANALYSIS.—Before any funds may be obli-
16 gated for implementation of a project that is projected to
17 cost more than \$250,000,000 in total project costs, the
18 Administrator, acting through the Associate Administrator
19 of the Office of Program Analysis and Evaluation, shall
20 conduct and consider an independent life-cycle cost anal-
21 ysis of such project and shall report the results to the Con-
22 gress. In developing cost accounting and reporting stand-
23 ards for carrying out this section, the Associate Adminis-
24 trator of the Office of Program Analysis and Evaluation

1 shall, to the extent practicable and consistent with other
2 laws, solicit the advice of expertise outside of NASA.

3 (c) DEFINITION.—For purposes of this section, the
4 term “implementation” means all activity in the life cycle
5 of a project after preliminary design, independent assess-
6 ment of the preliminary design, and approval to proceed
7 into implementation, including critical design, develop-
8 ment, certification, launch, operations, disposal of assets,
9 and, for technology programs, development, testing, anal-
10 ysis, and communication of the results.

11 (d) REPEALS.—Section 301 of the National Aero-
12 nautics and Space Administration Authorization Act of
13 2000 (42 U.S.C. 2459g) and section 1113 of the National
14 Aeronautics and Space Administration Authorization Act
15 of 2008 are repealed.

16 **TITLE XIII—COMPLIANCE WITH**
17 **STATUTORY PAY-AS-YOU-GO-**
18 **ACT OF 2010**

19 **SEC. 1301. COMPLIANCE PROVISION.**

20 The budgetary effects of this Act, for the purpose of
21 complying with the Statutory Pay-As-You-Go-Act of 2010,
22 shall be determined by reference to the latest statement
23 titled “Budgetary Effects of PAYGO Legislation” for this
24 Act, submitted for printing in the Congressional Record
25 by the Chairman of the Senate Budget Committee, pro-

- 1 vided that such statement has been submitted prior to the
- 2 vote on passage.

